

October 24, 2016

BY HAND DELIVERY AND ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

**RE: Docket 4654 – The Narragansett Electric Company, d/b/a National Grid
2017 Energy Efficiency Program Plan Technical Reference Manual and Evaluations**

Dear Ms. Massaro:

I have enclosed an electronic copy of National Grid's¹ 2017 Technical Reference Manual (TRM) and the evaluations referenced in the TRM. The Company submits these documents in support of the proposed Energy Efficiency Program Plan for 2017 (the 2017 Plan or Plan), which the Company filed with the PUC on October 17, 2016.

The 2017 TRM describes the energy efficiency measures National Grid will be implementing in 2017. The 2017 TRM builds on the work of past years, and many of the measures described in the 2017 TRM are the same as the measures described in the 2016 TRM. Note, however, that several measures have changed as a result of baseline changes or results from evaluation activities.

The attached PDF document includes a table of contents that provides page numbers for the various measure categories, with measure descriptions listed alphabetically under the category headings. National Grid continues to work on an on-line version of the TRM, so an on-line version is not yet publicly available.

Thank you for your attention to this filing. If you have any questions, please contact me at 781-907-2121.

Sincerely,



Raquel J. Webster

Enclosure: CD-ROM

cc: Jon Hagopian, Esq.
Steve Scialabba, Division

¹ The Narragansett Electric Company d/b/a National Grid (National Grid or Company).



Rhode Island Technical Reference Manual

For Estimating Savings from Energy Efficiency Measures

2017 Program Year

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Introduction

This *Rhode Island Technical Reference Manual* (“TRM”) documents for regulatory agencies, customers, and other stakeholders the methodologies and assumptions used by National Grid to estimate the savings, including reductions in energy and demand consumption and other resource and non-energy impacts, attributable to its electric and gas energy efficiency programs. This reference manual provides methods, formulas and default assumptions for estimating energy, peak demand and other resource and non-energy impacts from efficiency measures.

Within this TRM, efficiency measures are organized by the sector for which the measure is eligible and by the primary energy source associated with the measure. The two sectors are Residential and Commercial & Industrial (“C&I”). The primary energy sources addressed in this TRM are electricity and natural gas.

Each measure is presented in two pages as a “measure characterization.” The measure characterizations provide mathematical equations for determining savings (algorithms), as well as default assumptions and sources, where applicable. In addition, any descriptions of calculation methods or baselines are provided as appropriate. The parameters for calculating savings are listed in the same order for each measure.

Algorithms are provided for estimating annual energy and peak demand impacts for primary and secondary energy sources if appropriate. In addition, algorithms or calculated results may be provided for other non-energy impacts (such as water savings or operation and maintenance cost savings). Assumptions are based on Rhode Island data where available. Where Rhode Island-specific data is not available, assumptions may be based on: 1) manufacturer and industry data, 2) a combination of the best available data from jurisdictions in the same region, or 3) engineering judgment to develop credible and realistic factors.

The TRM is reviewed and updated annually to reflect changes in technology, baselines and evaluation results.

The TRM in the Context of Energy Efficiency Programs

Overview

The purpose of this section is to show how the TRM fits into the process of administering energy efficiency programs in Rhode Island. This section explains how the TRM is connected to the following efforts:

- Planning,
- Annual reporting,
- Updates to PA tracking systems,
- Evolution of program and measure cost effectiveness analysis tools,
- Evaluation, Measurement and Verification (“EM&V”),
- Quality control.

Planning and Reporting

National Grid is submitting this version of the RI TRM (the 2017 TRM) to the stakeholders along with its Energy Efficiency Program Plan (“EE Program Plan”) for 2017.

The RI TRM provides regulators and stakeholders with documentation of the assumptions and algorithms that National Grid will use in planning and reporting its energy savings for 2017. It can also be used to support qualification in ISO-New England Forward Capacity Market Auctions. However, due to the nature of planning, not all planning assumptions – such as those for Commercial and Industrial programs – are documented in this TRM. For these areas, the algorithms used to calculate planned savings are presented.

Updates to Program Administrator Tracking Systems

National Grid maintains a tracking system that contains the energy efficiency data that it uses to meet its annual reporting to the RI PUC. The current design of the tracking system influences the types of assumptions and algorithms that appear in this TRM. The current algorithms leverage inputs that National Grid collects.

Evolution of Program and Measure Cost Effectiveness Analysis Tools

The program and measure cost effectiveness analysis tools are Microsoft® Excel® workbooks used by National Grid to ensure that the measures and programs that they implement meet the cost effectiveness requirements defined by the Rhode Island PUC in Docket 4443. National Grid also uses the output from the cost effectiveness analysis tools to develop the input (data, tables, and graphs) for its EE Program Plans and Year-End Reports. National Grid envisions aligning the measure names and the categorization of measures in the TRM with the measure names and categorization of measures in the cost effectiveness analysis tools either directly, or through the use of a translation tool.

Evaluation, Measurement and Verification

Evaluation, Measurement and Verification (“EM&V”) ensures that the programs are evaluated, measured, and verified in a way that provides confidence to the public at large that the savings are real and in a way that enables National Grid to report those savings to the EERMC and RI PUC with full confidence.

A secondary goal of creating a TRM is to identify areas where savings calculations can be improved. The TRM will inform future EM&V planning as a means to make these improvements.

For its Rhode Island programs, National Grid may use evaluation results from other jurisdictions. For some of these, Rhode Island contributed sites and/or budgets. For others, the application of results from other jurisdictions is considered based on how similar the programs, delivery, and markets are to those in Rhode Island.

Quality Control

Regulators and stakeholders can use the TRM to confirm that savings inputs and calculations are reasonable and reliable. However, the TRM cannot be used by regulators and stakeholders to replicate the Company’s reported savings. The TRM does not provide regulators and stakeholders with data inputs at a level that is detailed enough to enable replication of the savings reported by PAs. These calculations occur within tracking systems, within separate Excel workbooks, and within cost effectiveness analysis tools. However, in the event that regulators and stakeholders request that PAs provide tracking system details, the reproduction of reported data will be possible using the TRM.

TRM Update Process

Overview

This section describes the process for updating the TRM. The update process is synchronized with the filing of EE Program Plans.

Updates to the TRM can include:

- additions of new measures,
- updates to existing TRM measures due to:
 - changes in baseline equipment or practices, affecting measure savings
 - changes in efficient equipment or practices, affecting measure savings
 - changes to deemed savings due the revised assumptions for algorithm parameter values (e.g., due to new market research or evaluation studies)
 - other similar types of changes,
- updates to impact factors (e.g., due to new impact evaluation studies),
- discontinuance of existing TRM measures, and
- updates to the glossary and other background material included in the TRM.

Each TRM is associated with a specific program year, which corresponds to the calendar year. The TRM for each program year is updated over time as needed to both plan for future program savings and to report actual savings.

Key Stakeholders and Responsibilities

Key stakeholders and their responsibilities for the TRM updates are detailed in the following table.

| Stakeholder | Responsibilities |
|--|---|
| National Grid | <ul style="list-style-type: none">• Identify and perform needed updates to the TRM• Provide TRM to interested stakeholders |
| Rhode Island EERMC and Division of Public Utilities and Carriers | <ul style="list-style-type: none">• In 2012, the EERMC commissioned the Natural Gas Opportunities Report• Review; suggest modifications; and accept TRM• Assure coordination with National Grid submissions of program plans and reported savings |
| Jointly | <ul style="list-style-type: none">• Administrative coordination of TRM activities, including:<ul style="list-style-type: none">• Assure collaboration and consensus regarding TRM updates• Assure updates are compiled and incorporated into the TRM• Coordinate with related program activities (e.g., evaluation and program reporting processes) |

TRM Update Cycle

The description below indicates the main milestones of the TRM update cycle over a period of two years. The identifier “program year” or “PY” is used to show that this cycle will be repeated every year. For example, for the 2017 Program Year, compilation of updates begins after the 2016 TRM is completed in October 2015, and continued through September 2016, for submission in October 2016.

September PY-2 to September PY-1: The PY TRM will be updated as needed based on evaluation studies and any other updates.

After the PY-1 TRM has been filed, there may be updates to the TRM. The most common updates to the TRM will result from new evaluation studies. Results of evaluation studies will be integrated into the next version of the TRM as the studies are completed. Other updates may include the results of group discussions to adopt latest research or the addition or removal of energy efficiency measures

November (PY-1) prior to program year: The PY TRM is filed with National Grid’s PY EE program plan

The PY TRM is submitted to the PUC jointly with National Grid’s EE program plan. With regard to the program plans, the TRM is considered a “planning document” in that it provides the documentation for how the PAs *plan* to count savings for that program year. The TRM is not intended to fully document how the PAs develop their plan estimates for savings.

January PY: National Grid begins to track savings based on the PY TRM

Beginning in January PY, the PAs will track savings for the PY based on the PY TRM.

Measure Characterization Structure

This section describes the common entries or inputs that make up each measure characterization. A formatted template follows the descriptions of each section of the measure characterization.

Source citations: The source of each assumption or default parameter value should be properly referenced in a footnote.

Applicability: All Measures shown within the 2017 TRM are active for the 2017 Program Year: from 1/1/2017 to 12/31/2017

Measure Description Overview

This section will include a plain text description of the efficient and baseline technology and the benefit(s) of its installation, as well as subfields of supporting information including:

Fuel: The fuel against which savings are being claimed, and the program from which EE incentives are being drawn

Sector: Indicates whether measure is Residential, Income Eligible or Commercial and Industrial

Project Type: Indicates if measure is Retrofit or New Construction / Time of Replacement

Category: Indicates the measure category, for example: Lighting, HVAC, Hot Water, Products, Food Service, Compressed Air, Motors/Drives, Refrigeration, Behavior, Custom, etc

Type and Sub-type: Further measure classification for purposes of sorting measures

Program Name: The current program name under which the measure is being delivered.

Measure Name: A single device or behavior may be analyzed as a range of measures depending on a variety of factors which largely translate to where it is and who is using it. Such factors include hours of use, location, and baseline (equipment replaced or behavior modified). For example, the same screw-in compact fluorescent lamp will produce different savings if installed in an emergency room waiting area than if installed in a bedside lamp.

Measure Description: Description of the energy efficiency measure, its benefits, and applications.

Baseline Description: Description of the assumed equipment/operation efficiency in the absence of program intervention. Multiple baselines will be provided as needed, e.g., for different markets. Baselines may refer to reference tables or may be presented as a table for more complex measures)

Savings Principle: The means by which the measure saves energy relative to the baseline. Description of the assumed or calculated equipment/operation efficiency from which the energy and demand savings are determined. The high efficiency case may be based on specific details of the measure installation, minimum requirements for inclusion in the program, or an energy efficiency case based on historical participation. It may refer to tables within the measure characterization or in the appendices or efficiency standards set by organizations such as ENERGY STAR[®] or the Consortium for Energy Efficiency

Savings Calculation method: How the savings values are determined; in most cases, values are either deemed or calculated

Savings unit: required minimum unit / characteristic for claiming listed savings values

Savings

This section includes various information on the measure savings and how they are determined.

- **Summary Average Gross Savings per Unit by Program:** This table summarizes the resource savings (kWh, kW, MMBtu) of all efficiency offerings within a measure category via a weighted average of their savings. This is only for illustrating savings and does not correspond to how savings are tracked
 - **Program:** This describes the programs in which the measures are offered. Some measures are offered in multiple program

Sector and Program name mapping will be as follows:

| Sector | Full Program Name |
|------------------------------------|-------------------------------------|
| Residential – Electric | Residential New Construction |
| | EnergyStar® HVAC |
| | EnergyWise |
| | EnergyWise Multifamily |
| | EnergyStar® Lighting |
| | Home Energy Reports |
| | EnergyStar® Products |
| | |
| Income Eligible – Electric | Single Family Appliance Management |
| | Income Eligible Multifamily |
| Commercial & Industrial – Electric | Commercial New Construction |
| | Commercial Retrofit |
| | Direct Install |
| | |
| Residential – Gas | EnergyStar® Heating System |
| | EnergyWise |
| | EnergyWise Multifamily |
| | Home Energy Reports |
| | Residential New Construction |
| | |
| Income Eligible – Gas | Single Family Appliance Management |
| | Income Eligible Multifamily |
| Commercial & Industrial – Gas | Commercial New Construction |
| | Commercial Retrofit |
| | Direct Install |
| | Commercial & Industrial Multifamily |

- **Algorithm Type:** This section describes which of four methods of savings calculation applies to a measure
 - Deemed: The same savings are allocated to every unit of a measure
 - Engineering Algorithm with Deemed Inputs: Measure savings are calculated with an engineering formula, the inputs of which are constant for all units of a measure.
 - Engineering Algorithm with Site Specific Inputs: Measure savings are calculated with an engineering formula, the inputs of which depend on data from the installation site.
 - Custom: Each unit of a measure receives a unique savings calculation that depends on site specific data.
- **Units:** This section describes what is installed or affected by an efficiency measure (eg. a boiler or a participant). It defines the quantity counted for savings.
- **Algorithm:** This section will describe the method for calculating the primary energy savings in appropriate units, i.e., kWh for electric energy savings or MMBtu for natural gas energy savings. The savings algorithm will be provided in a form similar to the following

$$\Delta kWh = \Delta kW \times \text{Hours}$$

Similarly, the method for calculating electric demand savings will be provided in a form similar to the following:

$$\Delta kW = (Watts_{BASE} - Watts_{EE}) / 1000$$

Below the savings algorithms, a table contains the definitions (and, in some cases, default values) of each input in the equation(s). The inputs for a particular measure may vary and will be reflected as such in this table (see example below).

| | | |
|-----------------------|---|---|
| ΔkWh | = | gross annual kWh savings from the measure |
| ΔkW | = | gross connected kW savings from the measure |
| Hours | = | average hours of use per year |
| Watts _{BASE} | = | baseline connected kW |
| Watt _{SEE} | = | energy efficient connected kW |

- **Hours:** The operating hours for equipment that is either on or off, or equivalent full load hours for technologies that operate at partial loads, or reduced hours for controls. Reference tables will be used as needed to avoid repetitive entries.
- **Measure Gross Savings per Unit:** This table summarizes the unit resource impacts of each efficiency offering within a measure category (e.g., the savings for boilers of different efficiencies and ratings in the Boiler measure category). The source for each value is referenced.
- **Non-Energy Impacts:** The non-energy impacts are shown for each efficiency measure

under Annual and One-Time headings, depending on their recommended application approach. If the measure has no NEIs, the entry is “N/A.”

Impact Factors for Calculating Adjusted Gross Savings:

This section includes a table of impact factor values for adjusting gross savings and calculating lifetime savings. Sources are referenced. Impact factors (free ridership, spillover and/or net-to-gross ratio) for calculating net savings from adjusted gross savings are in Appendix B.

- **Measure Life:** Measure Life includes equipment life and the effects of measure persistence. Equipment life is the number of years that a measure is installed and will operate until failure. Measure persistence takes into account business turnover, early retirement of installed equipment, and other reasons measures might be removed or discontinued.

Other impact factors are defined in the next section.

Impact Factors for Calculating Adjusted Gross and Net Savings

National Grid uses the algorithms in the Measure Characterization sections to calculate the gross savings for energy efficiency measures. Impact factors are then applied to make various adjustments to the gross savings estimate to account for the performance of individual measures or energy efficiency programs as a whole in achieving energy reductions as assessed through evaluation studies. Impact factors address both the technical performance of energy efficiency measures and programs, accounting for the measured energy and demand reductions realized compared to the gross estimated reductions, as well as the programs' effect on the market for energy efficient products and services.

This section describes the types of impact factors used to make such adjustments, and how those impacts are applied to gross savings estimates. Definitions of the impact factors and other terms are also provided in the Glossary (Appendix F).

Types of Impact Factors

The impact factors used to adjust savings fall into one of two categories:

Impact factors used to adjust gross savings:

- In-Service Rate ("ISR")
- Savings Persistence Factor ("SPF")
- Realization Rate ("RR")
- Summer and Winter Peak Demand Coincidence Factors ("CF").

Impact factors used to calculate net savings:

- Free-Ridership ("FR") and Spillover ("SO") Rates
- Net-to-Gross Ratios ("NTG").

The **in-service rate** is the actual portion of efficient units that are installed. For example, efficient lamps may have an in-service rate less than 1.00 since some lamps are purchased as replacement units and are not immediately installed. The ISR is 1.00 for most measures.

The **savings persistence factor** is the portion of first-year energy or demand savings expected to persist over the life of the energy efficiency measure. The SPF is developed by conducting surveys of installed equipment several years after installation to determine the actual operational capability of the equipment. The SPF is 1.00 for most measures.

In contrast to savings persistence, *measure persistence* takes into account business turnover, early retirement of installed equipment, and other reasons the installed equipment might be removed or discontinued. Measure persistence is generally incorporated as part of the measure life, and therefore is not included as a separate impact factor.

The **realization rate** is used to adjust the gross savings (as calculated by the savings algorithms) based on impact evaluation studies. The realization rate is equal to the ratio of measure savings developed from an impact evaluation to the estimated measure savings derived from the savings algorithms. The realization rate does not include the effects of any other impact factors. Depending on the impact evaluation study, there may be separate realization rates for energy (kWh), peak demand (kW), or fossil fuel energy (MMBtu).

A **coincidence factor** adjusts the connected load kW savings derived from the savings algorithm. A coincidence factor represents the fraction of the connected load reduction expected to occur at the same time as a particular system peak period. The coincidence factor includes both coincidence and diversity factors combined into one number, thus there is no need for a separate diversity factor in this TRM.

Coincidence factors are provided for the on-peak period as defined by the ISO New England for the Forward Capacity Market (“FCM”), and are calculated consistently with the FCM methodology. Electric demand reduction during the ISO New England peak periods is defined as follows:

- Summer On-Peak: average demand reduction from 1:00-5:00 PM on non-holiday weekdays in June, July, and August
- Winter On-Peak: average demand reduction from 5:00-7:00 PM on non-holiday weekdays in December and January

The values described as Coincidence Factors in the TRM are not always consistent with the strict definition of a Coincidence Factor (CF). It would be more accurate to define the Coincidence Factor as “the value that is multiplied by the Gross kW value to calculate the average kW reduction coincident with the on-peak periods.” A coincidence factor of 1.00 may be used because the coincidence is already included in the estimate of Gross kW; this is often the case when the “Max kW Reduction” is not calculated and instead the “Gross kW” is estimated using the annual kWh reduction estimate and a loadshape model.

A **free-rider** is a customer who participates in an energy efficiency program (and gets an incentive) but who would have installed some or all of the same measure(s) on their own, with no change in timing of the installation, if the program had not been available. The **free-ridership rate** is the percentage of savings attributable to participants who would have installed the measures in the absence of program intervention.

The **spillover rate** is the percentage of savings attributable to a measure or program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of 1) participants in the program who install additional energy efficient measures outside of the program as a result of participating in the program, and 2) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program. These two components are the **participant spillover** (SOP) and **non-participant spillover** (SONP).

The **net savings** value is the final value of savings that is attributable to a measure or program. Net savings differs from gross savings because it includes the effects of the free-ridership and/or spillover rates.

The **net-to-gross** ratio is the ratio of net savings to the gross savings adjusted by any impact factors (i.e., the “adjusted” gross savings). Depending on the evaluation study, the NTG ratio may be determined from the free-ridership and spillover rates, if available, or it may be a distinct value with no separate specification of FR and SO values.

Standard Net-to-Gross Formulas

The TRM measure entries provide algorithms or methodologies for calculating the gross energy and demand savings for each category of efficiency measures. The following standard formulas show how the impact factors are applied to calculate the net savings. These are the calculations used by National Grid to track and report gross and net savings for its energy efficiency programs in Rhode Island.

- **Calculation of Net Annual Electric Energy Savings**

$$\text{net_kWh} = \text{gross_kWh} \times \text{SPF} \times \text{ISR} \times \text{RRE} \times \text{NTG}$$
- **Calculation of Net Summer Electric Peak Demand Coincident kW Savings**

$$\text{net_kW}_{\text{SP}} = \text{gross_kW} \times \text{SPF} \times \text{ISR} \times \text{RR}_{\text{SP}} \times \text{CF}_{\text{SP}} \times \text{NTG}$$
- **Calculation of Net Winter Electric Peak Demand Coincident kW Savings**

$$\text{net_kW}_{\text{WP}} = \text{gross_kW} \times \text{SPF} \times \text{ISR} \times \text{RR}_{\text{WP}} \times \text{CF}_{\text{WP}} \times \text{NTG}$$
- **Calculation of Net Annual Natural Gas Energy Savings**

$$\text{net_MMBtu} = \text{gross_MMBtu} \times \text{SPF} \times \text{ISR} \times \text{RRE} \times \text{NTG}$$

Where:

Gross_kWh = Gross Annual kWh Savings

net_kWh = Net Annual kWh Savings

Gross_kW_{SP} = Gross Connected kW Savings (summer peak)

Gross_kW_{WP} = Gross Connected kW Savings (winter peak)

net_kW_{SP} = Adjusted Gross Connected kW Savings (winter peak)

net_kW_{WP} = Net Coincident kW Savings (winter peak)

Gross_MMBtu = Gross Annual MMBtu Savings

net_MMBtu = Net Annual MMBtu Savings

SPF = Savings Persistence Factor

ISR = In-Service Rate

CF_{SP} = Peak Coincidence Factor (summer peak)

CF_{WP} = Peak Coincidence Factor (winter peak)

RRE = Realization Rate for electric energy (kWh)

RR_{SP} = Realization Rate for summer peak kW

RR_{WP} = Realization Rate for winter peak kW

NTG = Net-to-Gross Ratio FR = Free-Ridership Factor SOP = Participant Spillover Factor
SONP = Non-Participant Spillover Factor

Depending on the evaluation study methodology:

- NTG is equal to $(1 - FR + SOP + SONP)$, or
- NTG is a single value with no distinction of FR, SOP, SONP, and/or other factors that cannot be reliably isolated.

Measure Characterizations

| TRM Reference Number | RIER001 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Clothes Dryers |
| Sub-type | Dryer |
| Program Name | EnergyStar Products |
| Measure Name | Heat Pump Dryer |
| Measure Description | The installation of a heat pump clothes dryer. |
| Baseline Description | A new electric dryer. |
| Savings Principle | A super efficient electric heat pump dryer. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed heat pump dryer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 241 |
| kWh/yr savings source | SEDI HE Dryer Screening Ver.2 Using DOE2005.xls |
| kWh/yr savings note | #N/A |
| kW reduction | 0.044 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | SEDI HE Dryer Screening Ver.2 Using DOE2005.xls |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 412.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 200 per measure |

| TRM Reference Number | RIER002 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Clothes Dryers |
| Sub-type | Dryer |
| Program Name | EnergyStar Products |
| Measure Name | EnergyStar Dryer |
| Measure Description | The installation of an EnergyStar clothes dryer . |
| Baseline Description | A new electric dryer. |
| Savings Principle | An EnergyStar electric dryer. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed EnergyStar dryer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 160 |
| kWh/yr savings source | Measure Screening Report ES Dryers 2017 Plan |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Measure Screening Report ES Dryers 2017 Plan |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | SEDI HE Dryer Screening Ver.2 Using DOE2005.xls |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |

| | |
|--|--|
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.90 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.10 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.90 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 60.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 50 per measure |

| TRM Reference Number | RIER005 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Dehumidifiers |
| Sub-type | Dehumidifier |
| Program Name | EnergyStar Products |
| Measure Name | Dehumidifier |
| Measure Description | The Installation of high efficiency dehumidifiers and the turn-in of existing inefficient dehumidifiers. |
| Baseline Description | Standard efficiency. |
| Savings Principle | The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Per dehumidifier |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 239 |
| kWh/yr savings source | Dehumidifier Savings 2015-9-22 for 2017 Plan |
| kWh/yr savings note | #N/A |
| kW reduction | 0.041 |
| kW reduction source | Dehumidifier Savings 2015-9-22 for 2017 Plan |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.85 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.50 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.50 |
| Net-to-Gross source | Negotiated FR Rate with EERMC Consultants July, 2015. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 34.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 30 per measure |

| TRM Reference Number | RIER007 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Dehumidifiers |
| Sub-type | Dehumidifier |
| Program Name | EnergyStar Products |
| Measure Name | Dehumidifier Recycling |
| Measure Description | Recycling of old dehumidifiers |
| Baseline Description | Operating inefficient unit. |
| Savings Principle | Recycling of inefficient unit. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per dehumidifier |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 152 |
| kWh/yr savings source | Dehumidifier Savings 2015-9-22 for 2017 Plan |
| kWh/yr savings note | #N/A |
| kW reduction | 0.03 |
| kW reduction source | Dehumidifier Savings 2015-9-22 for 2017 Plan |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.85 |

| | |
|--|------------------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 50.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$30 per measure |

| TRM Reference Number | RIER012 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Recycling |
| Sub-type | Freezer Recycling |
| Program Name | EnergyStar Products |
| Measure Name | Freezer Recycling |
| Measure Description | The retirement of old, inefficient secondary refrigerators and freezers. |
| Baseline Description | The baseline efficiency case is an old, inefficient secondary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use. |
| Savings Principle | The high efficiency case assumes no replacement of secondary unit. |
| Energy Savings calculation method | Deemed |
| Savings unit | Removal of existing refrigerator or freezer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 663 |
| kWh/yr savings source | NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.082 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |

| | |
|--|--|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.41 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.59 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 175.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 55 per measure |

| TRM Reference Number | RIER014 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Recycling |
| Sub-type | Refrigerator Recycling |
| Program Name | EnergyStar Products |
| Measure Name | Refrigerator Recycle |
| Measure Description | The retirement of old, inefficient secondary refrigerators and freezers. |
| Baseline Description | The baseline efficiency case is an old, inefficient secondary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use. |
| Savings Principle | The high efficiency case assumes no replacement of secondary unit. |
| Energy Savings calculation method | Deemed |
| Savings unit | Removal of existing refrigerator or freezer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 755 |
| kWh/yr savings source | NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.093 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |

| | |
|--|--|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.92 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.31 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.69 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 55 per measure |

| TRM Reference Number | RIER015 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Refrigerator Recycling |
| Sub-type | Refrigerator Recycling |
| Program Name | EnergyStar Products |
| Measure Name | Refrigerator Recycling (Primary) |
| Measure Description | The retirement of old, inefficient primary refrigerators and freezers. |
| Baseline Description | The baseline efficiency case is an old, inefficient primary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use. |
| Savings Principle | The high efficiency case is the replacement of the refrigerator with an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking. |
| Energy Savings calculation method | Deemed |
| Savings unit | Removal of existing refrigerator or freezer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 533 |
| kWh/yr savings source | NMR Group, Inc. (2011). Massachusetts Appliance Turn-In Program Evaluation Integrated Report Findings – FINAL. Prepared for National Grid, NSTAR Electric, Cape Light Compact, and Western Massachusetts Electric Company. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.066 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.31 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.69 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER016 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Refrigerators |
| Sub-type | Refrigerator |
| Program Name | EnergyWise |
| Measure Name | Refrig rebate |
| Measure Description | This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator. |
| Baseline Description | For Top Ten® and Most Efficient® refrigerators, the baseline is a 50% mix of available Energy Star® and Federal standard compliant refrigerators. For Energy Star® refrigerators, the baseline is a refrigerator that meets Federal standards. |
| Savings Principle | The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency refrigerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 460.8 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.026 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 173.97 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER021 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Appliances |
| Type | Refrigerators |
| Sub-type | Refrigerator |
| Program Name | Residential New Construction |
| Measure Name | Refrigerators |
| Measure Description | This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator. |
| Baseline Description | Existing refrigerator continues to operate. |
| Savings Principle | The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed refrigerator |
| Savings Equation | <p>Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. kWh_base = Deemed average demand per baseline unit. kWh_ee = Deemed average demand per high-efficiency unit. DeltakW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.013 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.92 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIER024 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart AC SEER 16.0 EER 13 |
| Measure Description | The purchase and installation of high efficiency central air-conditioning (CAC) unit rather than a standard CAC system, and/or to replace an existing inefficient CAC system. |
| Baseline Description | The baseline efficiency case is a blend of code-compliant central air-conditioning system with SEER = 13 and EER = 11. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10 and EER = 8.5. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified Central AC system. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency central AC system for cooling. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 211 |
| kWh/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.586 |
| kW reduction source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 16 |
| measure life source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

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|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Massachusetts Common Assumption |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Massachusetts Common Assumption |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.28 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.86 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 1061.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 250 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER027 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | Down Size 1/2 ton |
| Measure Description | Reduction in system size consistent with manual J calculations. |
| Baseline Description | The baseline efficiency case is a system that is not sized in accordance with a manual J calculation. |
| Savings Principle | The high efficiency case is a system that is sized in accordance with a manual J calculation. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed job (assume downsize 1/2 ton). |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 203 |
| kWh/yr savings source | RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating; |
| kWh/yr savings note | #N/A |
| kW reduction | 0.295 |
| kW reduction source | RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating; |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

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|--|--|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit ² | 120.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| TRM Reference Number | RIER030 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart AC SEER 18.0 EER 13 |
| Measure Description | The purchase and installation of high efficiency central air-conditioning (CAC) unit rather than a standard CAC system, and/or to replace an existing inefficient CAC system. |
| Baseline Description | The baseline efficiency case is a blend of code-compliant central air-conditioning system with SEER = 13 and EER = 11. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10 and EER = 8.5. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified Central AC system. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency central AC system for cooling. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 344.5 |
| kWh/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.957 |
| kW reduction source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 16 |
| measure life source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Massachusetts Common Assumption |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Massachusetts Common Assumption |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.28 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.86 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1808.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER033 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Air Source |
| Program Name | EnergyStar HVAC |
| Measure Name | Heat Pump SEER 16.0 EER 12 HSPF 8.5 |
| Measure Description | The purchase and installation of high efficiency residential heat pump system rather than a standard HVAC system, or to replace an existing inefficient HVAC system. |
| Baseline Description | The baseline efficiency case is a residential heat pump with EER = 11.85, SEER = 14 and HSPF = 8.2. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10, EER = 8.5 and HSPF = 7.0. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified air-source heat pump. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency air-source heat pump system for heating. |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + (1/HSPF_base - 1/HSPF_ee) × Hours_H]</p> <p>Gross kW = Tons × (kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee), (1/HSPF_base - 1/HSPF_ee)]</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.5 tons for 16 SEER unit / 2.8 tons for 18 SEER unit</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment.</p> <p>SEER_ee = Seasonal Energy Efficiency Ratio of new equipment.</p> <p>Hours_C = Deemed average equivalent full load cooling hours</p> <p>HSPF_base = Heating efficiency of baseline equipment.</p> <p>HSPF_ee = Heating efficiency of new equipment.</p> <p>Hours_H = Deemed average equivalent full load heating hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 618.9 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.371 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.23 |
| CF summer peak source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.53 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.35 |
| Spill-Over (participant) | 0.28 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.93 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 549.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 250 per measure |

| TRM Reference Number | RIER043 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Ductless |
| Program Name | EnergyStar HVAC |
| Measure Name | Mini Split HP SEER 18.0 HSPF 9 |
| Measure Description | The installation of a more efficient ENERGY STAR® rated Ductless MiniSplit system. |
| Baseline Description | The baseline efficiency case is a non- ENERGY STAR® rated ductless mini split heat pump with SEER 14, EER 8.5 and HSPF 8.2. |
| Savings Principle | The high efficiency case is a high-efficiency Ductless Mini Split System. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency ductless minisplit system. |
| Savings Equation | <p>Gross kWh = Tons × (12 kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_c + (1/HSPF_base - 1/HSPF_ee) × Hours_h]</p> <p>Gross kW = Tons × (12 kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee), (1/HSPF_base - 1/HSPF_ee)]</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 1.8 tons for 18 SEER unit / 1.1 tons for 20 SEER unit</p> <p>SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment</p> <p>SEER_ee = Seasonal Energy Efficiency Ratio of new equipment</p> <p>HSPF_base = Heating Season Performance Factor of baseline equipment</p> <p>HSPF_ee = Heating Season Performance Factor of new equipment</p> <p>Hours_c = Equivalent full load cooling hours</p> <p>Hours_h = Equivalent full load heating hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 307 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.496 |
| kW reduction source | #N/A |
| kW reduction note | Calculated. Tonnage used in calculations is 1.25, as provided by Conservation Services Group |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|---|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.45 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 700.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 250 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER049 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Air Source |
| Program Name | EnergyStar HVAC |
| Measure Name | Heat Pump SEER 18.0 HSPF 9.6 |
| Measure Description | The purchase and installation of high efficiency residential heat pump system rather than a standard HVAC system, or to replace an existing inefficient HVAC system. |
| Baseline Description | The baseline efficiency case is a residential heat pump with EER = 11.85, SEER = 14 and HSPF = 8.2. For early replacement installations, the baseline is a 10-12 year old HVAC unit with SEER = 10, EER = 8.5 and HSPF = 7.0. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified air-source heat pump. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency air-source heat pump system for heating. |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + (1/HSPF_base - 1/HSPF_ee) × Hours_H]</p> <p>Gross kW = Tons × (kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee), (1/HSPF_base - 1/HSPF_ee)]</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.5 tons for 16 SEER unit / 2.8 tons for 18 SEER unit</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment.</p> <p>SEER_ee = Seasonal Energy Efficiency Ratio of new equipment.</p> <p>Hours_C = Deemed average equivalent full load cooling hours</p> <p>HSPF_base = Heating efficiency of baseline equipment.</p> <p>HSPF_ee = Heating efficiency of new equipment.</p> <p>Hours_H = Deemed average equivalent full load heating hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 1372.9 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.882 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.23 |
| CF summer peak source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.53 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.35 |
| Spill-Over (participant) | 0.28 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.93 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1926.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIER050 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Ductless |
| Program Name | EnergyStar HVAC |
| Measure Name | MiniSplit HP SEER 20, HSPF 11 |
| Measure Description | The installation of a more efficient ENERGY STAR® rated Ductless MiniSplit system. |
| Baseline Description | The baseline efficiency case is a non- ENERGY STAR® rated ductless mini split heat pump with SEER 14, EER 8.5 and HSPF 8.2. |
| Savings Principle | The high efficiency case is a high-efficiency Ductless Mini Split System. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency ductless minisplit system. |
| Savings Equation | <p>Gross kWh = Tons × (12 kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_c + (1/HSPF_base - 1/HSPF_ee) × Hours_h]</p> <p>Gross kW = Tons × (12 kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee), (1/HSPF_base - 1/HSPF_ee)]</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 1.8 tons for 18 SEER unit / 1.1 tons for 20 SEER unit</p> <p>SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment</p> <p>SEER_ee = Seasonal Energy Efficiency Ratio of new equipment</p> <p>HSPF_base = Heating Season Performance Factor of baseline equipment</p> <p>HSPF_ee = Heating Season Performance Factor of new equipment</p> <p>Hours_c = Equivalent full load cooling hours</p> <p>Hours_h = Equivalent full load heating hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 317 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.528 |
| kW reduction source | #N/A |
| kW reduction note | Calculated. Tonnage used in calculations is 1.25, as provided by Conservation Services Group |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|---|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.45 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 700.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIER051 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | Central AC Quality Install |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart AC QIV ES |
| Measure Description | The verification of proper charge and airflow during installation of new Central AC system. |
| Baseline Description | The baseline efficiency case is a cooling system with SEER = 14.5 and EER = 12 not installed according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same cooling system installed according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed QIV on new AC system |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 35 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.12 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

| | |
|--|---|
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.16 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 175.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 175 per measure |

| TRM Reference Number | RIER052 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | Central AC Quality Install |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart AC QIV NES |
| Measure Description | The verification of proper charge and airflow during installation of new Central AC system. |
| Baseline Description | The baseline efficiency case is a cooling system with SEER = 14.5 and EER = 12 not installed according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same cooling system installed according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed QIV on new AC system |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 35 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.12 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

| | |
|--|---|
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.16 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 642.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 150 per measure |

| TRM Reference Number | RIER055 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | Heat Pump Quality Install |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart HP QIV ES |
| Measure Description | The verification of proper charge and airflow during installation of new Heat Pump systems. |
| Baseline Description | The baseline efficiency case is a heating and cooling system with SEER = 14.5, EER = 12 and HSPF = 8.2) not installed according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same heating and cooling system not installed according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed QIV on new heat pump system |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE</p> <p>Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.6 tons</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>SEER = Seasonal Energy Efficiency Ratio of existing equipment</p> <p>HSPF = Heating efficiency of existing equipment</p> <p>Hours_C = Deemed average equivalent full load cooling hours</p> <p>Hours_H = Deemed average equivalent full load heating hours</p> <p>5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.</p> <p>EER = Peak efficiency of existing equipment</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 244 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.175 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.26 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.16 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 175.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 175 per measure |

| TRM Reference Number | RIER056 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | Heat Pump Quality Install |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart HP QIV NES |
| Measure Description | The verification of proper charge and airflow during installation of new Heat Pump systems. |
| Baseline Description | The baseline efficiency case is a heating and cooling system with SEER = 14.5, EER = 12 and HSPF = 8.2) not installed according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same heating and cooling system not installed according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed QIV on new heat pump system |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE</p> <p>Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.6 tons</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>SEER = Seasonal Energy Efficiency Ratio of existing equipment</p> <p>HSPF = Heating efficiency of existing equipment</p> <p>Hours_C = Deemed average equivalent full load cooling hours</p> <p>Hours_H = Deemed average equivalent full load heating hours</p> <p>5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.</p> <p>EER = Peak efficiency of existing equipment</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 244 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.175 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.26 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.16 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 175.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 175 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER057 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | Central AC Quality Install |
| Program Name | EnergyStar HVAC |
| Measure Name | Mini Split Heat Pump QIV |
| Measure Description | The verification of proper charge and airflow during installation of new Central AC system. |
| Baseline Description | The baseline efficiency case is a cooling system with SEER = 14.5 and EER = 12 not installed according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same cooling system installed according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed QIV on new AC system |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 41 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.074 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | \$ - |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 0.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|--------------------|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 175.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 175 per measure |

| TRM Reference Number | RIER058 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Motors |
| Sub-type | ECM Motor |
| Program Name | EnergyStar HVAC |
| Measure Name | Furnace ECM |
| Measure Description | Installation of high efficiency motors on residential furnace fans, including electronically commutated motors (ECMs) or steady state brushless furnace fan motors. |
| Baseline Description | The baseline efficiency case is the installation of a furnace with a standard efficiency steady state motor. |
| Savings Principle | The high efficiency case is the installation an electronically commutated motor or brushless fan motor on a residential furnace. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency furnace fan motor. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 168 |
| kWh/yr savings source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.124 |
| kW reduction source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 7.22 |
| Oil MMBtu/yr savings source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Sachs, Harvey (2003). Energy Savings from Efficient Furnace Air Handlers in Massachusetts. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER060 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Motors |
| Sub-type | ECM Motor |
| Program Name | EnergyStar HVAC |
| Measure Name | ECM Gas Rebate |
| Measure Description | Installation of high efficiency motors on residential furnace fans, including electronically commutated motors (ECMs) or steady state brushless furnace fan motors. |
| Baseline Description | The baseline efficiency case is the installation of a furnace with a standard efficiency steady state motor. |
| Savings Principle | The high efficiency case is the installation an electronically commutated motor or brushless fan motor on a residential furnace. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency furnace fan motor. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 168 |
| kWh/yr savings source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.124 |
| kW reduction source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.72 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Sachs, Harvey (2003). Energy Savings from Efficient Furnace Air Handlers in Massachusetts. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | N/A |

| TRM Reference Number | RIER064 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | Residential New Construction |
| Measure Name | LEDs |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}})$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 985.5 |
| Hours Source | Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| Hours source note | #N/A |
| kWh/yr Savings | 30.59 |
| kWh/yr savings source | NMR Group (2012). Baseline Sensitivity Analysis Spreadsheet, Three-Year Planning Version. Prepared for the Massachusetts PAs. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.031 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

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|--|--|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.20 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.80 |
| Net-to-Gross source | NMR Group (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for national Grid. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 14.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 14 Per bulb |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER082 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Plug Load |
| Type | Room Air Cleaners |
| Sub-type | Room Air Cleaner |
| Program Name | EnergyStar Products |
| Measure Name | Room air cleaners |
| Measure Description | Rebates provided for the purchase of an ENERGY STAR® qualified room air cleaner. ENERGY STAR® air cleaners are 40% more energy-efficient than standard models. |
| Baseline Description | The baseline efficiency case is a conventional unit with clean air delivery rate (CADR) of 51-100. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified air cleaner with a CADR of 51-100. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated ENERGY STAR® room air cleaner |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5840 |
| Hours Source | Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances |
| Hours source note | #N/A |
| kWh/yr Savings | 391 |
| kWh/yr savings source | Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.084 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | Environmental Protection Agency (2012), Savings Calculator for Energy Star Qualified Appliances. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |

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|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.75 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 72.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 40 per measure |

| TRM Reference Number | RIER083 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Residential New Construction |
| Measure Name | Showerheads |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 129 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.022 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Verifying Thermostatic Valve Showerhead Savings.xls |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

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|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3696.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 10.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 10 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER084 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Heat Pump Water Heater |
| Program Name | EnergyStar HVAC |
| Measure Name | HPWH 50 gallon (electric) |
| Measure Description | Installation of a heat pump water heater (HPWH) instead of an electric resistance water heater. |
| Baseline Description | The baseline efficiency case is a new, standard efficiency electric resistance hot water heater. |
| Savings Principle | The high efficiency case is a high efficiency heat pump water heater. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed heat pump water heater. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1654 |
| kWh/yr savings source | Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.34 |
| kW reduction source | Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | #N/A |
| measure life note | Based on warranty of equipment |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

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|--|--|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.47 |
| CF summer peak source | Steven Winter Associates, Inc (2012). Heat Pump Water Heaters Evaluation of Field Installed Performance. Sponsored by National Grid and NSTAR. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 750.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIER088 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Clothes Washer |
| Sub-type | Clothes Washer |
| Program Name | Residential New Construction |
| Measure Name | CWASHER |
| Measure Description | The installation of an Energy Star clotheswasher in a Residential New Construction home. |
| Baseline Description | A standard non-Energy Star clotheswasher. |
| Savings Principle | An Energy Star clotheswasher uses less electricity and water to clean clothes. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 47.52 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.89 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER089 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Codes and Standards |
| Sub-type | Codes and Standards |
| Program Name | Residential New Construction |
| Measure Name | CODES AND STANDARDS |
| Measure Description | Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island. |
| Baseline Description | Un-influenced adoption curve of federal minimum codes and standards. |
| Savings Principle | Accelerated adoption of advancing energy codes and equipment standards. |
| Energy Savings calculation method | Calculated based on attribution study |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for national Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | NMR Group (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for national Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER090 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Cooling |
| Sub-type | COOLINGCPC |
| Program Name | Residential New Construction |
| Measure Name | COOLINGCPC |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |

| | |
|--|---|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER091 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot WaterCP |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER092 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab CoolingCP |
| Measure Description | The cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER093 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab HeatingCP |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER094 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Cooling_tier1 |
| Measure Description | The cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER095 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Cooling_tier2 |
| Measure Description | The cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER096 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Cooling_tier3 |
| Measure Description | The cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Synapse (2012). A Preliminary Analysis of Energy Impacts from Partial Deep Energy Retrofit Projects in National Grid's Jurisdiction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER097 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Heating_tier1 |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER098 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Heating_tier2 |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER099 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Heating_tier3 |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER100 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot Water_tier1 |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER101 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot Water_tier2 |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER102 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot Water_tier3 |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Common measure life for insulation measures. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER103 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Cooling_tier1 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER104 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Cooling_tier2 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER105 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Cooling |
| Program Name | Residential New Construction |
| Measure Name | Cooling_tier3 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER106 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | DHW_tier1 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER107 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | DHW_tier2 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER108 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | DHW_tier3 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER109 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Heating_tier1 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER110 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Heating_tier2 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER111 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Heating_tier3 |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |

| | |
|--|---|
| Coincidence factor (CF) winter peak | 0.89 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIER112 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Dishwasher |
| Sub-type | Dishwasher |
| Program Name | Residential New Construction |
| Measure Name | DISHWASH |
| Measure Description | The installation of an Energy Star Dishwasher in a Residential New Construction home. |
| Baseline Description | A standard non-Energy Star Dishwasher. |
| Savings Principle | An Energy Star dishwasher uses less electricity and water to clean dishes. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 40 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.0048 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.90 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER113 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Flow Control |
| Sub-type | Water Heater |
| Program Name | Residential New Construction |
| Measure Name | DHWCP |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |

| | |
|--|---|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER114 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Heating |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | HEATINGCPC |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed ESH heating, cooling, or DHW project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.24 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.89 |

| | |
|--|---|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 189.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER116 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Single Family Appliance Management |
| Measure Name | Programmable Thermostat, Gas |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 3.1 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 44.68 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 34.47 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER117 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Single Family Appliance Management |
| Measure Name | Programmable Thermostat, Oil |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 3.1 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 50.21 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 34.47 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER118 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Single Family Appliance Management |
| Measure Name | Programmable Thermostat, Other |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p> $Gross\ kWh = \Delta kWh_{custom}$ $Gross\ Summer\ kW = \Delta kW_{sp_custom}$ $Gross\ Winter\ kW = \Delta kW_{wp_custom}$ $Gross\ kWh = Qty \times \Delta kWh$ $Gross\ kW = Qty \times \Delta kW$ $Gross\ MMBtu_Gas = Qty \times \Delta MMBtu_Gas$ $Gross\ MMBtu_Oil = Qty \times \Delta MMBtu_Oil$ $Gross\ MMBtu_Propane = Qty \times \Delta MMBtu_Propane$ </p> <p>Where:</p> <p> Qty = Total number of units. ΔkWh = Average annual kWh reduction per unit. ΔkW = Average kW reduction per unit. $\Delta MMBtu_Gas$ = Average annual natural gas reduction per unit. $\Delta MMBtu_Oil$ = Average annual oil reduction per unit $\Delta MMBtu_Propane$ = Average annual propane reduction per unit </p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 3.1 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |

| | |
|--|--|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 44.53 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 34.47 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| TRM Reference Number | RIER119 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Dehumidifiers |
| Sub-type | Dehumidifier |
| Program Name | Single Family Appliance Management |
| Measure Name | Dehumidifier Rebate |
| Measure Description | The Installation of high efficiency dehumidifiers and the turn-in of existing inefficient dehumidifiers. |
| Baseline Description | Standard efficiency. |
| Savings Principle | The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Per dehumidifier |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 239 |
| kWh/yr savings source | Dehumidifier Savings 2015-9-22 for 2017 Plan |
| kWh/yr savings note | #N/A |
| kW reduction | 0.041 |
| kW reduction source | Dehumidifier Savings 2015-9-22 for 2017 Plan |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.85 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 3.22 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 2.39 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER121 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Freezers |
| Sub-type | Freezer |
| Program Name | Single Family Appliance Management |
| Measure Name | Replacement Freezer |
| Measure Description | This measure covers the replacement of an existing inefficient freezer with a new energy efficient model. |
| Baseline Description | The baseline efficiency case for both the replaced and baseline new freezer is represented by the existing freezer. It is assumed that low-income customers would replace their freezers with a used inefficient unit. |
| Savings Principle | The high efficiency case is a new high efficiency freezer. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency freezer. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kWh_base} - \text{kWh_ee})$ $\text{Gross kW} = \text{Qty} \times (\text{kWh_base} - \text{kWh_ee}) / \text{Hours}$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 484 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.06 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 19 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 7.92 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 203.98 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 600.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 600 per measure |

| TRM Reference Number | RIER122 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Heat Pump Water Heaters |
| Sub-type | Heat Pump Water Heaters |
| Program Name | Single Family Appliance Management |
| Measure Name | HP Water Heaters |
| Measure Description | Installation of a heat pump water heater (HPWH) instead of an electric resistance water heater. |
| Baseline Description | The baseline efficiency case is a new, standard efficiency electric resistance hot water heater. |
| Savings Principle | The high efficiency case is a high efficiency heat pump water heater. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per Water Heater |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1654 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.34 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.47 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 28.35 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 46.92 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER123 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Recycling |
| Sub-type | Refrigerator Recycling |
| Program Name | Single Family Appliance Management |
| Measure Name | Appliance Removal |
| Measure Description | This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator. |
| Baseline Description | For Top Ten® and Most Efficient® refrigerators, the baseline is a 50% mix of available Energy Star® and Federal standard compliant refrigerators. For Energy Star® refrigerators, the baseline is a refrigerator that meets Federal standards. |
| Savings Principle | The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency refrigerator. |
| Savings Equation | <p>Gross kWh = Qty × (kWh_base - kWh_ee) Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. kWh_base = Deemed average demand per baseline unit. kWh_ee = Deemed average demand per high-efficiency unit. DeltakW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1180 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.15 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 15.89 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 184.33 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 55.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 55 per measure |

| TRM Reference Number | RIER124 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Refrigerators |
| Sub-type | Refrigerator |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Refrigerator |
| Measure Description | This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator. ENERGY STAR® qualified refrigerators use at least 20% less energy than non-qualified models. |
| Baseline Description | The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit. |
| Savings Principle | The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency refrigerator. |
| Savings Equation | $\Delta kWh = ((kWh_{pre} - kWh_{es}) \times (RUL/EUL)) + (((kWh_{std} + kWh_{used})/2 - kWh_{es}) \times ((EUL - RUL)/EUL)) \times Focc$ <p>Where:</p> <p>kWh_{pre} = Annual kWh consumption of existing equipment. Value is based on metering or AHAM database. The default value is 874 kWh.</p> <p>kWh_{es} = Annual kWh consumption of new ENERGY STAR qualified refrigerator or freezer. This is from the nameplate on the new unit. The default value is 358 kWh.</p> <p>STD Average annual consumption of equipment meeting federal standard: Calculated by dividing the kWh_{es} by 0.9 (i.e., the Energy Star units are assumed to be 10% more efficient than the kWh_{std} units). The default value is 398 kWh.</p> <p>kWh_{used} Average annual consumption of used equipment. Default value is 475 kWh.</p> <p>RUL = Remaining Useful life assumed to be 6 years</p> <p>EUL = Estimated useful life for a new refrigerator is 12 years</p> <p>Focc = Occupant adjustment factor used to adjust the energy savings according to the number of occupants in the dwelling unit. See table below. Default is 2.3 occupants per tenant unit</p> <p>ΔkWh = 330, using the default assumptions</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |

| | |
|--|---|
| measure life | 12 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.86 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 2.76 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 2.06 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 398.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 380/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER125 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Refrigerators |
| Sub-type | Refrigerator |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Refrig rebate |
| Measure Description | This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator. ENERGY STAR® qualified refrigerators use at least 20% less energy than non-qualified models. |
| Baseline Description | The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit. |
| Savings Principle | The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency refrigerator. |
| Savings Equation | $\Delta kWh = ((kWh_{pre} - kWh_{es}) \times (RUL/EUL)) + (((kWh_{std} + kWh_{used})/2 - kWh_{es}) \times ((EUL - RUL)/EUL)) \times Focc$ <p>Where:</p> <p>kWh_{pre} = Annual kWh consumption of existing equipment. Value is based on metering or AHAM database. The default value is 874 kWh.</p> <p>kWh_{es} = Annual kWh consumption of new ENERGY STAR qualified refrigerator or freezer. This is from the nameplate on the new unit. The default value is 358 kWh.</p> <p>STD Average annual consumption of equipment meeting federal standard: Calculated by dividing the kWh_{es} by 0.9 (i.e., the Energy Star units are assumed to be 10% more efficient than the kWh_{std} units). The default value is 398 kWh.</p> <p>kWh_{used} Average annual consumption of used equipment. Default value is 475 kWh.</p> <p>RUL = Remaining Useful life assumed to be 6 years</p> <p>EUL = Estimated useful life for a new refrigerator is 12 years</p> <p>Focc = Occupant adjustment factor used to adjust the energy savings according to the number of occupants in the dwelling unit. See table below. Default is 2.3 occupants per tenant unit</p> <p>ΔkWh = 330, using the default assumptions</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |

| | |
|--|---|
| measure life | 12 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Residential Refrigerator. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.86 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 1.44 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 305.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 296/audit with multiple installed measures |

| TRM Reference Number | RIER126 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Appliances |
| Type | Refrigerators |
| Sub-type | Refrigerator |
| Program Name | Single Family Appliance Management |
| Measure Name | Replacement Refrigerator |
| Measure Description | This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator. ENERGY STAR® qualified refrigerators use at least 20% less energy than non-qualified models. |
| Baseline Description | The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit. |
| Savings Principle | The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed high-efficiency refrigerator. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kWh_base} - \text{kWh_ee})$ $\text{Gross kW} = \text{Qty} \times (\text{kWh_base} - \text{kWh_ee}) / \text{Hours}$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 384 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.05 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 19 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 6.57 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 202.98 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 1200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 1200 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER130 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Air Sealing/Infiltration |
| Program Name | EnergyWise |
| Measure Name | Air Sealing Kit (Oil) |
| Measure Description | The installation of recessed lighting cans that provide air sealing benefits. |
| Baseline Description | The baseline is leaky recessed lighting cans on thermal boundaries. |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST). |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed kit |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | Rise Engineering (2015). Memo on Pilot Findings for LED inserts for Recessed Light Cans. |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | Rise Engineering (2015). Memo on Pilot Findings for LED inserts for Recessed Light Cans. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 2.84 |
| Oil MMBtu/yr savings source | Rise Engineering (2015). Memo on Pilot Findings for LED inserts for Recessed Light Cans. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Rise Engineering (2015). Memo on Pilot Findings for LED inserts for Recessed Light Cans. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.20 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.80 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 14.11 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 68.74 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER131 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Oil |
| Program Name | EnergyWise MultiFamily |
| Measure Name | AIR SEALING OIL |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>Stories = Total stories in the multi-family building</p> <p>SQFT = Area of building in square feet</p> <p>CFM/SQFT_pre = Estimate of pre-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor</p> <p>CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the improved roof and floor</p> <p>deltakWh/CFM = Average annual kWh reduction per CFM</p> <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>kW/kWh = Average kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 3.02 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.28 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 135.83 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER133 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Electric with AC |
| Program Name | EnergyWise MultiFamily |
| Measure Name | AIR SEALING ELEC WITH AC |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>Stories = Total stories in the multi-family building SQFT = Area of building in square feet CFM/SQFT_pre = Estimate of pre-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the improved roof and floor deltakWh/CFM = Average annual kWh reduction per CFM Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM kW/kWh = Average kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.41 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.28 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 135.83 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER134 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Oil |
| Program Name | Income Eligible MultiFamily |
| Measure Name | AIR SEALING OIL |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>Stories = Total stories in the multi-family building SQFT = Area of building in square feet CFM/SQFT_pre = Estimate of pre-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the improved roof and floor deltakWh/CFM = Average annual kWh reduction per CFM Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM kW/kWh = Average kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 3.02 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 79.28 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.20 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER136 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Electric with AC |
| Program Name | Income Eligible MultiFamily |
| Measure Name | AIR SEALING ELEC WITH AC |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>Stories = Total stories in the multi-family building</p> <p>SQFT = Area of building in square feet</p> <p>CFM/SQFT_pre = Estimate of pre-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor</p> <p>CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of the improved roof and floor</p> <p>deltakWh/CFM = Average annual kWh reduction per CFM</p> <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>kW/kWh = Average kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.41 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 64.28 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.02 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER145 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Shell |
| Program Name | EnergyWise |
| Measure Name | Wx - GAS- Non Elec |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 72.4 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.081 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER146 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Shell |
| Program Name | EnergyWise |
| Measure Name | Wx - OIL- Non Elec |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 96.9 |
| kWh/yr savings source | The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.179 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 14 |
| Oil MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 109.92 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 513.88 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2631.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1117 / participant |

| TRM Reference Number | RIER147 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Shell |
| Program Name | EnergyWise |
| Measure Name | Wx-Electric - Elec |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 782.2 |
| kWh/yr savings source | The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.83 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 66.59 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 513.88 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2298.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1657 / participant |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER150 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Oil |
| Program Name | EnergyWise MultiFamily |
| Measure Name | INSULATION OIL |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post)</p> <p>Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>SQFT = Square feet of insulation installed</p> <p>deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation</p> <p>R_pre = R-Value of the existing insulation</p> <p>R_post = R-Value of the new installed insulation</p> <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>kW/kWh = Average annual kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 7.17 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.31 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 378.05 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER152 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Electric with AC |
| Program Name | EnergyWise MultiFamily |
| Measure Name | INSULATION ELEC WITH AC |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post)</p> <p>Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>SQFT = Square feet of insulation installed</p> <p>deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation</p> <p>R_pre = R-Value of the existing insulation</p> <p>R_post = R-Value of the new installed insulation</p> <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>kW/kWh = Average annual kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.41 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.31 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 378.05 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER153 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Oil |
| Program Name | Income Eligible MultiFamily |
| Measure Name | INSULATION OIL |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post)</p> <p>Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>SQFT = Square feet of insulation installed</p> <p>deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation</p> <p>R_pre = R-Value of the existing insulation</p> <p>R_post = R-Value of the new installed insulation</p> <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>kW/kWh = Average annual kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 7.17 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 85.78 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER155 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Electric with AC |
| Program Name | Income Eligible MultiFamily |
| Measure Name | INSULATION ELEC WITH AC |
| Measure Description | Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post)</p> <p>Gross kW = Gross kWh × kW/kWh</p> <p>Where:</p> <p>SQFT = Square feet of insulation installed</p> <p>deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation</p> <p>R_pre = R-Value of the existing insulation</p> <p>R_post = R-Value of the new installed insulation</p> <p>Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM</p> <p>kW/kWh = Average annual kW reduction per kWh reduction</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.41 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 54.25 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.33 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER156 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation & Air sealing |
| Sub-type | Weatherization |
| Program Name | Single Family Appliance Management |
| Measure Name | Weatherization (electric) |
| Measure Description | Installation of weatherization measures such as air sealing and insulation in homes heated with electricity, oil, or propane. Non-heating electric savings are achieved from reduced fan run time for heating and cooling systems. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed weatherization project. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1616 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.86 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 579.97 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 372.33 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 4500.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 4500 per job |

| TRM Reference Number | RIER157 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation & Air sealing |
| Sub-type | Weatherization |
| Program Name | Single Family Appliance Management |
| Measure Name | Weatherization (oil) |
| Measure Description | Installation of weatherization measures such as air sealing and insulation in homes heated with electricity, oil, or propane. Non-heating electric savings are achieved from reduced fan run time for heating and cooling systems. |
| Baseline Description | The baseline efficiency case is any existing home shell measures. |
| Savings Principle | The high efficiency case includes increased weatherization insulation levels. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed weatherization project. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 377 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.2 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 28.1 |
| Oil MMBtu/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 614.70 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 384.72 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 4500.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 4500 per job |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER161 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Custom |
| Type | Custom |
| Sub-type | Custom |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Custom |
| Measure Description | Vendors install a variety of measures at multifamily facilities. Measures include |
| Baseline Description | For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the |
| Savings Principle | The high efficiency scenario is specific to the facility and may include one or more energy efficiency |
| Energy Savings calculation method | Calc |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|------|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER162 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Custom |
| Type | Multi-family |
| Sub-type | Low Income |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Custom |
| Measure Description | Vendors install a variety of measures at multifamily facilities. Measures include |
| Baseline Description | For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the |
| Savings Principle | The high efficiency scenario is specific to the facility and may include one or more energy efficiency |
| Energy Savings calculation method | Calc |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|------------------------------------|
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 422.46 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 313.64 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER163 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise |
| Measure Name | Programmable Thermostat (Electric heat only) |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 214.6 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.113 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |

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|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.02 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.80 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER167 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Single Family Appliance Management |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 330 |
| kWh/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.176 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |

| | |
|--|---|
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 11.92 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 37.77 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER169 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise |
| Measure Name | WiFi Thermostat |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.231 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.20 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.80 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER172 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyStar HVAC |
| Measure Name | WiFi programmable thermostat with cooling (gas) |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.231 |
| kW reduction source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 6.6 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |

| | |
|--|---|
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit☐ | 200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit☐ | \$ 50 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER173 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyStar HVAC |
| Measure Name | WiFi programmable thermostat with cooling (oil) |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.231 |
| kW reduction source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 6.6 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| TRM Reference Number | RIER177 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise |
| Measure Name | EW Single FamilyWiFi Thermostat - DR Enabled |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.231 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER178 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise |
| Measure Name | Programmable Thermostat (Oil only) |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.176 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 3.4 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Home Energy Services Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|---|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER179 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise MultiFamily |
| Measure Name | THERMOSTAT Elec with AC |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 281 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.13 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.41 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.32 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER181 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise MultiFamily |
| Measure Name | THERMOSTAT Heat Pump |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 241 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.1 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.01 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.32 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER182 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise MultiFamily |
| Measure Name | THERMOSTAT OIL |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 2.3 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.32 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER185 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Income Eligible MultiFamily |
| Measure Name | THERMOSTAT Elec with AC |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 257 |
| kWh/yr savings source | The Cadmus Group (2015). Massachusetts Low-Income Multifamily Initiative Impact Evaluation. Prepared for the MA PAs. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.13 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.41 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 14.98 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 4.45 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER186 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Income Eligible MultiFamily |
| Measure Name | THERMOSTAT AC Only |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 25 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.06 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 11.86 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 2.13 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER187 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Income Eligible MultiFamily |
| Measure Name | THERMOSTAT Heat Pump |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 241 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.1 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |

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| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.01 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 14.77 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 4.29 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER188 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Income Eligible MultiFamily |
| Measure Name | THERMOSTAT OIL |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 2.26 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |

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| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 15.73 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.88 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

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|--------------------------------------|--|
| TRM Reference Number | RIER191 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement AC - SEER 18 (EE) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 306 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.851 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

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| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit | 942.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 300 per measure |

| TRM Reference Number | RIER192 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement AC - SEER 18 (Retire) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 269 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.748 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

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| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit ² | 942.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 300 per measure |

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|--------------------------------------|--|
| TRM Reference Number | RIER193 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement AC - SEER 16 (EE) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 173 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.48 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

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|--|--|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit ² | 942.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 300 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER194 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Central AC |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement AC - SEER 16 (Retire) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_C$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 269 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.748 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

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|--|--|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit | 942.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 300 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER196 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Cooling |
| Sub-type | Window AC |
| Program Name | Single Family Appliance Management |
| Measure Name | Window AC Replacements |
| Measure Description | Replacement of existing inefficient room air conditioners with more efficient models. This is only offered as a measure when an AC timer would not reduce usage during the peak period. |
| Baseline Description | The baseline efficiency case is the existing air conditioning unit. |
| Savings Principle | The high efficiency case is the high efficiency room air conditioning unit. |
| Energy Savings calculation method | Deemed |
| Savings unit | Replacement of existing window AC with high-efficiency window AC. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 0 |
| Hours Source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Hours source note | #N/A |
| kWh/yr Savings | 100 |
| kWh/yr savings source | Quantec, LLC (2005). Evaluation of National Grid's 2003 Appliance Management Program: Room Air Conditioning Metering and Non-Energy Benefits Study. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.29 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Room Air Conditioner. Interactive Excel Spreadsheet found at www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRE) | 1.00 |

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|--|---|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 50.85 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 350.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 350 per measure |

| TRM Reference Number | RIER197 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ducting |
| Sub-type | Duct Insulation |
| Program Name | EnergyStar HVAC |
| Measure Name | Duct Sealing - 100 CFM reduction in leaks 15% of flow to 5% |
| Measure Description | A 66% reduction in duct leakage from 15% to 5% of supplied CFM. |
| Baseline Description | The baseline efficiency case assumes a 15% leakage. |
| Savings Principle | The high efficiency case is a system with duct leakage reduced by 66% to 5% leakage. |
| Energy Savings calculation method | Deemed |
| Savings unit | Complete duct sealing job for existing HVAC system |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 212 |
| kWh/yr savings source | RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating; |
| kWh/yr savings note | #N/A |
| kW reduction | 0.3 |
| kW reduction source | RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating; |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

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|--|--|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit ² | 200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 200 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER199 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ducting |
| Sub-type | Duct Insulation |
| Program Name | EnergyStar HVAC |
| Measure Name | Energy Star QI with Duct Modifications |
| Measure Description | 50% reduction in duct leakage from 20% to 10%. This measure may also include duct modifications. |
| Baseline Description | The baseline efficiency case is a system with an installation that is inconsistent with manufacturer specifications and may include leaky ducts. |
| Savings Principle | The high efficiency case is a system with an installation that is consistent with manufacturer specifications and may have reduced duct leakage. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed job |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 513 |
| kWh/yr savings source | RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating; |
| kWh/yr savings note | #N/A |
| kW reduction | 0.85 |
| kW reduction source | RLW Analytics (2002). Market Research for the Rhode Island, Massachusetts, and Connecticut Residential HVAC Market. Prepared for National Grid, Northeast Utilities, NSTAR, Fitchburg Gas and Electric Light Company and United Illuminating; |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

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|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.26 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.16 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 525 per measure |

| TRM Reference Number | RIER203 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ducting |
| Sub-type | Duct Insulation |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Heating System Retrofit-Furnace |
| Measure Description | The installation of high efficiency heating systems |
| Baseline Description | The baseline is the existing heating system. |
| Savings Principle | The high efficiency case includes replacing heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Heating system |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 132 |
| kWh/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.07 |
| kW reduction source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 14.3 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |

| | |
|--|------------------------------------|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 117.26 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.33 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER206 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Early replacement |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement HP - SEER 18 (EE) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 1216 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.84 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

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|--|--|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit ² | 1000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 850 per measure |

| TRM Reference Number | RIER207 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Early replacement |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement HP - SEER 18 (Retire) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 1104 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.33 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

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|--|--|
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit | 1000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 850 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER208 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Early replacement |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement HP - SEER 16 (EE) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 462 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.32 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

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| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit | 1000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 850 per measure |

| TRM Reference Number | RIER210 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Early replacement |
| Program Name | EnergyStar HVAC |
| Measure Name | Early Replacement HP - SEER 16 (Retire) |
| Measure Description | Early replacement of a Central Air Conditioning or Heat Pump Unit. This measure accounts for the additional savings achieved for the early replacement of existing inefficient AC or heat pump units over the remaining life of the existing equipment. |
| Baseline Description | The baseline efficiency case is assumed to be a typical 10-12 year-old central air-conditioning or heat pump unit with SEER 10, EER 8.5, and HSPF 7.0 |
| Savings Principle | For the retirement savings over the remaining life of the existing AC unit, the efficient case is a SEER 13, EER 11, HSPF 7.6 unit. For the high efficiency savings over the lifetime of the new AC unit, the efficient case is a new high efficiency EER 14.5, EER 12, 8.2 HSPF unit. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installation of a new efficient air conditioner. |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}}) \times \text{Hours}_{\text{C}}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times (1/\text{SEER}_{\text{base}} - 1/\text{SEER}_{\text{ee}})$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment. SEER_ee = Seasonal Energy Efficiency Ratio of new equipment. Hours_C = Deemed average equivalent full load cooling hours</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 1104 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.33 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

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| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit | 1000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 850 per measure |

| TRM Reference Number | RIER213 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating |
| Sub-type | Efficient Heating |
| Program Name | Single Family Appliance Management |
| Measure Name | Heating system replacement (oil) |
| Measure Description | Replacement of existing oil heating system with a new high efficiency system. Electric savings can be attributed to reduced fan run time and reduced usage of electric space heaters. |
| Baseline Description | The baseline efficiency case is the existing inefficient heating equipment. |
| Savings Principle | The high efficiency case is the new efficient heating equipment. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency heating system. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 132 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.07 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group, Inc. (2012) Memo to HEHE Program Administrators Re: Impacts of Upcoming Federal Standards on HEHE.Gas Space and Water Heating Measures; June 8, 2012. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 18.4 |
| Oil MMBtu/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |

| | |
|--|---|
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.47 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 346.27 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 250.52 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 4500.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 4500 per measure |

| TRM Reference Number | RIER214 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating |
| Sub-type | Efficient Heating |
| Program Name | EnergyStar HVAC |
| Measure Name | Oil Heat Replacement |
| Measure Description | Replacement of existing oil or propane heating system with a new high efficiency system. Electric savings can be attributed to reduced fan run time and reduced usage of electric space heaters. |
| Baseline Description | The baseline efficiency case is the existing inefficient heating equipment. |
| Savings Principle | The high efficiency case is the new efficient heating equipment. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency heating system. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Gross MMBtu_Oil = Qty × deltaMMBtu_Oil Gross MMBtu_Propane = Qty × deltaMMBtu_Propane</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 132 |
| kWh/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.07 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 18.4 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |

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|--|---|
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.01 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit☐ | 500.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit☐ | \$ 200 per measure |

| TRM Reference Number | RIER215 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating |
| Sub-type | Retrofit Boiler |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Heating System Retrofit-Boiler |
| Measure Description | The installation of high efficiency heating systems |
| Baseline Description | The baseline is the existing heating system. |
| Savings Principle | The high efficiency case includes replacing heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Heating system |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 20.4 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boilers. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |

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|--|--|
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER216 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating |
| Sub-type | Retrofit Furnace |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Heating System Retrofit-Furnace |
| Measure Description | The installation of high efficiency heating systems |
| Baseline Description | The baseline is the existing heating system. |
| Savings Principle | The high efficiency case includes replacing heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Heating system |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 132 |
| kWh/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.07 |
| kW reduction source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 14.3 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |

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|--|--|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER217 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating |
| Sub-type | Retrofit Boiler |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Heating System Retrofit-Boiler |
| Measure Description | The installation of high efficiency heating systems |
| Baseline Description | The baseline is the existing heating system. |
| Savings Principle | The high efficiency case includes replacing heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Heating system |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 20.4 |
| Oil MMBtu/yr savings source | The Cadmus Group, Inc. (2012). Low Income Single Family Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boilers. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |

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|--|------------------------------------|
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 115.48 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER220 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | Heat Pump Tune Up |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart HP Digital Check |
| Measure Description | Tune-up of an existing heat pump system. |
| Baseline Description | The baseline efficiency case is a standard residential heat pump system that does not operating according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same baseline system but which operates according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed tune-up of existing heat pump system |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE</p> <p>Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE</p> <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.6 tons</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>SEER = Seasonal Energy Efficiency Ratio of existing equipment</p> <p>HSPF = Heating efficiency of existing equipment</p> <p>Hours_C = Deemed average equivalent full load cooling hours</p> <p>Hours_H = Deemed average equivalent full load heating hours</p> <p>%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.</p> <p>EER = Peak efficiency of existing equipment</p> |
| Hours | 0 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 330 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.205 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | KEMA (2013). Project 25 Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; Page 1-5 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

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| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.21 |
| CF summer peak source | #N/A |
| CF summer peak note | Massachusetts Common Assumption |
| Coincidence factor (CF) winter peak | 0.50 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit | 742.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 500 per measure |

| TRM Reference Number | RIER221 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | HVAC O&M |
| Sub-type | HVAC Tune Up |
| Program Name | EnergyStar HVAC |
| Measure Name | CoolSmart AC Digital Check |
| Measure Description | Tune-up of an existing central AC system. |
| Baseline Description | The baseline efficiency case is a standard central air-conditioning system that does not operate according to manufacturer specifications. |
| Savings Principle | The high efficiency case is the same baseline system but which operates according to manufacturer specifications. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Completed tune-up of existing AC system |
| Savings Equation | $\text{Gross kWh} = \text{Tons} \times (\text{kBtu/hr per ton}) \times 1/\text{SEER} \times \text{Hours_C} \times \% \text{SAVE}$ $\text{Gross kW} = \text{Tons} \times (\text{kBtu/hr per ton}) \times 1/\text{EER} \times \% \text{SAVE}$ <p>Where:</p> <p>Tons = Deemed average equipment capacity: 2.7 tons 12 kBtu/hr per ton = Conversion factor SEER = Seasonal Energy Efficiency Ratio of existing equipment Hours_C = Deemed average equivalent full load cooling hours 5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups. EER = Peak efficiency of existing equipment</p> |
| Hours | 360 |
| Hours Source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Hours source note | #N/A |
| kWh/yr Savings | 45 |
| kWh/yr savings source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.147 |
| kW reduction source | ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | NYSERDA Deemed Savings Database (Rev 11). |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

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| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.25 |
| CF summer peak source | #N/A |
| CF summer peak note | Massachusetts Common Assumption |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Massachusetts Common Assumption |
| Gross Measure TRC unit ² | 175.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 175 per measure |

| TRM Reference Number | RIER222 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Pipe Wrap Heating Oil |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear Foot |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.16 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

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| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER225 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Pipe Wrap Heating Oil |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear Foot |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.16 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 6.90 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER228 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Motors |
| Sub-type | ECM Motor |
| Program Name | EnergyStar HVAC |
| Measure Name | ECM Pumps |
| Measure Description | Heating hot water circulation retrofit projects replacing the existing hot water circulation systems with ECM pumps and zone valves. |
| Baseline Description | The baseline case is standard efficiency steady-state motor without variable speed capabilities. |
| Savings Principle | The efficient case is the installation of a pump with an electronically commutated motor (ECM) with variable speed capabilities on a boiler. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed ECM circulator pump retrofit project. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 142.3 |
| kWh/yr savings source | The Cadmus Group (2012). Impact Evaluation of the 2011-2012 ECM Circulation Pump Pilot Program. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.076 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | The Cadmus Group (2012). Impact Evaluation of the 2011-2012 ECM Circulation Pump Pilot Program. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit☐ | 750.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit☐ | \$ 300 per measure |

| TRM Reference Number | RIER235 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | LED Fixture |
| Program Name | EnergyStar Lighting |
| Measure Name | Outdoor LED Fixture |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | Existing lighting mix. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Retrofitted fixture |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW_base} - \text{kW_ee}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW_base} - \text{kW_ee})$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 115.36 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.096068 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 30.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 8 per fixture |

| TRM Reference Number | RIER236 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | LED Screw Base |
| Program Name | EnergyWise |
| Measure Name | LED Outdoor Fixture |
| Measure Description | The installation of Light-Emitting Diode (LED) outdoor fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 46.32 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.046 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER237 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Dwelling Reflector |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Dwelling Ext Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER238 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Common Reflector |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Ext Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER240 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Dwelling LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Dwelling Ext LED Fixture |
| Measure Description | The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |

| | |
|--|---|
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER241 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Common LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Ext LED Fixture |
| Measure Description | The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | The baseline efficiency case is the existing lighting hours of use. |
| Savings Principle | The high efficiency case is lights thaare using fewer hours, reducing energy. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER242 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Dwelling Reflector |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Dwelling Ext Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 17.81 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 11.15 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER243 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Common Reflector |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Ext Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.37 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 12.31 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER245 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Dwelling LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Dwelling Ext LED Fixture |
| Measure Description | The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |

| | |
|--|---|
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.65 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 13.01 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER247 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Common LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Ext LED Bulbs |
| Measure Description | The installation of ENERGY STAR® LED outdoor bulbs. |
| Baseline Description | The baseline efficiency case is the existing installed bulb. |
| Savings Principle | The high efficiency case is bulbs that use fewer watts. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed bulb |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 115 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 189.94 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 11.19 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER248 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Common LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Ext LED Bulbs |
| Measure Description | The installation of ENERGY STAR® LED outdoor bulbs. |
| Baseline Description | The baseline efficiency case is the existing installed bulb. |
| Savings Principle | The high efficiency case is bulbs that use fewer watts. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed bulb |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 141.8 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER250 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | LED Bulbs (15,000) |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}})$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>kW_base = Deemed average demand per baseline unit.</p> <p>kW_ee = Deemed average demand per high-efficiency unit.</p> <p>Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 37.27 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.031042271 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.05 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.03 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 6 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.10 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.90 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 5 per bulb |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER251 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | LED (15,000) HTR |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}})$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 37.27 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.031042271 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.05 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.03 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 6 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 10.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 8 per bulb |

| TRM Reference Number | RIER280 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Fixture |
| Program Name | EnergyWise |
| Measure Name | LED Fixture |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 45 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.046 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER282 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Fixture |
| Program Name | EnergyStar Lighting |
| Measure Name | LED Fixtures |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | <p>Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 55.54 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.046252984 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|--|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.07 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.93 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 35.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 7 per fixture |

| TRM Reference Number | RIER289 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyWise |
| Measure Name | LED Bulbs |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 47.6 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.008 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER291 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | LED A Lamps |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}})$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>kW_base = Deemed average demand per baseline unit.</p> <p>kW_ee = Deemed average demand per high-efficiency unit.</p> <p>Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 37.27 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.031042271 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.05 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.03 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.20 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.80 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 10.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 3.5 per bulb |

| TRM Reference Number | RIER293 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | LED Bulbs (EISA Exempt) |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}})$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>kW_base = Deemed average demand per baseline unit.</p> <p>kW_ee = Deemed average demand per high-efficiency unit.</p> <p>Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 52.39 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.043630098 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.06 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.04 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | Expected lifetime from ENERGY STAR |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.20 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.80 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 14.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 8 per bulb |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER295 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | Single Family Appliance Management |
| Measure Name | LED Bulbs LI |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW_base} - \text{kW_ee}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW_base} - \text{kW_ee})$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 1022 |
| Hours Source | Nexus Market Research, RLW Analytics and GDS Associates (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| Hours source note | #N/A |
| kWh/yr Savings | 45.63 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.046300409 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 3.28 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 229.77 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 17.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 17 per measure |

| TRM Reference Number | RIER298 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Fixture |
| Program Name | Single Family Appliance Management |
| Measure Name | Indoor Fixtures |
| Measure Description | The installation of ENERGY STAR® LED indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | 0 |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with and LED. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Retrofitted fixture |
| Savings Equation | Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW Where: Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours. |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 67.99 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.068987609 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|--|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 3.58 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 230.49 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIER301 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | School Program LED Bulbs |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | Existing lighting mix. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed lamp |
| Savings Equation | <p>Gross kWh = Qty × (kW_base - kW_ee) × Hours Gross kW = Qty × (kW_base - kW_ee)</p> <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 32.86 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.031042271 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.04 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.02 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.50 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

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|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.20 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.80 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 8 per bulb |

| TRM Reference Number | RIER304 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | HTR LED A Lamps |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW_base} - \text{kW_ee}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW_base} - \text{kW_ee})$ <p>Where:</p> <p>Qty = Total number of units. kW_base = Deemed average demand per baseline unit. kW_ee = Deemed average demand per high-efficiency unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 37.27 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.031042271 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.06 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.03 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.01 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 15.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 10 per bulb |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER306 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyStar Lighting |
| Measure Name | LED Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}}) \times \text{Hours}$ $\text{Gross kW} = \text{Qty} \times (\text{kW}_{\text{base}} - \text{kW}_{\text{ee}})$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>kW_base = Deemed average demand per baseline unit.</p> <p>kW_ee = Deemed average demand per high-efficiency unit.</p> <p>Hours = Deemed average annual operating hours.</p> |
| Hours | 1059 |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | 57.15 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.047597109 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | -0.06 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | -0.04 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | -0.01 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 0.98 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.14 |
| CF summer peak source | Nexus Market Research and RLW Analytics (2009). Residential Lighting Markdown Impact Evaluation. Prepared for Markdown and Buydown Program Sponsors in CT, MA, RI, and VT. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.20 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.80 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 15.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 10 per bulb |

| TRM Reference Number | RIER307 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyWise |
| Measure Name | LED Bulbs (EISA Exempt) |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 43.6 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.044 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER308 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | LED Screw Base |
| Program Name | EnergyWise |
| Measure Name | LED Bulbs Reflectors |
| Measure Description | The installation of Light-Emitting Diode (LED) reflectors. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 47.6 |
| kWh/yr savings source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kWh/yr savings note | #N/A |
| kW reduction | 0.048 |
| kW reduction source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER309 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling EISA |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Dwelling Int EISA Exempt |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER310 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common EISA |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Int EISA Exempt |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| TRM Reference Number | RIER311 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling Reflector |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Dwelling Int Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER312 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common Reflector |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Int Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER314 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Dwelling Int LED Fixture |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER316 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Int LED Fixture |
| Measure Description | The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |

| | |
|--|---|
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER319 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling EISA |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Dwelling Int EISA Exempt |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.89 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 12.70 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER320 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common EISA |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Int EISA Exempt |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 17.79 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 11.14 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER321 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling Reflector |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Dwelling Int Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 17.74 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 11.10 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER322 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common Reflector |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Int Reflector |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.92 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 12.72 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER324 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Dwelling Int LED Fixture |
| Measure Description | The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes. |
| Baseline Description | The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent. |
| Savings Principle | The high efficiency case is and ENERGY STAR® qualified LED fixture. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | NMR Group, Northeast Residential Lighting Hours-of-Use Study, May 2014 |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 18.87 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 12.44 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER326 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Int LED Fixture |
| Measure Description | The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified compact fluorescent light fixture wired for exclusive use with pin-based CFLs. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |

| | |
|--|---|
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.17 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.54 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 12.94 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER328 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Ext LED Fixture |
| Measure Description | The installation of ENERGY STAR® compact fluorescent (CFL) indoor fixtures. Compact fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly less wattage and significantly longer lifetimes. Hardwired fluorescent fixtures offer comparable luminosity to incandescent fixtures at significantly lower wattage and offer significantly longer lifespan. |
| Baseline Description | The baseline efficiency case is the existing lighting hours of use. |
| Savings Principle | The high efficiency case is lights thaare using fewer hours, reducing energy. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Rebated lamp or fixture. |
| Savings Equation | $\text{Gross kWh} = [(QTY_pre \times Watts_pre \times Hours_base) - (QTY_ee \times Watts_ee \times Hours_ee)] / 1000 \times 52$ $\text{Gross kW} = [(QTY_pre \times Watts_pre) - (QTY_ee \times Watts_ee)] / 1000$ <p>Where:</p> <p>QTY_pre = Quantity of pre-retrofit fixtures/bulbs QTY_ee = Quantity of efficient fixtures/bulbs installed Watts_pre = Rated watts of pre-retrofit fixtures/bulbs Watts_ee = Rated watts of efficient fixtures/bulbs installed Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs 1000 = Watts per kW 52 = Weeks per year</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 25.36 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 17.26 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER330 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Common Int LED Bulbs |
| Measure Description | The installation of ENERGY STAR® LED indoor bulbs. |
| Baseline Description | The baseline efficiency case is the existing installed bulb. |
| Savings Principle | The high efficiency case is bulbs that use fewer watts. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed bulb |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 304.2 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 21.49 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 13.88 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER331 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling LED |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Dwelling Int LED Bulbs |
| Measure Description | The installation of ENERGY STAR® LED indoor bulbs. |
| Baseline Description | The baseline efficiency case is the existing installed bulb. |
| Savings Principle | The high efficiency case is bulbs that use fewer watts. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed bulb |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 41 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 17.94 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 11.25 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER333 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Common LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Common Int LED Bulbs |
| Measure Description | The installation of ENERGY STAR® LED indoor bulbs. |
| Baseline Description | The baseline efficiency case is the existing installed bulb. |
| Savings Principle | The high efficiency case is bulbs that use fewer watts. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed bulb |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 119.1 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER334 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Interior |
| Sub-type | Dwelling LED |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Dwelling Int LED Bulbs |
| Measure Description | The installation of ENERGY STAR® LED indoor bulbs. |
| Baseline Description | The baseline efficiency case is the existing installed bulb. |
| Savings Principle | The high efficiency case is bulbs that use fewer watts. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed bulb |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 35 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 3.50 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER337 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Motors/Drives |
| Type | Variable Speed Drive |
| Sub-type | Pump |
| Program Name | EnergyStar Products |
| Measure Name | Pool pump (2) |
| Measure Description | The installation of a 2-speed or variable speed drive pool pump. Operating a pool pump for a longer period of time at a lower wattage can move the same amount of water using significantly less energy. |
| Baseline Description | The baseline efficiency case is a single speed pump. |
| Savings Principle | The high efficiency case is a 2-speed or variable speed pump. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed efficient pool pump. |
| Savings Equation | <p>Gross kWh = Qty × kWh_base × %SAVE Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. kWh_base = Deemed average annual kWh consumption per baseline unit. %SAVE = Deemed average savings factor. DeltakW = Deemed average kW reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 824 |
| kWh/yr savings source | Pacific Gas and Electric The Multi-Speed Pool Pump Fact Sheet. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.35 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions. Prepared for Pacific Gas and Electric Company. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|--|
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 300.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 250 per measure |

| TRM Reference Number | RIER339 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Motors/Drives |
| Type | Variable Speed Drive |
| Sub-type | Pump |
| Program Name | EnergyStar Products |
| Measure Name | Pool pump (variable) |
| Measure Description | The installation of a 2-speed or variable speed drive pool pump. Operating a pool pump for a longer period of time at a lower wattage can move the same amount of water using significantly less energy. |
| Baseline Description | The baseline efficiency case is a single speed pump. |
| Savings Principle | The high efficiency case is a 2-speed or variable speed pump. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed efficient pool pump. |
| Savings Equation | <p>Gross kWh = Qty × kWh_base × %SAVE Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. kWh_base = Deemed average annual kWh consumption per baseline unit. %SAVE = Deemed average savings factor. DeltakW = Deemed average kW reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1062 |
| kWh/yr savings source | Pacific Gas and Electric The Multi-Speed Pool Pump Fact Sheet. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.5 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions. Prepared for Pacific Gas and Electric Company. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|--|
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 650.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 300 per measure |

| TRM Reference Number | RIER341 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Participant |
| Type | NEI |
| Sub-type | Low Income |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Participant (NEB) |
| Measure Description | This row identifies a participant for tracking and cost purposes. |
| Baseline Description | N/A |
| Savings Principle | N/A |
| Energy Savings calculation method | N/A |
| Savings unit | N/A |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.77 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |

| | |
|--|---|
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 7.70 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER342 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Participant |
| Type | Participant |
| Sub-type | Participant |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Participant |
| Measure Description | This row identifies a participant for tracking and cost purposes. |
| Baseline Description | 0 |
| Savings Principle | 0 |
| Energy Savings calculation method | 0 |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |

| | |
|--|------|
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER343 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Plug Load |
| Type | Smart Strips |
| Sub-type | Smart Strip |
| Program Name | EnergyStar Products |
| Measure Name | Advanced Power Strips |
| Measure Description | The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls. |
| Baseline Description | The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on |
| Savings Principle | The high efficiency case is the use of a smart strip or advanced smart strip. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated smart strip. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 346 |
| kWh/yr savings source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.074 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|--|
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 100.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 35 per measure |

| TRM Reference Number | RIER345 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Plug Load |
| Type | Smart Strips |
| Sub-type | Smart Strip |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Smart Strips |
| Measure Description | The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls. |
| Baseline Description | The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on |
| Savings Principle | The high efficiency case is the use of a smart strip or advanced smart strip. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated smart strip. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 75.1 |
| kWh/yr savings source | NEEP (2012). Advanced Power Strips Deemed Savings Methodology. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.001 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 6 |
| measure life source | Nexus Market Research and RLW Analytics (2008). Residential Lighting Measure Life Study. Prepared for New England Residential Lighting Program Sponsors. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.77 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.01 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.76 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 398.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 380/audit with multiple installed measures |

| TRM Reference Number | RIER346 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Plug Load |
| Type | Smart Strips |
| Sub-type | Smart Strip |
| Program Name | EnergyWise |
| Measure Name | Smart Strip |
| Measure Description | The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls. |
| Baseline Description | The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on |
| Savings Principle | The high efficiency case is the use of a smart strip or advanced smart strip. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated smart strip. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 21.6 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.004 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER347 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Plug Load |
| Type | Smart Strips |
| Sub-type | Smart Strip |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Smart Strips |
| Measure Description | The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls. |
| Baseline Description | The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on |
| Savings Principle | The high efficiency case is the use of a smart strip or advanced smart strip. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated smart strip. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 75.1 |
| kWh/yr savings source | NEEP (2012). Advanced Power Strips Deemed Savings Methodology. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.001 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 305.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 296/audit with multiple installed measures |

| TRM Reference Number | RIER348 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Plug Load |
| Type | Smart Strips |
| Sub-type | Smart Strip |
| Program Name | Single Family Appliance Management |
| Measure Name | Smart Strips |
| Measure Description | The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls. |
| Baseline Description | The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on |
| Savings Principle | The high efficiency case is the use of a smart strip or advanced smart strip. |
| Energy Savings calculation method | Deemed |
| Savings unit | Rebated smart strip. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 75 |
| kWh/yr savings source | ECOS 2009 Smart Plug Strips: Draft Report |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.01 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.75 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 30.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 30 per measure |

| TRM Reference Number | RIER349 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Plug Load |
| Type | Smart Strips |
| Sub-type | Smart Strip |
| Program Name | EnergyStar Products |
| Measure Name | Smart Strips |
| Measure Description | The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls. |
| Baseline Description | The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on |
| Savings Principle | The high efficiency case is the use of a smart strip or advanced smart strip. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per smart strip |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 79 |
| kWh/yr savings source | ECOS 2009 Smart Plug Strips: Draft Report |
| kWh/yr savings note | #N/A |
| kW reduction | 0.017 |
| kW reduction source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |

| | |
|--|--|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | The Cadmus Group, Inc. (2012). Demand Impact Model. Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 20.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 15 per measure |

| TRM Reference Number | RIER350 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Refrigeration O&M |
| Sub-type | Refrigerator Brush |
| Program Name | EnergyWise |
| Measure Name | Refrigerator Brush |
| Measure Description | The cleaning of refrigerator coils. |
| Baseline Description | A refrigerator with uncleaned coils. |
| Savings Principle | A refrigerator with coils cleaned by an auditor. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per brushed refrigerator coil |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 10.9 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.001 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.93 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER352 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Vending Miser |
| Type | Vending Miser |
| Sub-type | Vending Miser |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Vending Miser |
| Measure Description | Controls significantly reduce the energy consumption of refrigerated beverage vending machine lighting and refrigeration systems by powering down these systems during periods of inactivity while maintaining a refrigerated product. This measure applies to refrigerated beverage vending machines and glass front refrigerated coolers. This measure does not apply to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1612 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.184 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER353 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Vending Miser |
| Type | Vending Miser |
| Sub-type | Vending Miser |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Vending Miser |
| Measure Description | Controls significantly reduce the energy consumption of refrigerated beverage vending machine lighting and refrigeration systems by powering down these systems during periods of inactivity while maintaining a refrigerated product. This measure applies to refrigerated beverage vending machines and glass front refrigerated coolers. This measure does not apply to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1612 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.184 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 21.71 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 16.13 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER354 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Faucet aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 305.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 296/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER358 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | EnergyWise |
| Measure Name | Faucet aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a residential setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 36.6 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.006 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.94 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group, Inc. (2012). Home Energy Services Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER360 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Single Family Appliance Management |
| Measure Name | DHWater Measure (electric) |
| Measure Description | DHW measures include high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | The baseline efficiency case is the existing domestic hot water equipment. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 134 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.94 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 4028.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 6.44 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 29.67 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 8 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER362 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Single Family Appliance Management |
| Measure Name | DHWater Measure (gas & other) |
| Measure Description | DHW measures include high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | The baseline efficiency case is the existing domestic hot water equipment. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.9 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

| | |
|--|---|
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 4028.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 4.68 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 28.33 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 8 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER364 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Single Family Appliance Management |
| Measure Name | DHWater Measure (oil) |
| Measure Description | DHW measures include high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | The baseline efficiency case is the existing domestic hot water equipment. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | <p>Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross kWh = $\text{Qty} \times \text{deltakWh}$ Gross kW = $\text{Qty} \times \text{deltakW}$ Gross MMBtu_Gas = $\text{Qty} \times \text{deltaMMBtu_Gas}$ Gross MMBtu_Oil = $\text{Qty} \times \text{deltaMMBtu_Oil}$ Gross MMBtu_Propane = $\text{Qty} \times \text{deltaMMBtu_Propane}$</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit. deltaMMBtu_Oil = Average annual oil reduction per unit deltaMMBtu_Propane = Average annual propane reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.7 |
| Oil MMBtu/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 4028.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.92 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 28.33 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 8 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER367 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Single Family Appliance Management |
| Measure Name | Waterbed mattress replacement |
| Measure Description | Replacement of waterbed mattress with a standard mattress. |
| Baseline Description | The baseline efficiency case is an existing waterbed mattress. |
| Savings Principle | The high efficiency case is a new standard mattress. |
| Energy Savings calculation method | Deemed |
| Savings unit | Replacement of existing waterbed mattress with new standard mattress. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 872 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.19 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | http://www.serta.com/best-mattress-FAQs-mattresses-Serta-Number--1-Best-Selling-Mattress.html |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 11.75 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 8.72 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 600.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 600 per measure |

| TRM Reference Number | RIER373 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyStar Products |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner electric DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 372 |
| kWh/yr savings source | Verifying Thermostatic Valve Showerhead Savings.xls |
| kWh/yr savings note | #N/A |
| kW reduction | 0.055 |
| kW reduction source | PGE Low Flow Showerhead and Thermostatic Restriction Valve |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|-------------------|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.94 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3022.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 40.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 15 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER379 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyStar Products |
| Measure Name | Low Flow Showerhead thermo Control (ladybug electric DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 76 |
| kWh/yr savings source | Verifying Thermostatic Valve Showerhead Savings.xls |
| kWh/yr savings note | #N/A |
| kW reduction | 0.011 |
| kW reduction source | PGE Low Flow Showerhead and Thermostatic Restriction Valve |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|-------------------|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.94 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 621.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 30.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 11 per measure |

| TRM Reference Number | RIER385 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyStar Products |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner oil. Propane DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 2.09 |
| Oil MMBtu/yr savings source | Verifying Thermostatic Valve Showerhead Savings.xls |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 1.2 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|-------------------|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3022.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 40.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 15 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER386 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyStar Products |
| Measure Name | Low Flow Showerhead thermo Control (ladybug oil. Propane DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.43 |
| Oil MMBtu/yr savings source | Verifying Thermostatic Valve Showerhead Savings.xls |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0.38 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|-------------------|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 621.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 30.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 11 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER387 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyStar Products |
| Measure Name | Low Flow Showerhead thermo Control (ladybug gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|-------------------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 621.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 30.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 11 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER388 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyStar Products |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|-------------------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3022.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 40.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 15 per measure |

| TRM Reference Number | RIER389 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | EnergyWise MultiFamily |
| Measure Name | AERATOR Oil |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.86 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER391 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | EnergyWise MultiFamily |
| Measure Name | SHOWERHEAD Elec |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 129 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Massachusetts common assumption |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2165.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER392 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise MultiFamily |
| Measure Name | SHOWERHEAD Oil |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 1.14 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Massachusetts common assumption |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2165.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER394 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise MultiFamily |
| Measure Name | TSV Showerhead Oil |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.39 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2723.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER395 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise MultiFamily |
| Measure Name | TSV Showerhead Other |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2723.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER399 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise MultiFamily |
| Measure Name | TSV Showerhead Elec |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 335 |
| kWh/yr savings source | National Grid (2014). Review of ShowerStart evolve. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.06 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Massachusetts common assumption |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2165.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER402 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | Income Eligible MultiFamily |
| Measure Name | AERATOR Oil |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.28 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.57 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER404 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Income Eligible MultiFamily |
| Measure Name | SHOWERHEAD Oil |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 1.07 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Massachusetts common assumption |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2165.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER406 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | Income Eligible MultiFamily |
| Measure Name | AERATOR Elec |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 97 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.31 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.98 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER407 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Income Eligible MultiFamily |
| Measure Name | SHOWERHEAD Elec |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 217 |
| kWh/yr savings source | The Cadmus Group (2015). Massachusetts Low-Income Multifamily Initiative Impact Evaluation. Prepared for the MA PAs. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.04 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | The Cadmus Group (2015). Massachusetts Low-Income Multifamily Initiative Impact Evaluation. Prepared for the MA PAs. |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Massachusetts common assumption |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2165.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 2.92 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 2.18 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER408 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Income Eligible MultiFamily |
| Measure Name | TSV Showerhead Elec |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed showerhead. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 335 |
| kWh/yr savings source | National Grid (2014). Review of ShowerStart evolve. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.06 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Massachusetts common assumption |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2165.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 4.51 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 3.36 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER410 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise |
| Measure Name | EW Pipe Insulation |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 33.3 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.003 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.94 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIER411 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Pipe Wrap DHW Elec |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear Foot |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 129 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER412 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Pipe Wrap DHW Oil |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear Foot |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 1.14 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER415 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Pipe Wrap DHW Elec |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear Foot |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 129 |
| kWh/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0.1 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.86 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.58 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 8.35 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.30 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER416 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Pipe Wrap DHW Oil |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear Foot |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 1.14 |
| Oil MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts Multifamily Program Impact Analysis July 2012 – Revised May 2013. Prepared for MA PAs |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 8.70 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.01 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER421 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Water Heater |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Tankless WH Oil |
| Measure Description | Installation of high efficiency water heating system. |
| Baseline Description | The baseline is the existing water heating system. |
| Savings Principle | The high efficiency case includes replacing water heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Water Heating System |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE; Page 10. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 374.99 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.18 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER424 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Water Heater |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Standalone WH Oil |
| Measure Description | Installation of high efficiency water heating system. |
| Baseline Description | The baseline is the existing water heating system. |
| Savings Principle | The high efficiency case includes replacing water heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Water Heating System |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE; Page 10. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 254.91 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.18 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIER425 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Water Heater |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Standalone WH Other |
| Measure Description | Installation of high efficiency water heating system. |
| Baseline Description | The baseline is the existing water heating system. |
| Savings Principle | The high efficiency case includes replacing water heating systems with higher efficiency systems. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Water Heating System |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE; Page 10. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.58 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.18 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER427 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Audit |
| Sub-type | Educational Kit |
| Program Name | Single Family Appliance Management |
| Measure Name | Basic Educational Measures |
| Measure Description | Installation of basic educational measures during an audit to help customers become more aware of energy efficiency. |
| Baseline Description | The baseline efficiency case assumes no measures installed. |
| Savings Principle | The high efficiency case includes basic educational measures such as CFLs, low flow showerheads, pool and air conditioner timers, torchieres, and programmable thermostats. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed audit. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 138 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.03 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | #N/A |
| measure life note | National Grid assumption based on regional PA working groups. |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 9.56 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 176.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$176 per kit |

| TRM Reference Number | RIER429 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | New Movers |
| Measure Description | A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | A control group of homes that does not receive Home Energy Reports |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Customer receiving energy reports |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |

| | |
|--|--|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 9.07 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 9.07 per participant |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER433 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | Opt-out dual fuel |
| Measure Description | A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | No Home Energy Report. |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Per participant |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 1.08 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 9.07 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 9.07 per participant |

| TRM Reference Number | RIER434 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | Opt-Out electric |
| Measure Description | A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | No Home Energy Report. |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Per participant |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 0.93 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 9.07 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 9.07 per participant |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIER435 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | New Movers dual fuel |
| Measure Description | A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | A control group of homes that does not receive Home Energy Reports |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Customer receiving energy reports |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.73 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |

| | |
|--|--|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 9.07 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 9.07 per participant |

| TRM Reference Number | RIER438 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | Residential |
| Project Type | 0 |
| Category | Lighting |
| Type | Interior |
| Sub-type | Torchiere |
| Program Name | EnergyWise |
| Measure Name | EW TORCHIERE1 |
| Measure Description | The installation of ENERGY STAR® torchieres. Torchieres offer comparable luminosity to incandescents at significantly less wattage and significantly longer lifetimes. |
| Baseline Description | The baseline efficiency case is a blend of incandescent, compact fluorescent, and halgoen lamps. For home audit applications, the baseline is the existing fixture. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified torchiere. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed torchiere |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 40.1 |
| kWh/yr savings source | The Cadmus Group, Inc (2012). Rhode Island EnergyWise Single Family Impact Evaluation. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.014 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 4 |
| measure life source | MA Residential Lighting Worksheet 2017, including reference to Market Adoption Model |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.13 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 766/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIER439 |
| Fuel | Electric |
| Sector | Residential |
| Project Type | 0 |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise |
| Measure Name | EW SHOWERHEAD |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 34.3 |
| kWh/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| kWh/yr savings note | #N/A |
| kW reduction | 0.004 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.94 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2401.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group, Inc. (2012). Home Energy Services Impact Evaluation. Prepared for the Electric and Gas Prog Admins of MA. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 790.00 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 766/audit with multiple installed measures |

| TRM Reference Number | RIEC008 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Custom |
| Type | Lighting |
| Sub-type | Lighting |
| Program Name | Direct Install |
| Measure Name | Custom lighting |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.04 |

| | |
|--|---|
| RRe source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.02 |
| RRd summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.13 |
| RRd winter peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC022 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Custom |
| Type | Other |
| Sub-type | Other |
| Program Name | Direct Install |
| Measure Name | Custom other |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.81 |

| | |
|--|---|
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.77 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.53 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC012 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Custom |
| Type | Refrigeration |
| Sub-type | Refrigeration |
| Program Name | Direct Install |
| Measure Name | Custom refrigeration |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.60 |

| | |
|--|---|
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.49 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.69 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC014 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Direct Install |
| Measure Name | Programmable Thermostats |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system providing space heating or cooling without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed thermostat |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC015 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Lighting |
| Type | Controls |
| Sub-type | Occupancy Sensor |
| Program Name | Direct Install |
| Measure Name | Occupancy sensors |
| Measure Description | This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls. |
| Baseline Description | The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction). |
| Savings Principle | The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed lighting controls project. |
| Savings Equation | <p>Gross kWh = $\text{SUM}[\text{QTY}_i \times \text{Watts}_i \times (\text{Hours_base}_i - \text{Hours_ee}_i)] / (\text{Watts per kW})$</p> <p>Gross kW = $\text{SUM}(\text{QTY}_i \times \text{Watts}_i) / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_i = Quantity in controlled fixtures in location i</p> <p>Watts_i = Connected wattage of controlled fixtures in location i</p> <p>Hours_{base_i} = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations).</p> <p>Hours_{ee_i} = Total annual hours that the connected lighting in location i operates with the lighting controls implemented.</p> <p>1,000 Watts per kW = Conversion factor</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.</p> <p>deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 9 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.87 |
| RRe source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.94 |
| RRd summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.94 |
| RRd winter peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.35 |
| CF summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.28 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC016 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Lighting |
| Type | Exterior |
| Sub-type | LED Fixture |
| Program Name | Direct Install |
| Measure Name | Exterior LED Fixtures |
| Measure Description | The installation of hardwired ENERGY STAR® LED outdoor fixtures with pin-based bulbs. Savings for this measure are attributable to high efficiency outdoor lighting fixtures and are treated similarly to indoor fixtures. |
| Baseline Description | Lighting baseline mix. |
| Savings Principle | The high efficiency case is the installation of LED lighting fixtures. |
| Energy Savings calculation method | Calculated using deemed inputs |
| Savings unit | Installed LED fixtures |
| Savings Equation | <p>Gross kWh = Qty × deltakW × Hours Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. DeltakW = Deemed average kW reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.05 |
| RRe source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.11 |
| CF summer peak source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.91 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC019 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Lighting |
| Type | Interior |
| Sub-type | Efficient Lighting |
| Program Name | Direct Install |
| Measure Name | Lighting systems |
| Measure Description | This measure promotes the installation of efficient lighting including, but not limited to, efficient fluorescent lamps, ballasts, and fixtures, solid state lighting, and efficient high intensity discharge (HID) lamps, ballasts, and fixtures. |
| Baseline Description | For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices. |
| Savings Principle | For both new construction and retrofit installations, the high efficiency case is project-specific and is determined using actual fixture counts for the project and wattages found in Tables 3 and 5 in Appendix A. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed high-efficiency lighting project. |
| Savings Equation | <p>Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)</p> <p>Where:</p> <p>QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific.</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |

| | |
|--|---|
| measure life source | Nexus Market Research and RLW Analytics (2004). Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs. Submitted to The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, N |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.03 |
| RRe source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.96 |
| RRd summer peak source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.96 |
| RRd winter peak source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.55 |
| CF summer peak source | DNV GL (2015) RI Small Business EE Program Prescriptive Lighting Study |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.45 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC021 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Lighting |
| Type | Signage |
| Sub-type | Exit Sign LED |
| Program Name | Direct Install |
| Measure Name | LED Exit Signs |
| Measure Description | The installation of an LED exit sign |
| Baseline Description | For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices. |
| Savings Principle | The high efficiency case is the installation of LED exit signs. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed high-efficiency lighting project. |
| Savings Equation | <p>Gross kWh = $[\text{SUM}(\text{QTY_base_i} \times \text{Watts_base_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW}) \times \text{Hours}$ Gross kW = $[\text{SUM}(\text{QTY_base_i} \times \text{Watts_base_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific.</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|--|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007. Prepared for National Grid |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.98 |
| RRd summer peak source | Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007. Prepared for National Grid |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.98 |
| RRd winter peak source | Summit Blue Consulting (2008). Large Commercial and Industrial Retrofit Program Impact Evaluation 2007. Prepared for National Grid |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC023 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Door Heater Control |
| Program Name | Direct Install |
| Measure Name | Door heater control |
| Measure Description | The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating also results in a reduced cooling load. |
| Baseline Description | The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls. |
| Savings Principle | The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by calculating the dew point of the store, and controlling the anti-sweat heater based on specific algorithms for freezer and cooler doors. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed door heater controls on existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_DoorHeater × %OFF × Hours Gross kW = kW_DoorHeater × %OFF</p> <p>Where:</p> <p>kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific %OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters Hours = Door heater annual run hours before controls</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #VALUE! |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.50 |
| CF summer peak source | HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSco; Table 9. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC024 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Door Heater Control |
| Program Name | Direct Install |
| Measure Name | Freezer Door Heater Controls |
| Measure Description | The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating also results in a reduced cooling load. |
| Baseline Description | The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls. |
| Savings Principle | The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by calculating the dew point of the store, and controlling the anti-sweat heater based on specific algorithms for freezer and cooler doors. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed door heater controls on existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_DoorHeater × %OFF × Hours Gross kW = kW_DoorHeater × %OFF</p> <p>Where:</p> <p>kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific %OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters Hours = Door heater annual run hours before controls</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #VALUE! |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.50 |
| CF summer peak source | HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSco; Table 9. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC025 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Fan Control |
| Program Name | Direct Install |
| Measure Name | Fan Control |
| Measure Description | Installation of controls to modulate the evaporator fans based on temperature control. Energy savings include: fan energy savings from reduced fan operating hours, refrigeration energy savings from reduced waste heat, and compressor energy savings resulting from the electronic temperature control. |
| Baseline Description | The baseline efficiency case assumes evaporator fans that run 8760 annual hours with no temperature control. |
| Savings Principle | The high efficiency case is the use of an energy management system to control evaporator fan operation based on temperature. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed controls on evaporator fans in existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_Fan × %OFF × (Hours per year) × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) + [kW_cp × Hours_cp + kW_fan × (Hours per year) × (1-%OFF)] × %SAVE</p> <p>Gross kW = Gross kWh / Hours</p> <p>Where:</p> <p>kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment</p> <p>%OFF_heater = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters</p> <p>8760 Hours per year = Conversion factor</p> <p>1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience.</p> <p>3,413 Btu/hr per kW = Conversion factor</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>kW_cp = Total power demand of compressor motor and condenser fan calculated from equipment nameplate data and estimated 0.85 power factor</p> <p>Hours_cp = Equivalent annual full load hours of compressor operation; Estimate based on NRM field experience.</p> <p>%OFF_evap = Percent of annual hours that the evaporator is turned off; Estimate based on NRM field experience.</p> <p>%SAVE = Reduced run-time of compressor and evaporator due to electronic controls; Estimate based on NRM field experience.</p> |
| Hours | 4072 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Calculation assumptions based off of NRM field experience and data |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |

| | |
|--|---|
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.58 |
| RRe source | HEC, Inc. (1996). Analysis of Savings from Walkin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | HEC, Inc. (1996). Analysis of Savings from Walkin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | HEC, Inc. (1996). Analysis of Savings from Walkin Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.23 |
| CF summer peak source | HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSco; Table 9. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.84 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC026 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Novelty Cooler Control |
| Program Name | Direct Install |
| Measure Name | Novelty cooler shutoff |
| Measure Description | Installation of controls to shut off a facility's novelty coolers for non-perishable goods based on pre-programmed store hours. Energy savings occur as coolers cycle off during facility unoccupied hours. |
| Baseline Description | The baseline efficiency case is the novelty coolers operating 8,760 hours per year. |
| Savings Principle | The high efficiency case is the novelty coolers operating fewer than 8,760 hours per year since they are controlled to cycle each night based on pre-programmed facility unoccupied hours. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed controls on existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_nc × DC_nc × HoursOff</p> <p>Gross kW = 0</p> <p>Where:</p> <p>kW_nc = Power demand of novelty cooler calculated from equipment nameplate data and estimated 0.85 power factor.</p> <p>DC_nc = Weighted average annual duty cycle; Estimate based on NRM field experience.</p> <p>HoursOff = Potential hours off every night per year, estimated as one less than the number of hours the store is closed per day: site-specific.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #VALUE! |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|---|
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC027 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Vending Miser |
| Program Name | Direct Install |
| Measure Name | Glass front refrigerated coolers |
| Measure Description | Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1208 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.138 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC028 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Vending Miser |
| Program Name | Direct Install |
| Measure Name | Non-refrigerated snack vending machine |
| Measure Description | Controls significantly reduce the energy consumption of vending machine lighting by powering down lighting during periods of inactivity. This measure applies to non-refrigerated snack vending machines. This measure does not apply to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency non-refrigerated snack vending machine without a control system capable of powering down lighting during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency non-refrigerated snack vending machine with a control system capable of powering down lighting during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 343 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.039 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC029 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Vending Miser |
| Program Name | Direct Install |
| Measure Name | Refrigerated beverage vending machine |
| Measure Description | Controls significantly reduce the energy consumption of refrigerated beverage vending machine lighting and refrigeration systems by powering down these systems during periods of inactivity while maintaining a refrigerated product. This measure applies to refrigerated beverage vending machines and glass front refrigerated coolers. This measure does not apply to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1612 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.184 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|---|
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC033 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Motors |
| Sub-type | ECM |
| Program Name | Direct Install |
| Measure Name | ECM evaporator fan motors (walk-in coolers/ freezers) |
| Measure Description | Installation of electronically commutated motors (ECMs) in multi-deck and freestanding coolers and freezers, typically on the retail floor of convenience stores, liquor stores, and grocery stores. |
| Baseline Description | The baseline efficiency case is the existing case motor. |
| Savings Principle | The high efficiency case is the replacement of the existing case motor with an ECM. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed electronically commutated motor for evaporator fans in existing cooler/freezer. |
| Savings Equation | $\text{Gross kWh} = \text{kW_Fan} \times \text{LRF} \times \text{Hours} \times (1 + \text{RefrigEff} \times (\text{Btu/hr per kW}) / (\text{Btu/hr per ton}))$ $\text{Gross kW} = \text{Gross kWh} / \text{Hours}$ <p>Where:</p> <p>kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment LRF = Load reduction factor for motor replacement Hours = Annual fan operating hours: site-specific 1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 0.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.87 |
| CF summer peak source | RLW Analytics (2007). Impact Evaluation Analysis of the 2005 Custom SBS Program. Prepared for National Grid. Derivation based on site specific results from the study adjusted for current on peak hours. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.51 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC034 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Refrigeration |
| Type | Refrigeration Lighting |
| Sub-type | Refrigerator Case LED |
| Program Name | Direct Install |
| Measure Name | LEDs for freezer/cooler cases |
| Measure Description | Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load. |
| Baseline Description | The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases. |
| Savings Principle | The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed lighting project. |
| Savings Equation | <p>Gross kWh = [SUM(QTY_base × Watts_base × Hours_base) - SUM(QTY_ee × kW_ee × Hours_ee)] × (1 + EffRefrig × (Btu/hr per kW) / (Btu/hr per ton))</p> <p>Gross kW = Gross kWh / Hours_ee</p> <p>Where:</p> <p>QTY_base = Quantity of baseline lighting fixtures in cooler/freezer case Watts_base = Connected wattage of baseline lighting fixtures in cooler/freezer case Hours_base = Annual operating hours of baseline lighting fixtures in cooler/freezer case QTY_ee = Quantity of efficient lighting fixtures in cooler/freezer case Watts_ee = Connected wattage of efficient lighting fixtures in cooler/freezer case Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case 1.9 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.04 |
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.07 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.15 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors set to 1.00 since gross kW is the average kW reduction during operation. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC035 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | Direct Install |
| Measure Name | Faucet Aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow. |
| Baseline Description | The baseline efficiency case is a 2.2 GPM faucet. |
| Savings Principle | The high efficiency is a low-flow faucet aerator. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 387.4 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.07 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 5460.00 |
| Sewer savings: gallons/yr | 5460.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC036 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Spray Valve |
| Program Name | Direct Install |
| Measure Name | Pre-Rinse Spray Valve |
| Measure Description | Retrofitting existing standard spray nozzles in locations where service water is supplied by an electric hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM. |
| Baseline Description | Standard spray valve. |
| Savings Principle | The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed pre-rinse spray valve. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 2871.4 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.75 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 6410.00 |
| Sewer savings: gallons/yr | 6410.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC037 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Direct Install |
| Measure Name | Low-Flow Showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is a 2.5 GPM showerhead. |
| Savings Principle | The high efficiency case is a 1.5 GPM showerhead. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1185 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.2 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 7300.00 |
| Sewer savings: gallons/yr | 7300.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC038 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Spray Valve |
| Program Name | Direct Install |
| Measure Name | Salon Nozzle |
| Measure Description | The installation of a high efficiency low flow salon nozzle. |
| Baseline Description | Standard salon nozzle. |
| Savings Principle | An efficient low flow salon nozzle. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed salon nozzle |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 4648.9 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.79 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 28639.00 |
| Sewer savings: gallons/yr | 28639.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.01 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.76 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.53 /kWh |

| TRM Reference Number | RIEC039 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Codes and Standards |
| Type | Codes and Standards |
| Sub-type | Codes and Standards |
| Program Name | Commercial New Construction |
| Measure Name | CODES AND STANDARDS |
| Measure Description | Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island. |
| Baseline Description | Un-influenced adoption curve of federal minimum codes and standards. |
| Savings Principle | Accelerated adoption of advancing energy codes and equipment standards. |
| Energy Savings calculation method | Calculated based on attribution study |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | KEMA Rhode Island Energy Code Compliance Baseline Study |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | KEMA Rhode Island Energy Code Compliance Baseline Study |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |

| | |
|--|---|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIEC044 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | High Efficiency Air Compressors |
| Sub-type | Variable Displacement |
| Program Name | Commercial New Construction |
| Measure Name | Variable Displacement (50<=HP<=75) |
| Measure Description | The installation of oil flooded, rotary screw compressors with Variable Displacement capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver. |
| Baseline Description | The baseline efficiency case is a typical load / unload compressor. |
| Savings Principle | The high efficiency case is an oil-flooded, rotary screw compressor with Variable Displacement capacity control with a properly sized air receiver. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per horsepower (hp) of installed air compressor capacity. |
| Savings Equation | $\text{Gross kWh} = \text{HP_compressor} \times \text{deltakW/HP} \times \text{Hours}$ $\text{Gross kW} = \text{HP_compressor} \times \text{deltakW/HP}$ $\text{HP_compressor} = \text{Nominal rated horsepower of high efficiency air compressor: site-specific}$ $\text{Hours} = \text{Annual operating hours of the air compressor: site-specific}$ $\text{deltakW/HP} = \text{Air compressor kW reduction per HP}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.19 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.41 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC045 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | High Efficiency Air Compressors |
| Sub-type | Variable Speed Drive |
| Program Name | Commercial New Construction |
| Measure Name | VSD (15<=HP<25) |
| Measure Description | The installation of oil flooded, rotary screw compressors with Variable Speed Drive capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver. |
| Baseline Description | The baseline efficiency case is a typical load / unload compressor. |
| Savings Principle | The high efficiency case is an oil-flooded, rotary screw compressor with Variable Speed Drive capacity control with a properly sized air receiver. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per horsepower (hp) of installed air compressor capacity. |
| Savings Equation | $\text{Gross kWh} = \text{HP_compressor} \times \text{deltakW/HP} \times \text{Hours}$ $\text{Gross kW} = \text{HP_compressor} \times \text{deltakW/HP}$ $\text{HP_compressor} = \text{Nominal rated horsepower of high efficiency air compressor: site-specific}$ $\text{Hours} = \text{Annual operating hours of the air compressor: site-specific}$ $\text{deltakW/HP} = \text{Air compressor kW reduction per HP}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.19 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.41 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC046 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | High Efficiency Air Compressors |
| Sub-type | Variable Speed Drive |
| Program Name | Commercial New Construction |
| Measure Name | VSD (25<=HP<=75) |
| Measure Description | The installation of oil flooded, rotary screw compressors with Variable Speed Drive capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver. |
| Baseline Description | The baseline efficiency case is a typical load / unload compressor. |
| Savings Principle | The high efficiency case is an oil-flooded, rotary screw compressor with Variable Speed Drive capacity control with a properly sized air receiver. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per horsepower (hp) of installed air compressor capacity. |
| Savings Equation | $\text{Gross kWh} = \text{HP_compressor} \times \text{deltakW/HP} \times \text{Hours}$ $\text{Gross kW} = \text{HP_compressor} \times \text{deltakW/HP}$ $\text{HP_compressor} = \text{Nominal rated horsepower of high efficiency air compressor: site-specific}$ $\text{Hours} = \text{Annual operating hours of the air compressor: site-specific}$ $\text{deltakW/HP} = \text{Air compressor kW reduction per HP}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.19 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.41 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC047 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Low Pressure Drop Filters |
| Sub-type | Low Pressure Drop Filter |
| Program Name | Commercial New Construction |
| Measure Name | Low pressure drop filter |
| Measure Description | Filters remove solids and aerosols from compressed air systems. Low pressure drop filters have longer lives and lower pressure drops than traditional coalescing filters resulting in higher efficiencies. |
| Baseline Description | The baseline efficiency case is a standard coalescing filter with initial drop of between 1 and 2 pounds per sq inch (psi) with an end of life drop of 10 psi. |
| Savings Principle | The high efficiency case is a low pressure drop filter with initial drop not exceeding 1 psi when new and 3 psi at element change. Filters must be deep-bed, "mist eliminator" style and installed on a single operating compressor rated 15 – 75 HP. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed filter. |
| Savings Equation | <p>Gross kWh = Qty × HP_compressor × (kW per HP) × %SAVE × Hours</p> <p>Gross kW = Qty × HP_compressor × (kW per HP) × %SAVE</p> <p>Where:</p> <p>Qty = Number of filters installed: site-specific</p> <p>HP_compressor = Average compressor load: site-specific</p> <p>kW per HP = Conversion factor</p> <p>%SAVE = Percent change in pressure drop: site-specific</p> <p>Hours = Annual operating hours of the lower pressure drop filter: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | Based on NSTAR estimates of typical replacement schedule |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.80 |
| CF summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.54 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC048 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Refrigerated Air Dryers |
| Sub-type | Refrigerated Air Dryer |
| Program Name | Commercial New Construction |
| Measure Name | Dryer (100≤CFM<200) |
| Measure Description | The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryer. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible. |
| Baseline Description | The baseline efficiency case is a non-cycling refrigerated air dryer. |
| Savings Principle | The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per CFM of installed air dryer capacity. |
| Savings Equation | <p>Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM</p> <p>Where:</p> <p>CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.00558 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.56 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC049 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Refrigerated Air Dryers |
| Sub-type | Refrigerated Air Dryer |
| Program Name | Commercial New Construction |
| Measure Name | Dryer (200<=CFM<300) |
| Measure Description | The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryer. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible. |
| Baseline Description | The baseline efficiency case is a non-cycling refrigerated air dryer. |
| Savings Principle | The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per CFM of installed air dryer capacity. |
| Savings Equation | <p>Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM</p> <p>Where:</p> <p>CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.00558 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.56 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC050 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Refrigerated Air Dryers |
| Sub-type | Refrigerated Air Dryer |
| Program Name | Commercial New Construction |
| Measure Name | Dryer (300<=CFM<400) |
| Measure Description | The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryer. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible. |
| Baseline Description | The baseline efficiency case is a non-cycling refrigerated air dryer. |
| Savings Principle | The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per CFM of installed air dryer capacity. |
| Savings Equation | <p>Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM</p> <p>Where:</p> <p>CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.00558 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.56 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC051 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Refrigerated Air Dryers |
| Sub-type | Refrigerated Air Dryer |
| Program Name | Commercial New Construction |
| Measure Name | Dryer (CFM >=400) |
| Measure Description | The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryer. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible. |
| Baseline Description | The baseline efficiency case is a non-cycling refrigerated air dryer. |
| Savings Principle | The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per CFM of installed air dryer capacity. |
| Savings Equation | <p>Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM</p> <p>Where:</p> <p>CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.00558 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.56 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 0.32 /kWh |

| TRM Reference Number | RIEC052 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Refrigerated Air Dryers |
| Sub-type | Refrigerated Air Dryer |
| Program Name | Commercial New Construction |
| Measure Name | Dryer (CFM<100) |
| Measure Description | The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryer. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible. |
| Baseline Description | The baseline efficiency case is a non-cycling refrigerated air dryer. |
| Savings Principle | The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per CFM of installed air dryer capacity. |
| Savings Equation | <p>Gross kWh = CFM_dryer × deltakW/CFM × Hours Gross kW = CFM_dryer × deltakW/CFM</p> <p>Where:</p> <p>CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM Hours = Annual operating hours of the refrigerated air dryer: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.00558 |
| kW reduction source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.56 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC053 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Compressed Air |
| Type | Zero Loss Condensate Drains |
| Sub-type | Zero Loss Condensate Drain |
| Program Name | Commercial New Construction |
| Measure Name | Zero loss condensate drain |
| Measure Description | Drains remove water from a compressed air system. Zero loss condensate drains remove water from a compressed air system without venting any air, resulting in less air demand and consequently greater efficiency. |
| Baseline Description | The baseline efficiency case is the installation of a standard condensate drain on a compressor system. |
| Savings Principle | The high efficiency case is the installation of a zero loss condensate drain on a single operating compressor rated <= 75 HP. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed drain. |
| Savings Equation | <p>Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM</p> <p>Where:</p> <p>CFM_pipe = CFM capacity of piping: site-specific 0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity 0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario. Hours = Annual operating hours of the zero loss condensate drain: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.80 |
| CF summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.54 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.04 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC065 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | HVAC |
| Sub-type | HVAC |
| Program Name | Commercial New Construction |
| Measure Name | Custom HVAC |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.75 |

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|--|---|
| RRe source | DNV GL (2015) Impact Evaluation of 2012 Custom HVAC Installations (MAEEAC) |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.58 |
| RRd summer peak source | DNV GL (2015) Impact Evaluation of 2012 Custom HVAC Installations (MAEEAC) |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.66 |
| RRd winter peak source | DNV GL (2015) Impact Evaluation of 2012 Custom HVAC Installations (MAEEAC) |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.33 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.67 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.32 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC070 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Lighting |
| Sub-type | Lighting |
| Program Name | Commercial New Construction |
| Measure Name | Custom lighting |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.92 |

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|--|---|
| RRe source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.11 |
| RRd summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.79 |
| RRd winter peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.33 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.67 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.32 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| TRM Reference Number | RIEC080 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Fryer |
| Program Name | Commercial New Construction |
| Measure Name | Commercial Electric Fryer |
| Measure Description | Installation of a qualified ENERGY STAR® commercial fryer, which saves energy during preheating, cooking, and idling. |
| Baseline Description | The baseline efficiency case is a deep-fat fryer with a cooking efficiency of 75%, a shortening capacity of up to 65 pounds, daily a preheat energy of 2.3 kWh, and an idle energy rate of 1.05 kW |
| Savings Principle | The high efficiency case is a deep-fat fryer with a cooking energy efficiency of 80%, a shortening capacity of up to 65 pounds, a daily preheat energy of 2.3 kWh, and an idle energy rate of 1.05 kW. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency electric fryer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 3756 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 760 |
| kWh/yr savings source | ENERGYSTAR Commercial Kitchen Equipment Savings Calculator: Fryer Calculations. www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls . |
| kWh/yr savings note | #N/A |
| kW reduction | 0.202 |
| kW reduction source | ENERGYSTAR Commercial Kitchen Equipment Savings Calculator: Fryer Calculations. www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls . |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101, Commercial Convection Oven, Revision #0. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | All PAs use 100% savings persistence factors. |

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|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.90 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays. |
| Coincidence factor (CF) winter peak | 0.90 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

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|--------------------------------------|--|
| TRM Reference Number | RIEC081 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Griddle |
| Program Name | Commercial New Construction |
| Measure Name | Commercial electric griddle |
| Measure Description | Installation of a qualified ENERGY STAR® griddle. ENERGY STAR® griddles save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates. |
| Baseline Description | The baseline efficiency case is a standard efficiency (30% efficient) griddle. |
| Savings Principle | The high efficiency case is a griddle with an efficiency of 38%. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency commercial electric griddle. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 3756 |
| Hours Source | Technical Assessment of Commercial Ovens < http://www.fishnick.com/equipment/techassessment/7_ovens.pdf >, pg.23 |
| Hours source note | #N/A |
| kWh/yr Savings | 2226 |
| kWh/yr savings source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kWh/yr savings note | #N/A |
| kW reduction | 0.593 |
| kW reduction source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Food Service Technology Center (2011). Electric Griddle Life-Cycle Cost Calculator. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

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|--|---|
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.90 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays. |
| Coincidence factor (CF) winter peak | 0.90 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIEC082 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Oven |
| Program Name | Commercial New Construction |
| Measure Name | Commercial Electric Convection Oven |
| Measure Description | Installation of a qualified ENERGY STAR® commercial oven. ENERGY STAR® commercial ovens save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates. |
| Baseline Description | The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15 of Appendix A. |
| Savings Principle | The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15 of Appendix A. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency commercial electric oven. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 3756 |
| Hours Source | Technical Assessment of Commercial Ovens < http://www.fishnick.com/equipment/techassessment/7_ovens.pdf >, pg.23 |
| Hours source note | #N/A |
| kWh/yr Savings | 1364 |
| kWh/yr savings source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kWh/yr savings note | #N/A |
| kW reduction | 0.436 |
| kW reduction source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101, Commercial Convection Oven, Revision #0. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.90 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays. |
| Coincidence factor (CF) winter peak | 0.90 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC083 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Oven |
| Program Name | Commercial New Construction |
| Measure Name | Commercial electric oven |
| Measure Description | Installation of a qualified ENERGY STAR® commercial oven. ENERGY STAR® commercial ovens save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates. |
| Baseline Description | The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15 of Appendix A. |
| Savings Principle | The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15 of Appendix A. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency commercial electric oven. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 3756 |
| Hours Source | Technical Assessment of Commercial Ovens < http://www.fishnick.com/equipment/techassessment/7_ovens.pdf >, pg.23 |
| Hours source note | #N/A |
| kWh/yr Savings | 9688 |
| kWh/yr savings source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kWh/yr savings note | #N/A |
| kW reduction | 2.579 |
| kW reduction source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Pacific Gas & Electric Company – Customer Energy Efficiency Department (2007). Work Paper PGECOFST101, Commercial Convection Oven, Revision #0. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|---|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.90 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays. |
| Coincidence factor (CF) winter peak | 0.90 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | N/A |

| TRM Reference Number | RIEC084 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Steamer |
| Program Name | Commercial New Construction |
| Measure Name | Commercial electric steamer |
| Measure Description | Installation of a qualified ENERGY STAR® commercial steam cooker. ENERGY STAR® steam cookers save energy during cooling and idle times due to improved cooking efficiency and idle energy rates. |
| Baseline Description | The baseline efficiency case is a conventional electric steam cooker with a cooking energy efficiency of 30%, pan production capacity of 23.3 pounds per hour, and an idle energy rate of 1.2 kW. |
| Savings Principle | The high efficiency case is an ENERGY STAR® electric steam cooker with a cooking energy efficiency of 50%, pan production capacity of 16.7 pounds per hour, and an idle energy rate of 0.4 kW. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency commercial electric steamer. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 3756 |
| Hours Source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| Hours source note | #N/A |
| kWh/yr Savings | 8381 |
| kWh/yr savings source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kWh/yr savings note | #N/A |
| kW reduction | 2.231 |
| kW reduction source | ENERGY Star Commercial Kitchen Equipment Savings Calculator: Griddle Calculations < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls > |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.90 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are .9 for both summer and winter seasons to account for restaurants that close one day per week or may not serve lunch and dinner on weekdays. |
| Coincidence factor (CF) winter peak | 0.90 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIEC085 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Dishwasher |
| Sub-type | High Temp, Door Type |
| Program Name | Commercial New Construction |
| Measure Name | Dishwasher - High Temperature Door Type |
| Measure Description | Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster. |
| Baseline Description | The baseline efficiency case is a commercial dishwasher with 0.87 kW idle energy rate and 1.29 gal/rack water consumption. |
| Savings Principle | The high efficiency case is a commercial dishwasher with 0.70 kW idle energy rate and 0.89 gal/rack water consumption or lower following ENERGY STAR efficiency requirements. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed Dishwasher |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 4151 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.74 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 35000.00 |
| Sewer savings: gallons/yr | 35000.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| TRM Reference Number | RIEC086 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Dishwasher |
| Sub-type | High Temp, Single Tank |
| Program Name | Commercial New Construction |
| Measure Name | Dishwasher - High Temperature Single Tank Conveyor |
| Measure Description | Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster. |
| Baseline Description | The baseline efficiency case is a commercial dishwasher with 1.93 kW idle energy rate and 0.87 gal/rack water consumption. |
| Savings Principle | The high efficiency case is a commercial dishwasher with 1.50 kW idle energy rate and 0.70 gal/rack water consumption or lower following ENERGY STAR efficiency requirements. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed Dishwasher |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 4243 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.75 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 21300.00 |
| Sewer savings: gallons/yr | 21300.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC087 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Dishwasher |
| Sub-type | High Temp, Under Counter |
| Program Name | Commercial New Construction |
| Measure Name | Dishwasher - High Temperature Under Counter |
| Measure Description | Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster. |
| Baseline Description | The baseline efficiency case is a commercial dishwasher with 0.76 kW idle energy rate and 1.09 gal/rack water consumption. |
| Savings Principle | The high efficiency case is a commercial dishwasher with 0.50 kW idle energy rate and 0.86 gal/rack water consumption or lower following ENERGY STAR efficiency requirements. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed Dishwasher |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1791 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.32 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

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|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 5400.00 |
| Sewer savings: gallons/yr | 5400.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| TRM Reference Number | RIEC088 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Dishwasher |
| Sub-type | Low Temp, Door Type |
| Program Name | Commercial New Construction |
| Measure Name | Dishwasher - Low Temperature Door Type |
| Measure Description | Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agent in the final rinse cycle and sometimes a drying agent. |
| Baseline Description | The baseline efficiency case is a commercial dishwasher with 0.60 kW idle energy rate and 2.10 gal/rack water consumption. |
| Savings Principle | The high efficiency case is a commercial dishwasher with 0.60 kW idle energy rate and 1.18 gal/rack water consumption or lower following ENERGY STAR efficiency requirements. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed Dishwasher |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 13851 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 2.46 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 80600.00 |
| Sewer savings: gallons/yr | 80600.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| TRM Reference Number | RIEC089 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Dishwasher |
| Sub-type | Low Temp, Single tank |
| Program Name | Commercial New Construction |
| Measure Name | Dishwasher - Low Temperature Single Tank Conveyor |
| Measure Description | Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agent in the final rinse cycle and sometimes a drying agent. |
| Baseline Description | The baseline efficiency case is a commercial dishwasher with 1.60 kW idle energy rate and 1.31 gal/rack water consumption. |
| Savings Principle | The high efficiency case is a commercial dishwasher with 1.60 kW idle energy rate and 0.79 gal/rack water consumption or lower following ENERGY STAR efficiency requirements. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed Dishwasher |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 11685 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 2.07 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 65100.00 |
| Sewer savings: gallons/yr | 65100.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| TRM Reference Number | RIEC090 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Dishwasher |
| Sub-type | Low Temp, Under Counter |
| Program Name | Commercial New Construction |
| Measure Name | Dishwasher - Low Temperature Under Counter |
| Measure Description | Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agent in the final rinse cycle and sometimes a drying agent. |
| Baseline Description | The baseline efficiency case is a commercial dishwasher with 0.50 kW idle energy rate and 1.73 gal/rack water consumption. |
| Savings Principle | The high efficiency case is a commercial dishwasher with 0.50 kW idle energy rate and 1.19 gal/rack water consumption or lower following ENERGY STAR efficiency requirements. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed Dishwasher |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 2178 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.39 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

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|--|--|
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 12700.00 |
| Sewer savings: gallons/yr | 12700.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC091 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Hot Food Cabinet |
| Sub-type | 1/2 |
| Program Name | Commercial New Construction |
| Measure Name | Hot Food Holding Cabinet - 1/2 |
| Measure Description | Installation of a qualified ENERGY STAR® hot food holding cabinet (HFHC). |
| Baseline Description | The baseline efficiency idle energy rate for a HFHC is 400 W for all sizes. |
| Savings Principle | A HFHC that incorporates better insulation, reducing heat loss, and may also offer additional energy saving devices such as magnetic door gaskets, auto-door closures, or dutch doors. 1/2 size idle energy rate is 172 W. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per hot food cabinet |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 4695 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 695 |
| kWh/yr savings source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.15 |
| kW reduction source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

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|--|--|
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIEC092 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Hot Food Cabinet |
| Sub-type | 3/4 |
| Program Name | Commercial New Construction |
| Measure Name | Hot Food Holding Cabinet - 3/4 |
| Measure Description | Installation of a qualified ENERGY STAR® hot food holding cabinet (HFHC). |
| Baseline Description | The baseline efficiency idle energy rate for a HFHC is 400 W for all sizes. |
| Savings Principle | A HFHC that incorporates better insulation, reducing heat loss, and may also offer additional energy saving devices such as magnetic door gaskets, auto-door closures, or dutch doors. 3/4 size idle energy rate is 258 W. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per hot food cabinet |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 4695 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1042 |
| kWh/yr savings source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.22 |
| kW reduction source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

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|--|--|
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit☐ | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit☐ | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC093 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Hot Food Cabinet |
| Sub-type | Full |
| Program Name | Commercial New Construction |
| Measure Name | Hot Food Holding Cabinet - Full |
| Measure Description | Installation of a qualified ENERGY STAR® hot food holding cabinet (HFHC). |
| Baseline Description | The baseline efficiency idle energy rate for a HFHC is 400 W for all sizes. |
| Savings Principle | A HFHC that incorporates better insulation, reducing heat loss, and may also offer additional energy saving devices such as magnetic door gaskets, auto-door closures, or dutch doors. Full size idle energy rate is 294 W. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per hot food cabinet |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 4695 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 2376 |
| kWh/yr savings source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.51 |
| kW reduction source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | ENERGY STAR® Commercial Kitchen Equipment Savings Calculator: HFHC Calcs. < http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/commercial_kitchen_equipment_calculator.xls >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|--|
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIEC094 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Ice Machine |
| Sub-type | Ice Making Head |
| Program Name | Commercial New Construction |
| Measure Name | Ice Making Head |
| Measure Description | Installation of a qualified ENERGY STAR® commercial ice machine. |
| Baseline Description | The baseline efficiency case is a non-ENERGY STAR® commercial ice machine. |
| Savings Principle | Commercial ice machines meeting the ENERGY STAR® specifications are on average 15 percent more energy efficient and 10 percent more water-efficient than standard models. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per ice machine |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 665 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.08 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|--|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3322.00 |
| Sewer savings: gallons/yr | 3322.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC095 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Ice Machine |
| Sub-type | Ice Remote/Split |
| Program Name | Commercial New Construction |
| Measure Name | Ice Remote/Split |
| Measure Description | Installation of a qualified ENERGY STAR® commercial ice machine. |
| Baseline Description | The baseline efficiency case is a non-ENERGY STAR® commercial ice machine. |
| Savings Principle | Commercial ice machines meeting the ENERGY STAR® specifications are on average 15 percent more energy efficient and 10 percent more water-efficient than standard models. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per ice machine |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1196 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.14 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|--|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIEC096 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Ice Machine |
| Sub-type | Ice Self Contained |
| Program Name | Commercial New Construction |
| Measure Name | Ice Self Contained |
| Measure Description | Installation of a qualified ENERGY STAR® commercial ice machine. |
| Baseline Description | The baseline efficiency case is a non-ENERGY STAR® commercial ice machine. |
| Savings Principle | Commercial ice machines meeting the ENERGY STAR® specifications are on average 15 percent more energy efficient and 10 percent more water-efficient than standard models. |
| Energy Savings calculation method | Deemed |
| Savings unit | Per ice machine |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakWh / Hours</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Deemed average annual kWh reduction per unit. Hours = Deemed average annual operating hours.</p> |
| Hours | 5634 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 205 |
| kWh/yr savings source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.02 |
| kW reduction source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | In-service rates are set to 100% based on the assumption that all purchased units are installed. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

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|--|--|
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rates are 100% since savings estimates are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3526.00 |
| Sewer savings: gallons/yr | 3526.00 |
| Water / Sewer savings Source | Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Ice Machine Calcs. < http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >. Tool downloaded August 10, 2015. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

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|--------------------------------------|--|
| TRM Reference Number | RIEC133 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Controls |
| Sub-type | Economizer |
| Program Name | Commercial New Construction |
| Measure Name | Dual enthalpy economizer controls |
| Measure Description | The measure is to upgrade the outside-air dry-bulb economizer to a dual enthalpy economizer. The system will continuously monitor the enthalpy of both the outside air and return air. The system will control the system dampers adjust the outside quantity based on the two readings. |
| Baseline Description | The baseline efficiency case for this measure assumes the relevant HVAC equipment is operating with a fixed dry-bulb economizer. |
| Savings Principle | The high efficiency case is the installation of an outside air economizer utilizing two enthalpy sensors, one for outdoor air and one for return air. |
| Energy Savings calculation method | Deemed |
| Savings unit | Total tons of controlled cooling capacity. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 289 |
| kWh/yr savings source | Patel, Dinesh (2001). Energy Analysis: Dual Enthalpy Control. Prepared for NSTAR. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.289 |
| kW reduction source | Patel, Dinesh (2001). Energy Analysis: Dual Enthalpy Control. Prepared for NSTAR. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.05 |
| RRe source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |

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| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.34 |
| CF summer peak source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC134 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Ground Source |
| Program Name | Commercial New Construction |
| Measure Name | Ground source (closed loop) heat pump |
| Measure Description | This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications. |
| Baseline Description | The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. |
| Savings Principle | The high efficiency case assumes a high-efficiency air cooled, water source, ground water source, or ground source heat pump system that exceeds the energy efficiency requirements of the International Energy Conservation Code (IECC) 2015. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed heat pump system for space cooling / heating. |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]</p> <p>Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)</p> <p>Where:</p> <p>Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER=SEER/1.1</p> |
| Hours | 0 |
| Hours Source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |

| | |
|--|--|
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.05 |
| RRe source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.40 |
| CF summer peak source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC135 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Ground Source |
| Program Name | Commercial New Construction |
| Measure Name | Water source heat pump |
| Measure Description | This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications. |
| Baseline Description | The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. |
| Savings Principle | The high efficiency case assumes a high-efficiency air cooled, water source, ground water source, or ground source heat pump system that exceeds the energy efficiency requirements of the International Energy Conservation Code (IECC) 2015. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed heat pump system for space cooling / heating. |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]</p> <p>Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)</p> <p>Where:</p> <p>Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER=SEER/1.1</p> |
| Hours | 0 |
| Hours Source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |

| | |
|--|--|
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.05 |
| RRe source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.40 |
| CF summer peak source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC136 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heat Pumps |
| Sub-type | Groundwater Source |
| Program Name | Commercial New Construction |
| Measure Name | Groundwater source (open loop) heat pump |
| Measure Description | This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications. |
| Baseline Description | The baseline efficiency case for new installations assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. |
| Savings Principle | The high efficiency case assumes a high-efficiency air cooled, water source, ground water source, or ground source heat pump system that exceeds the energy efficiency requirements of the International Energy Conservation Code (IECC) 2015. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed heat pump system for space cooling / heating. |
| Savings Equation | <p>Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]</p> <p>Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)</p> <p>Where:</p> <p>Tons = Rated cooling capacity of the installed equipment: site-specific. 12 kBtu/hr per ton = Conversion factor SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific. Hours_C = Equivalent full load cooling hours HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific. Hours_H = Equivalent full load heating hours CR = Capacity Ratio converts rated cooling capacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric Benefits Analysis Update. Prepared for Dave Weber, NSTAR. EER_base = Energy Efficiency Ratio of baseline equipment. EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER=SEER/1.1</p> |
| Hours | 0 |
| Hours Source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |

| | |
|--|--|
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.05 |
| RRe source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.40 |
| CF summer peak source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC137 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Motors |
| Sub-type | ECM Motor |
| Program Name | Commercial New Construction |
| Measure Name | ECM fan motor for HVAC |
| Measure Description | This measure is offered through the Cool Choice program and promotes the installation of electronically commutated motors (ECMs) on fan powered terminal boxes, fan coils, and HVAC supply fans on small unitary equipment. |
| Baseline Description | The baseline efficiency case for this measure assumes the VAV box fans are powered by a single speed fractional horsepower permanent split capacitor (PSC) induction motor. |
| Savings Principle | The high efficiency case must have a motor installed on new, qualifying HVAC equipment. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed ECM fan motor. |
| Savings Equation | <p>Gross kWh = DesignCFM × BoxSizeFactor × %Flow_Annual × Hours Gross Summer kW = DesignCFM × BoxSizeFactor × %Flow_Summer × Hours Gross Winter kW = DesignCFM × BoxSizeFactor × %Flow_Winter × Hours</p> <p>Where:</p> <p>DesignCFM = Capacity of the VAV box in cubic feet per minute: site-specific. BoxSizeFactor = Savings factor in Watts/CFM %Flow_Annual = Average % of design flow over all operating hours %Flow_Summer = Average % of design flow during summer peak period %Flow_Winter = Average % of design flow during winter peak period Hours = Estimated annual operating hours for VAV box fans: site-specific. DesignCFM = Capacity of the VAV box in cubic feet per minute: site-specific. Hours = Estimated annual operating hours for VAV box fans: site-specific.</p> |
| Hours | 0 |
| Hours Source | KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum. |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

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|--|--|
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC143 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Ventilation |
| Sub-type | Demand Control Ventilation |
| Program Name | Commercial New Construction |
| Measure Name | Demand control ventilation |
| Measure Description | The measure is to control quantity of outside air to an air handling system based on detected space CO2 levels. The installed systems monitor the CO2 in the spaces or return air and reduce the outside air use when possible to save energy while meeting indoor air quality standards. |
| Baseline Description | The baseline efficiency case for this measure assumes the relevant HVAC equipment has no ventilation control. |
| Savings Principle | The high efficiency case is the installation of an outside air intake control based on CO2 sensors. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed demand control ventilation project. |
| Savings Equation | <p>Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = Gross kWh \times $\Delta MMBtu_{Gas/kWh}$ Gross MMBtu Oil = Gross kWh \times $\Delta MMBtu_{Oil/kWh}$</p> <p>$\Delta MMBtu_{Gas/kWh}$ = Deemed average natural gas impact per gross electric energy impact $\Delta MMBtu_{Oil/kWh}$ = Deemed average heating oil impact per gross electric energy impact</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Calculated with the National Grid DCV savings Tool |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because energy savings are custom calculated. |

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| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because energy savings are custom calculated. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to 1.00 because coincidence is built into the estimates of Gross kW. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC153 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Lighting |
| Type | Controls |
| Sub-type | Dimming |
| Program Name | Commercial New Construction |
| Measure Name | Daylight dimming |
| Measure Description | This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls. |
| Baseline Description | The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction). |
| Savings Principle | The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed lighting controls project. |
| Savings Equation | <p>Gross kWh = $\text{SUM}[\text{QTY}_i \times \text{Watts}_i \times (\text{Hours_base}_i - \text{Hours_ee}_i)] / (\text{Watts per kW})$ Gross kW = $\text{SUM}(\text{QTY}_i \times \text{Watts}_i) / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_i = Quantity in controlled fixtures in location i Watts_i = Connected wattage of controlled fixtures in location i Hours_{base_i} = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations). Hours_{ee_i} = Total annual hours that the connected lighting in location i operates with the lighting controls implemented. 1,000 Watts per kW = Conversion factor</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

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| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.38 |
| RRe source | RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.96 |
| RRd summer peak source | RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.96 |
| RRd winter peak source | RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.15 |
| CF summer peak source | RLW Analytics (2007). Lighting Controls Impact Evaluation Final Report, 2005 Energy Initiative, Design 2000plus and Small Business Services Program. Prepared for National Grid. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.02 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.27 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.20 /kWh |

| TRM Reference Number | RIEC154 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Lighting |
| Type | Controls |
| Sub-type | Occupancy Sensor |
| Program Name | Commercial New Construction |
| Measure Name | Occupancy sensors |
| Measure Description | This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls. |
| Baseline Description | The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction). |
| Savings Principle | The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed lighting controls project. |
| Savings Equation | <p>Gross kWh = $\text{SUM}[\text{QTY}_i \times \text{Watts}_i \times (\text{Hours_base}_i - \text{Hours_ee}_i)] / (\text{Watts per kW})$</p> <p>Gross kW = $\text{SUM}(\text{QTY}_i \times \text{Watts}_i) / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_i = Quantity in controlled fixtures in location i</p> <p>Watts_i = Connected wattage of controlled fixtures in location i</p> <p>Hours_{base_i} = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations).</p> <p>Hours_{ee_i} = Total annual hours that the connected lighting in location i operates with the lighting controls implemented.</p> <p>1,000 Watts per kW = Conversion factor</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.</p> <p>deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|--|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.68 |
| RRe source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.96 |
| RRd summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.96 |
| RRd winter peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.15 |
| CF summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.02 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.27 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.20 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC158 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Lighting |
| Type | Exterior |
| Sub-type | Street Lighting |
| Program Name | Commercial New Construction |
| Measure Name | LED Street Lights |
| Measure Description | The installation of LED street lights. |
| Baseline Description | The baseline case is customer owned high-pressure sodium, incandescent, or mercury vapor street lighting. |
| Savings Principle | The high efficiency case is the installation of LED street lighting. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed LED Streetlight |
| Savings Equation | <p>Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours</p> <p>Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)</p> <p>Where:</p> <p>QTY_base_i = Quantity of baseline fixtures in location i</p> <p>Watts_base_i = Connected wattage of baseline fixtures in location i</p> <p>QTY_ee_j = Quantity of efficient fixtures in location j</p> <p>Watts_ee_j = Connected wattage of efficient fixtures in location j</p> <p>1,000 Watts per kW = Conversion factor</p> <p>Hours = Lighting annual hours of operation: site-specific.</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.</p> <p>deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | #N/A |
| measure life note | Based on National Grid Staff estimates |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Calc |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | Calc |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.27 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.20 /kWh |

| TRM Reference Number | RIEC165 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Lighting |
| Type | LEDs |
| Sub-type | LED Performance |
| Program Name | Commercial New Construction |
| Measure Name | LED Performance lighting |
| Measure Description | Advanced lighting design refers to the implementation of various lighting design principles aimed at creating a quality and appropriate lighting experience while reducing unnecessary light usage. This is often done by a professional in a new construction situation. Advanced lighting design uses techniques like maximizing task lighting and efficient fixtures to create a system of optimal energy efficiency and functionality. |
| Baseline Description | The baseline efficiency assumes compliance with lighting power density requirements as mandated by Rhode Island State Building Code. Energy efficiency must be met via compliance with the International Energy Conservation Code (IECC) 2012, as described in Appendix A Table 1 and Table 2. |
| Savings Principle | The high efficiency case assumes lighting systems with lighting power densities below those required by Rhode Island State Building Code. Installed lighting wattage should be determined using the installed fixture counts and wattages. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed lighting fixture project. |
| Savings Equation | <p>Gross kWh = $[\text{SUM}(\text{LPD_base_i} \times \text{Area_i} \times \text{Hours_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j} \times \text{Hours_j})] / (\text{Watts per kW})$</p> <p>Gross kW = $[\text{SUM}(\text{LPD_base_i} \times \text{Area_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW})$</p> <p>Where:</p> <p>Area_i = Floor area of location i (SQFT)</p> <p>Hours_base_i = Total annual operating hours for baseline lighting equipment in location i</p> <p>QTY_ee_j = Quantity of efficient fixtures in location j</p> <p>Watts_ee_j = Connected wattage of efficient fixtures in location j</p> <p>Hours_j = Lighting annual hours of operation: site-specific.</p> <p>1,000 Watts per kW = Conversion factor</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.</p> <p>deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |

| | |
|--|---|
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.07 |
| RRe source | KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.80 |
| RRd summer peak source | KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.73 |
| RRd winter peak source | KEMA (2009). National Grid USA 2008 Custom Lighting Impact Evaluation, Final Report. Prepared for National Grid. KEMA (2009). // Sample Design and Impact Evaluation Analysis of the 2008 Custom Program. Prepared for National Grid; Table 19. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.02 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 0.27 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 0.20 /kWh |

| TRM Reference Number | RIEC202 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | New Construction |
| Category | Refrigeration |
| Type | Refrigeration Lighting |
| Sub-type | Refrigerator Case LED |
| Program Name | Commercial New Construction |
| Measure Name | LEDs for freezer/cooler cases |
| Measure Description | Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load. |
| Baseline Description | The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases. |
| Savings Principle | The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed lighting project. |
| Savings Equation | <p>Gross kWh = $[SUM(QTY_base \times Watts_base \times Hours_base) - SUM(QTY_ee \times kW_ee \times Hours_ee)] \times (1 + EffRefrig \times (Btu/hr \text{ per kW}) / (Btu/hr \text{ per ton}))$</p> <p>Gross kW = Gross kWh / Hours_ee</p> <p>Where:</p> <p>QTY_base = Quantity of baseline lighting fixtures in cooler/freezer case Watts_base = Connected wattage of baseline lighting fixtures in cooler/freezer case Hours_base = Annual operating hours of baseline lighting fixtures in cooler/freezer case QTY_ee = Quantity of efficient lighting fixtures in cooler/freezer case Watts_ee = Connected wattage of efficient lighting fixtures in cooler/freezer case Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case 1.9 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience. 3413 Btu/hr per kW = Conversion factor 12,000 Btu/hr per ton = Conversion factor Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|--|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.94 |
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.01 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.01 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.02 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per kWh |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.27 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.20 /kWh |

| TRM Reference Number | RIEC205 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Compressed Air |
| Type | Compressor |
| Sub-type | Variable compressor up to 25 HP |
| Program Name | Commercial Retrofit |
| Measure Name | Variable compressor up to 25 HP |
| Measure Description | The installation of oil flooded, rotary screw compressors with Variable Displacement capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is an oil-flooded, rotary screw compressor with Variable Displacement capacity control with a properly sized air receiver. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per horsepower (hp) of installed air compressor capacity. |
| Savings Equation | $\text{Gross kWh} = \text{HP_compressor} \times \text{deltakW/HP} \times \text{Hours}$ $\text{Gross kW} = \text{HP_compressor} \times \text{deltakW/HP}$ $\text{HP_compressor} = \text{Nominal rated horsepower of high efficiency air compressor: site-specific}$ $\text{Hours} = \text{Annual operating hours of the air compressor: site-specific}$ $\text{deltakW/HP} = \text{Air compressor kW reduction per HP}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.41 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC206 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Compressed Air |
| Type | Compressor |
| Sub-type | Variable compressor up to 75 HP |
| Program Name | Commercial Retrofit |
| Measure Name | Variable compressor up to 75 HP |
| Measure Description | The installation of oil flooded, rotary screw compressors with Variable Displacement capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is an oil-flooded, rotary screw compressor with Variable Displacement capacity control with a properly sized air receiver. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per horsepower (hp) of installed air compressor capacity. |
| Savings Equation | $\text{Gross kWh} = \text{HP_compressor} \times \text{deltakW/HP} \times \text{Hours}$ $\text{Gross kW} = \text{HP_compressor} \times \text{deltakW/HP}$ $\text{HP_compressor} = \text{Nominal rated horsepower of high efficiency air compressor: site-specific}$ $\text{Hours} = \text{Annual operating hours of the air compressor: site-specific}$ $\text{deltakW/HP} = \text{Air compressor kW reduction per HP}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.41 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC207 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Compressed Air |
| Type | Compressor |
| Sub-type | VSD compressor up to 75 HP |
| Program Name | Commercial Retrofit |
| Measure Name | VSD compressor up to 75 HP |
| Measure Description | The installation of oil flooded, rotary screw compressors with Variable Speed Drive capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is an oil-flooded, rotary screw compressor with Variable Speed Drive capacity control with a properly sized air receiver. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | kW saved per horsepower (hp) of installed air compressor capacity. |
| Savings Equation | $\text{Gross kWh} = \text{HP_compressor} \times \text{deltakW/HP} \times \text{Hours}$ $\text{Gross kW} = \text{HP_compressor} \times \text{deltakW/HP}$ $\text{HP_compressor} = \text{Nominal rated horsepower of high efficiency air compressor: site-specific}$ $\text{Hours} = \text{Annual operating hours of the air compressor: site-specific}$ $\text{deltakW/HP} = \text{Air compressor kW reduction per HP}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.41 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.05 |
| CF summer peak source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.83 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC209 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Compressed Air |
| Type | Drain |
| Sub-type | Zero Loss Drain |
| Program Name | Commercial Retrofit |
| Measure Name | Zero Loss Drain |
| Measure Description | Drains remove water from a compressed air system. Zero loss condensate drains remove water from a compressed air system without venting any air, resulting in less air demand and consequently greater efficiency. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is the installation of a zero loss condensate drain on a single operating compressor rated <= 75 HP. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed drain. |
| Savings Equation | <p>Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM</p> <p>Where:</p> <p>CFM_pipe = CFM capacity of piping: site-specific 0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity 0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario. Hours = Annual operating hours of the zero loss condensate drain: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.80 |
| CF summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.54 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC210 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Compressed Air |
| Type | Filter |
| Sub-type | Low pressure drop filter |
| Program Name | Commercial Retrofit |
| Measure Name | Low pressure drop filter |
| Measure Description | Filters remove solids and aerosols from compressed air systems. Low pressure drop filters have longer lives and lower pressure drops than traditional coalescing filters resulting in higher efficiencies. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is a low pressure drop filter with initial drop not exceeding 1 psi when new and 3 psi at element change. Filters must be deep-bed, "mist eliminator" style and installed on a single operating compressor rated 15 – 75 HP. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed filter. |
| Savings Equation | <p>Gross kWh = Qty × HP_compressor × (kW per HP) × %SAVE × Hours</p> <p>Gross kW = Qty × HP_compressor × (kW per HP) × %SAVE</p> <p>Where:</p> <p>Qty = Number of filters installed: site-specific</p> <p>HP_compressor = Average compressor load: site-specific</p> <p>kW per HP = Conversion factor</p> <p>%SAVE = Percent change in pressure drop: site-specific</p> <p>Hours = Annual operating hours of the lower pressure drop filter: site-specific</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | KEMA (2016) Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations |

| | |
|--|---|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.80 |
| CF summer peak source | DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.54 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.14 |
| Net-to-Gross | 0.72 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.43 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC211 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | CHP |
| Sub-type | CHP |
| Program Name | Commercial Retrofit |
| Measure Name | Custom CHP |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.95 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.52 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.26 /kWh |

| TRM Reference Number | RIEC212 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | Compressed Air |
| Sub-type | Compressed Air |
| Program Name | Commercial Retrofit |
| Measure Name | Custom Compressed Air |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.93 |
| RRe source | KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17. |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.04 |
| RRd winter peak source | KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC216 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | HVAC |
| Sub-type | HVAC |
| Program Name | Commercial Retrofit |
| Measure Name | Custom HVAC |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.75 |

| | |
|--|---|
| RRe source | DNV GL (2015) Impact Evaluation of 2012 Custom HVAC Installations (MAEEAC) |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.58 |
| RRd summer peak source | DNV GL (2015) Impact Evaluation of 2012 Custom HVAC Installations (MAEEAC) |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.66 |
| RRd winter peak source | DNV GL (2015) Impact Evaluation of 2012 Custom HVAC Installations (MAEEAC) |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| TRM Reference Number | RIEC218 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | Lighting |
| Sub-type | Lighting |
| Program Name | Commercial Retrofit |
| Measure Name | Custom lighting |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.92 |

| | |
|--|---|
| RRe source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.11 |
| RRd summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.79 |
| RRd winter peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Custom Lighting Installations. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC220 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | Motor |
| Sub-type | Motor |
| Program Name | Commercial Retrofit |
| Measure Name | Custom Motor |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.14 |
| RRd summer peak source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.17 |
| RRd winter peak source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| TRM Reference Number | RIEC222 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | Other |
| Sub-type | Other |
| Program Name | Commercial Retrofit |
| Measure Name | Custom Other |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.14 |
| RRd summer peak source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.17 |
| RRd winter peak source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC223 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | Process |
| Sub-type | Process |
| Program Name | Commercial Retrofit |
| Measure Name | Custom process |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.93 |

| | |
|--|---|
| RRe source | KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.04 |
| RRd winter peak source | KEMA (2010). Sample Design and Impact Evaluation Analysis of 2009 Custom Program. Prepared for National Grid; Table 17. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| TRM Reference Number | RIEC243 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Energy Management System |
| Program Name | Commercial Retrofit |
| Measure Name | Energy management system |
| Measure Description | The measure is the installation of a new building energy management system (EMS) or the expansion of an existing energy management system for control of non-lighting electric and gas end-uses in an existing building on existing equipment. |
| Baseline Description | The baseline case is the existing equipment and systems without the implemented controls. |
| Savings Principle | The high efficiency case is the installation of a new EMS or the expansion of an existing EMS to control additional non-lighting electric and/or gas equipment. The EMS must be installed in an existing building on existing equipment. |
| Energy Savings calculation method | Custom |
| Savings unit | Upgrade to existing energy management system. |
| Savings Equation | <p>Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = Gross kWh $\times \Delta MMBtu_{Gas/kWh}$ Gross MMBtu Oil = Gross kWh $\times \Delta MMBtu_{Oil/kWh}$</p> <p>$\Delta MMBtu_{Gas/kWh}$ = Deemed average natural gas impact per gross electric energy impact $\Delta MMBtu_{Oil/kWh}$ = Deemed average heating oil impact per gross electric energy impact</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.04 |
| RRe source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co. |
| RRe note | #N/A |

| | |
|--|--|
| RR demand (RRd) summer peak | 1.03 |
| RRd summer peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.03 |
| RRd winter peak source | The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 3, Energy Management Control Systems. Prepared for NE Power Service Co. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC245 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Occupancy Sensor |
| Program Name | Commercial Retrofit |
| Measure Name | Hotel occupancy sensor |
| Measure Description | The measure is to the installation of hotel occupancy sensors (HOS) to control packaged terminal AC units (PTACs) with electric heat, heat pump units and/or fan coil units in hotels that operate all 12 months of the year. |
| Baseline Description | The baseline efficiency case assumes the equipment has no occupancy based controls. |
| Savings Principle | The high efficiency case is the installation of controls that include (a) occupancy sensors, (b) window/door switches for rooms that have operable window or patio doors, and (c) set back to 65 degrees Fahrenheit in the heating mode and set forward to 78 F in the cooling mode when occupancy detector is in the unoccupied mode. Sensors controlled by a front desk system are not eligible. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed hotel occupancy sensor. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 438 |
| kWh/yr savings source | National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.09 |
| kW reduction source | National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.30 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.70 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.64 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.32 /kWh |

| TRM Reference Number | RIEC249 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Controls |
| Sub-type | Occupancy Sensor |
| Program Name | Commercial Retrofit |
| Measure Name | Occupancy sensors |
| Measure Description | This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls. |
| Baseline Description | The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction). |
| Savings Principle | The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed lighting controls project. |
| Savings Equation | <p>Gross kWh = $\text{SUM}[\text{QTY}_i \times \text{Watts}_i \times (\text{Hours_base}_i - \text{Hours_ee}_i)] / (\text{Watts per kW})$</p> <p>Gross kW = $\text{SUM}(\text{QTY}_i \times \text{Watts}_i) / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_i = Quantity in controlled fixtures in location i</p> <p>Watts_i = Connected wattage of controlled fixtures in location i</p> <p>Hours_{base_i} = Total annual hours that the connected lighting in location i operated without controls (for retrofit installations) or would have operated with code-compliance controls (for new construction installations).</p> <p>Hours_{ee_i} = Total annual hours that the connected lighting in location i operates with the lighting controls implemented.</p> <p>1,000 Watts per kW = Conversion factor</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.</p> <p>deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.68 |
| RRe source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.96 |
| RRd summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.96 |
| RRd winter peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.15 |
| CF summer peak source | KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.18 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.46 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.232 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC262 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Street Lights |
| Sub-type | Street lighting |
| Program Name | Commercial Retrofit |
| Measure Name | Street Lighting |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | <p>Gross kWh = $[\text{SUM}(\text{QTY_base_i} \times \text{Watts_base_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW}) \times \text{Hours}$ Gross kW = $[\text{SUM}(\text{QTY_base_i} \times \text{Watts_base_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific.</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | NEEP DOE LED Street Lighting Assessment and Strategies for the Northeast and Mid-Atlantic |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |

| | |
|--|---|
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.46 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.232 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC263 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Lighting |
| Type | Street Lights |
| Sub-type | Street lighting w/controls |
| Program Name | Commercial Retrofit |
| Measure Name | Street Lighting with controls |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | <p>Gross kWh = $[\text{SUM}(\text{QTY_base_i} \times \text{Watts_base_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW}) \times \text{Hours}$ Gross kW = $[\text{SUM}(\text{QTY_base_i} \times \text{Watts_base_i}) - \text{SUM}(\text{QTY_ee_j} \times \text{Watts_ee_j})] / (\text{Watts per kW})$</p> <p>Where:</p> <p>QTY_base_i = Quantity of baseline fixtures in location i Watts_base_i = Connected wattage of baseline fixtures in location i QTY_ee_j = Quantity of efficient fixtures in location j Watts_ee_j = Connected wattage of efficient fixtures in location j 1,000 Watts per kW = Conversion factor Hours = Lighting annual hours of operation: site-specific.</p> <p>deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved. deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | NEEP DOE LED Street Lighting Assessment and Strategies for the Northeast and Mid-Atlantic |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |

| | |
|--|---|
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.46 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.232 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC307 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Defrost Control |
| Program Name | Commercial Retrofit |
| Measure Name | Defrost control |
| Measure Description | A control mechanism to skip defrost cycles when defrost is unnecessary. |
| Baseline Description | The baseline efficiency case is an evaporator fan electric defrost system that uses a time clock mechanism to initiate defrost. |
| Savings Principle | The high efficiency case is an evaporator fan defrost system with electric defrost controls. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed defrost controls in existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_Defrost × DRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton))</p> <p>Gross kW = Gross kWh / Hours</p> <p>Where:</p> <p>kW_Defrost = Load of electric defrost: site-specific</p> <p>DRF = Defrost reduction factor- percent reduction in defrosts required per year: 35%</p> <p>Hours = Number of hours defrost occurs over a year without the defrost controls</p> <p>1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience.</p> <p>3413 Btu/hr per kW = Conversion factor</p> <p>12 kBtu/hr per ton = Conversion factor</p> |
| Hours | The number of defrost cycles is estimated to decrease by 35% from an average number of defrost cycles of 1460 defrosts/year at 40 minutes each for a total of 973 hours/year. The number of defrost cycles with the defrost controls is 949 cycles/year, or 633 |
| Hours Source | #N/A |
| Hours source note | #VALUE! |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors set to 1.00 since gross kW is the average kW reduction during operation. |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC308 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Door Heater Control |
| Program Name | Commercial Retrofit |
| Measure Name | Door heater control |
| Measure Description | The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating results in a reduced cooling load. |
| Baseline Description | The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls. |
| Savings Principle | The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by measuring the ambient humidity and temperature of the store, calculating the dew point, and using pulse width modulation (PWM) to control the anti-sweat heater based on specific algorithms for freezer and cooler doors. Door temperature is typically maintained about 5 degrees Fahrenheit above the store air dew point temperature with the heaters operating at 80% (adjustable). |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed door heater controls on existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_DoorHeater × %OFF × Hours Gross kW = kW_DoorHeater × %OFF</p> <p>Where:</p> <p>kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific %OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters Hours = Door heater annual run hours before controls</p> |
| Hours | Pre-retrofit hours are 8,760 hours per year. After controls are installed, the door heaters in freezers are on for an average 4,730.4 hours/year (46% off time) and the door heaters for coolers are on for an average 2,277.6 hours/year (74% off time). |
| Hours Source | #N/A |
| Hours source note | #VALUE! |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |

| | |
|--|---|
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed 100% because savings are based on researched assumptions. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.50 |
| CF summer peak source | HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSCO; Table 9. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| | |
|-----------------------------------|---|
| TRM Reference Number | RIEC309 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Fan Control |
| Program Name | Commercial Retrofit |
| Measure Name | Evaporator fan control |
| Measure Description | Installation of controls to modulate the evaporator fans based on temperature control. Energy savings include: fan energy savings from reduced fan operating hours, refrigeration energy savings from reduced waste heat, and compressor energy savings resulting from the electronic temperature control. Electronic controls allow less fluctuation in temperature, thereby creating savings. |
| Baseline Description | The baseline efficiency case assumes evaporator fans that run 8760 annual hours with no temperature control. |
| Savings Principle | The high efficiency case is the use of an energy management system to control evaporator fan operation based on temperature. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed controls on evaporator fans in existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_Fan × %OFF × (Hours per year) × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton)) + [kW_cp × Hours_cp + kW_fan × (Hours per year) × (1-%OFF)] × %SAVE</p> <p>Gross kW = Gross kWh / Hours</p> <p>Where:</p> <p>kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment</p> <p>%OFF_heater = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters</p> <p>8760 Hours per year = Conversion factor</p> <p>1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience.</p> <p>3,413 Btu/hr per kW = Conversion factor</p> <p>12 kBtu/hr per ton = Conversion factor</p> <p>kW_cp = Total power demand of compressor motor and condenser fan calculated from equipment nameplate data and estimated 0.85 power factor</p> <p>Hours_cp = Equivalent annual full load hours of compressor operation; Estimate based on NRM field experience.</p> <p>%OFF_evap = Percent of annual hours that the evaporator is turned off; Estimate based on NRM field experience.</p> <p>%SAVE = Reduced run-time of compressor and evaporator due to electronic controls; Estimate based on NRM field experience.</p> |
| Hours | 4072 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |

| | |
|--|---|
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.58 |
| RRe source | HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | HEC, Inc. (1996). Analysis of Savings from Walk-In Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.23 |
| CF summer peak source | HEC, Inc. (1995). Analysis of Door Master Walk-In Cooler Anti-Sweat Door Heater Controls Installed at 10 Sites in MA. Prepared for NEPSco; Table 9. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.84 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| TRM Reference Number | RIEC310 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Novelty Cooler Control |
| Program Name | Commercial Retrofit |
| Measure Name | Novelty cooler shutoff |
| Measure Description | Installation of controls to shut off a facility's novelty coolers for non-perishable goods based on pre-programmed store hours. Energy savings occur as coolers cycle off during facility unoccupied hours. |
| Baseline Description | The baseline efficiency case is the novelty coolers operating 8,760 hours per year. |
| Savings Principle | The high efficiency case is the novelty coolers operating fewer than 8,760 hours per year since they are controlled to cycle each night based on pre-programmed facility unoccupied hours. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed controls on existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_nc × DC_nc × HoursOff</p> <p>Gross kW = 0</p> <p>Where:</p> <p>kW_nc = Power demand of novelty cooler calculated from equipment nameplate data and estimated 0.85 power factor.</p> <p>DC_nc = Weighted average annual duty cycle; Estimate based on NRM field experience.</p> <p>HoursOff = Potential hours off every night per year, estimated as one less than the number of hours the store is closed per day: site-specific.</p> |
| Hours | Energy and demand savings are based on the reduced operation hours of the cooler equipment. Hours reduced per day are estimated on a case-by-case basis, and are typically calculated as one less than the number of hours per day that the facility is closed |
| Hours Source | #N/A |
| Hours source note | #VALUE! |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |

| | |
|--|---|
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 0.147 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC311 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Vending Miser |
| Program Name | Commercial Retrofit |
| Measure Name | Glass front refrigerated coolers |
| Measure Description | Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1208 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.138 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| TRM Reference Number | RIEC312 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Vending Miser |
| Program Name | Commercial Retrofit |
| Measure Name | Non-refrigerated snack vending machine |
| Measure Description | Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 343 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.039 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | National Grid assumption based on regional PA working groups. Assumptions based on historical steam trap surveys. Steam losses in lbs/hr are found using "Boiler Efficiency Institute (1987). Steam Efficiency Improvement; Page 34, Table 4.1 under Steam Leak |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |

| | |
|--|---|
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIEC313 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Controls |
| Sub-type | Vending Miser |
| Program Name | Commercial Retrofit |
| Measure Name | Refrigerated beverage vending machine |
| Measure Description | Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls. |
| Baseline Description | The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Savings Principle | The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed vending miser. |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW</p> <p>Where:</p> <p>Qty = Total number of units. Delta kWh = Deemed average annual kWh reduction per unit. Delta kW = Deemed average kW reduction per unit.</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 1612 |
| kWh/yr savings source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.184 |
| kW reduction source | USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| TRM Reference Number | RIEC316 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Custom |
| Sub-type | Refrigeration |
| Program Name | Commercial Retrofit |
| Measure Name | Custom Refrigeration |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | Defined per project. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRe note | #N/A |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.14 |
| RRd summer peak source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.17 |
| RRd winter peak source | DNV GL (2014) impact Evaluation of Rhode Island Custom Refrigeration, Motor, and Other Measures |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| TRM Reference Number | RIEC317 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Motors |
| Sub-type | ECM |
| Program Name | Commercial Retrofit |
| Measure Name | Case ECMs |
| Measure Description | Installation of various sizes of electronically commutated motors (ECMs) in walk-in coolers and freezers to replace existing evaporator fan motors. |
| Baseline Description | The baseline efficiency case is an existing case motor. |
| Savings Principle | The high efficiency case is the replacement of an existing case with an ECM. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed electronically commutated motor for evaporator fans in existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_motor × LRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton))</p> <p>Gross kW = Gross kWh / Hours</p> <p>Where:</p> <p>kW_motor = Metered load of existing case motor: site-specific</p> <p>LRF = Load reduction factor: 53% when shaded pole motors are replaced, 29% when PSC motors are replaced</p> <p>Hours = Average runtime of case motors; Estimate based on NRM field experience.</p> <p>RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience.</p> <p>3413 Btu/hr per kW = Conversion factor</p> <p>12,000 Btu/hr per ton = Conversion factor</p> |
| Hours | Hours are the annual operating hours of the case motors. |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|---|
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.87 |
| CF summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.51 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| TRM Reference Number | RIEC318 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Motors |
| Sub-type | ECM |
| Program Name | Commercial Retrofit |
| Measure Name | ECM Evaporator fan Motors for Walk-in coolers |
| Measure Description | Installation of electronically commutated motors (ECMs) in multi-deck and freestanding coolers and freezers, typically on the retail floor of convenience stores, liquor stores, and grocery stores. |
| Baseline Description | The baseline efficiency case is the existing case motor. |
| Savings Principle | The high efficiency case is the replacement of the existing case motor with an ECM. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Installed electronically commutated motor for evaporator fans in existing cooler/freezer. |
| Savings Equation | <p>Gross kWh = kW_Fan × LRF × Hours × (1 + RefrigEff × (Btu/hr per kW) / (Btu/hr per ton))</p> <p>Gross kW = Gross kWh / Hours</p> <p>Where:</p> <p>kW_Fan = Power demand of evaporator fan calculated from equipment nameplate data and estimated 0.55 power factor/adjustment</p> <p>LRF = Load reduction factor for motor replacement</p> <p>Hours = Annual fan operating hours: site-specific</p> <p>1.6 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience.</p> <p>3413 Btu/hr per kW = Conversion factor</p> <p>12,000 Btu/hr per ton = Conversion factor</p> |
| Hours | The annual operating hours are assumed to be 8,760 * (1-%OFF), where %OFF = 0 if the facility does not have evaporator fan controls or %OFF > 0 if the facility has evaporator fan controls. See section: Refrigeration – Evaporator Fan Controls for %OFF valu |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | Algorithm Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Measure Impact Spreadsheet User's Manual. Prepared for NSTAR. |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.87 |
| CF summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.51 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC319 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Refrigeration Lighting |
| Sub-type | Refrigerator Case LED |
| Program Name | Commercial Retrofit |
| Measure Name | LEDs for freezer/cooler cases |
| Measure Description | Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load. |
| Baseline Description | The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases. |
| Savings Principle | The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed lighting project. |
| Savings Equation | <p>Gross kWh = [SUM(QTY_base × Watts_base × Hours_base) - SUM(QTY_ee × kW_ee × Hours_ee)] × (1 + EffRefrig × (Btu/hr per kW) / (Btu/hr per ton))</p> <p>Gross kW = Gross kWh / Hours_ee</p> <p>Where:</p> <p>QTY_base = Quantity of baseline lighting fixtures in cooler/freezer case</p> <p>Watts_base = Connected wattage of baseline lighting fixtures in cooler/freezer case</p> <p>Hours_base = Annual operating hours of baseline lighting fixtures in cooler/freezer case</p> <p>QTY_ee = Quantity of efficient lighting fixtures in cooler/freezer case</p> <p>Watts_ee = Connected wattage of efficient lighting fixtures in cooler/freezer case</p> <p>Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case</p> <p>1.9 RefrigEff = Efficiency of typical refrigeration system (kW/ton); Estimate based on NRM field experience.</p> <p>3413 Btu/hr per kW = Conversion factor</p> <p>12,000 Btu/hr per ton = Conversion factor</p> <p>Hours_ee = Annual operating hours of efficient lighting fixtures in cooler/freezer case</p> |
| Hours | 8760 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |

| | |
|--|---|
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.94 |
| RRe source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.01 |
| RRd summer peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.01 |
| RRd winter peak source | RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are assumed to be 1.0 since exit signs are on 8,760 hours a year |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.46 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.232 /kWh |

| TRM Reference Number | RIEC320 |
|--------------------------------------|---|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Refrigeration |
| Type | Temp Maintain |
| Sub-type | Night Cover |
| Program Name | Commercial Retrofit |
| Measure Name | Cooler night cover |
| Measure Description | Installation of retractable aluminum woven fabric covers for open-type refrigerated display cases, where the covers are deployed during the facility unoccupied hours in order to reduce refrigeration energy consumption. |
| Baseline Description | The baseline efficiency case is the annual operation of open-display cooler cases. |
| Savings Principle | The high efficiency case is the use of night covers to protect the exposed area of display cooler cases during unoccupied hours. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Linear feet of installed night covers on existing cooler cases. |
| Savings Equation | <p>Gross kWh = Width × deltakW/feet × Hours Gross kW = Width × deltakW/feet</p> <p>Where:</p> <p>Width = Width in feet of the opening that the night covers protect: site-specific deltakW/feet = Savings factor based on the temperature of the case Hours = Annual hours that the night covers are in use: site-specific</p> |
| Hours | Hours represent the number of annual hours that the night covers are in use, and should be determined on a case-by-case basis. |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence Factors are set to zero since demand savings typically occur during off-peak hours |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.28 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.79 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.29 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.147 /kWh |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC321 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Whole Building |
| Type | BOC Training |
| Sub-type | Certification |
| Program Name | Commercial Retrofit |
| Measure Name | Building operator certification |
| Measure Description | The Building Operator Certification (BOC) class improves operators' ability to optimize / minimize gas and electricity use in buildings. |
| Baseline Description | The basecase is a building operator without specific training on efficient use of gas and electricity in buildings. |
| Savings Principle | The high efficiency case is a building operator attending a class on improving the efficiency of gas and electricity use in buildings. |
| Energy Savings calculation method | Deemed |
| Savings unit | kWh/SF/BOC completion |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0.178 |
| kWh/yr savings source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

| | |
|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1695.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1250 per measure |

| TRM Reference Number | RIEC322 |
|--------------------------------------|--|
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Whole Building |
| Type | BOC Training |
| Sub-type | Certification + capital improvements |
| Program Name | Commercial Retrofit |
| Measure Name | Building operator certification + capital improvements |
| Measure Description | The Building Operator Certification (BOC) class improves operators' ability to optimize / minimize gas and electricity use in buildings. |
| Baseline Description | The basecase is a building operator without specific training on efficient use of gas and electricity in buildings. |
| Savings Principle | The high efficiency case is a building operator attending a class on improving the efficiency of gas and electricity use in buildings, as well as capital investments in EE projects. |
| Energy Savings calculation method | Deemed |
| Savings unit | kWh/SF/BOC completion |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0.364 |
| kWh/yr savings source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |

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|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1695.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1250 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIEC324 |
| Fuel | Electric |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Whole Building |
| Type | Custom |
| Sub-type | Whole Building |
| Program Name | Commercial Retrofit |
| Measure Name | Comprehensive Retrofit (CR) |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom energy-efficiency project. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.20 |

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|--|---|
| RRe source | KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid. |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.84 |
| RRd summer peak source | KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid. |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.50 |
| RRd winter peak source | KEMA (2011). Impact Evaluation of Custom Comprehensive and HVAC Installations. Prepared for National Grid. |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | For all custom projects, gross summer and winter peak coincidence factors are custom-calculated based on project-specific information. The actual or measured coincidence factors are included in the summer and winter demand realization rates. |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.07 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.99 |
| Net-to-Gross source | TetraTech (2014). 2013 Commercial and Industrial Programs Free-ridership and Spillover Study. September, 2014 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 0.24 /kWh |

| TRM Reference Number | RIGR001 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | EnergyStar HVAC |
| Measure Name | Boiler (forced hot water) >= 95% AFUE |
| Measure Description | Installation of a new space heating gas-fired condensing boiler. |
| Baseline Description | The baseline efficiency case is a boiler with an AFUE equal to 82%. |
| Savings Principle | The high efficiency case is a boiler with an AFUE greater than or equal to 90% or 95%. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency boiler |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 14.1 |
| Gas Heat MMBtu/yr savings source | Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 19 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 49.11 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 383.53 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.32 |
| Spill-Over (participant) | 0.08 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.76 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 4044.15 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 700 per measure |

| TRM Reference Number | RIGR003 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | EnergyStar HVAC |
| Measure Name | Boiler (forced hot water) 90% AFUE |
| Measure Description | Installation of a new space heating gas-fired boiler. |
| Baseline Description | The baseline efficiency case is a boiler with an AFUE equal to 82%. |
| Savings Principle | The high efficiency case is a boiler with an AFUE greater than or equal to 90% or 95%. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency boiler |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 11.4 |
| Gas Heat MMBtu/yr savings source | Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 49.70 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 385.23 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.32 |
| Spill-Over (participant) | 0.08 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.76 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIGR011 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | EnergyStar HVAC |
| Measure Name | Integrated water heater/condensing boiler |
| Measure Description | This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank. |
| Baseline Description | The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater. |
| Savings Principle | The high efficiency case is an integrated water heater/condensing boiler with a 90% AFUE boiler and a 0.9 EF water heater. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency integrated boiler/water heater |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 10.4 |
| Gas Heat MMBtu/yr savings source | Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 2.74 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 19.27 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.34 |
| Spill-Over (participant) | 0.08 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.74 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1728.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIGR014 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Efficient Heating |
| Program Name | Residential New Construction |
| Measure Name | Heating_tier1 |
| Measure Description | This measure involves the installation of a high-efficiency natural gas heating system. |
| Baseline Description | The baseline efficiency case is a standard efficiency natural gas heating system. |
| Savings Principle | The high efficiency case is the installation of a high-efficiency natural gas heating system. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency natural gas heating system. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 189.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR015 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Efficient Heating |
| Program Name | Residential New Construction |
| Measure Name | Heating_tier2 |
| Measure Description | This measure involves the installation of a high-efficiency natural gas heating system. |
| Baseline Description | The baseline efficiency case is a standard efficiency natural gas heating system. |
| Savings Principle | The high efficiency case is the installation of a high-efficiency natural gas heating system. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency natural gas heating system. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 189.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR016 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Efficient Heating |
| Program Name | Residential New Construction |
| Measure Name | Heating_tier3 |
| Measure Description | This measure involves the installation of a high-efficiency natural gas heating system. |
| Baseline Description | The baseline efficiency case is a standard efficiency natural gas heating system. |
| Savings Principle | The high efficiency case is the installation of a high-efficiency natural gas heating system. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency natural gas heating system. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 189.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR017 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Furnace |
| Program Name | EnergyStar HVAC |
| Measure Name | Furnace (forced hot air) >= 97% AFUE |
| Measure Description | Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan. |
| Baseline Description | The baseline efficiency case is a 85% AFUE (negotiated) furnace. |
| Savings Principle | The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor or a new furnace with AFUE >= 97% and an electronically commutated motor. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency furnace with ECM |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 9.2 |
| Gas Heat MMBtu/yr savings source | Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.16 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 379.29 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.41 |
| Spill-Over (participant) | 0.22 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.81 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1865.98 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 300 per measure |

| TRM Reference Number | RIGR019 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Furnace |
| Program Name | EnergyStar HVAC |
| Measure Name | Furnace (forced hot air) 95% AFUE w/ECM |
| Measure Description | Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan. |
| Baseline Description | The baseline efficiency case is a 85% AFUE (negotiated) furnace. |
| Savings Principle | The high efficiency case is a new furnace with AFUE >= 95% and an electronically commutated motor or a new furnace with AFUE >= 97% and an electronically commutated motor. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency furnace with ECM |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 8.1 |
| Gas Heat MMBtu/yr savings source | Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.16 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 379.29 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.41 |
| Spill-Over (participant) | 0.22 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.81 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1703.82 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 300 per measure |

| TRM Reference Number | RIGR025 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | EnergyStar HVAC |
| Measure Name | Integrated water heater/condensing boiler 95 |
| Measure Description | This measure promotes the installation of a combined condensing high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank. |
| Baseline Description | The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater. |
| Savings Principle | The high efficiency case is an integrated water heater/condensing boiler with a 95% AFUE boiler and a 0.95 EF water heater. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency integrated boiler/water heater |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 12.8 |
| Gas Heat MMBtu/yr savings source | Cadmus (2015) High Efficiency Heating Equipment Impact Evaluation |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 2.74 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 19.27 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.34 |
| Spill-Over (participant) | 0.08 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.74 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR026 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Residential New Construction |
| Measure Name | Hot water heating_tier1 |
| Measure Description | DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | The baseline efficiency case is the existing domestic hot water equipment. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR027 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Residential New Construction |
| Measure Name | Hot water heating_tier2 |
| Measure Description | DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | The baseline efficiency case is the existing domestic hot water equipment. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR028 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Flow Control Measures |
| Program Name | Residential New Construction |
| Measure Name | Hot water heating_tier3 |
| Measure Description | DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | The baseline efficiency case is the existing domestic hot water equipment. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed DHW efficiency measure. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR029 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Residential New Construction |
| Measure Name | Low-flow showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3696.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 10.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 10 per measure |

| TRM Reference Number | RIGR030 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Condensing Water Heater |
| Program Name | EnergyStar HVAC |
| Measure Name | Condensing Gas Water Heater (THERMAL EFFICIENCY 0.95) |
| Measure Description | Condensing water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a stand-alone storage water heater with an energy factor ≥ 0.67 , a condensing water heater with an energy factor ≥ 0.95 , a tankless water heater with an energy factor ≥ 0.82 , or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency water heater |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|--|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.70 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 41.28 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.37 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | Nexus Market Research (2010). HEHE Process and Impact Evaluation. Prepared for GasNetworks |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1728.48 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGR033 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Efficient Standard Tank Water Heater |
| Program Name | EnergyStar HVAC |
| Measure Name | High Efficiency Stand Alone Water Heater (0.67 EF) |
| Measure Description | Stand-alone storage water heaters are high efficiency water heaters that are not combined with space heating devices. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a stand-alone storage water heater with an energy factor ≥ 0.67 , a condensing water heater with an energy factor ≥ 0.95 , a tankless water heater with an energy factor ≥ 0.82 , or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency water heater |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | Verifying Thermostatic Valve Showerhead Savings.xls |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.30 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 58.47 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.13 |
| Spill-Over (participant) | 0.13 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 562.23 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR038 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Tankless Water Heater |
| Program Name | EnergyStar HVAC |
| Measure Name | Tankless Water Heaters (EF 0.82) |
| Measure Description | Tankless water heaters circulate water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a stand-alone storage water heater with an energy factor ≥ 0.67 , a condensing water heater with an energy factor ≥ 0.95 , a tankless water heater with an energy factor ≥ 0.82 , or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency water heater |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 19 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.23 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 56.39 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.37 |
| Spill-Over (participant) | 0.25 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.88 |
| Net-to-Gross source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIGR041 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Tankless Water Heater |
| Program Name | EnergyStar HVAC |
| Measure Name | Tankless Water Heaters (EF 0.94) |
| Measure Description | Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a stand-alone storage water heater with an energy factor ≥ 0.67 , a condensing water heater with an energy factor ≥ 0.95 , a tankless water heater with an energy factor ≥ 0.82 , or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed condensing tankless water heater |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|------------------------------------|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 1.23 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 56.39 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.25 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.75 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2077.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 400 per measure |

| TRM Reference Number | RIGR042 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Codes and Standards |
| Sub-type | Codes and Standards |
| Program Name | Residential New Construction |
| Measure Name | CODES AND STANDARDS |
| Measure Description | Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island. |
| Baseline Description | Un-influenced adoption curve of federal minimum codes and standards. |
| Savings Principle | Accelerated adoption of advancing energy codes and equipment standards. |
| Energy Savings calculation method | Calculated based on attribution study |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for national Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for national Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 11 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR043 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | CP |
| Measure Description | To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy. |
| Baseline Description | The User Defined Reference Home was revised in 2012 as a result of a baseline study. |
| Savings Principle | The high efficiency case is represented by the specific energy characteristics of each "as-built" home completed through the program. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR044 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Flow Control Measures |
| Program Name | Residential New Construction |
| Measure Name | CP-DHW |
| Measure Description | DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy. |
| Baseline Description | 0 |
| Savings Principle | 0 |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR045 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab CP |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR046 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab CP-DHW |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR055 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Heating_tier1 |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | Calculated, per 100ft2 |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR056 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Heating_tier2 |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | Calculated, per 100ft2 |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR057 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | Heating |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Heating_tier3 |
| Measure Description | The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | Calculated, per 100ft2 |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR058 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot Water_tier1 |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR059 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot Water_tier2 |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| TRM Reference Number | RIGR060 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | New Construction |
| Category | Whole Home |
| Type | Custom |
| Sub-type | DHW |
| Program Name | Residential New Construction |
| Measure Name | Renovation Rehab Domestic Hot Water_tier3 |
| Measure Description | The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems. |
| Baseline Description | The baseline case is the current version of the RI energy code and/or UDRH performance. |
| Savings Principle | The efficient case is the post-retrofit performance of a house participating the program |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Complete Renovation Rehab project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| kW reduction note | Supplied by vendor |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | NMR Group, KEMA, The Cadmus Group, Dorothy Conant (2012). Rhode Island 2011 Baseline Study of Single-Family Residential New Construction. Prepared for National Grid. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |

| | |
|--|---|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | Coincidence factors are custom calculated based on project-specific detail. |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | Varies by performance tier, housing type & number of units. See Source for details per housing Unit |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR064 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Air Sealing/Infiltration |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Air Sealing |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft³-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu)</p> <p>Where:</p> <p>CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft³-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |

| | |
|--|---|
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 57.86 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 146.12 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 390.45 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 390/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR065 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Air Sealing/Infiltration |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Air Sealing |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft³-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu)</p> <p>Where:</p> <p>CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft³-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |

| | |
|--|---|
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.28 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 135.83 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.19 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.81 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| TRM Reference Number | RIGR066 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Air Sealing/Infiltration |
| Program Name | EnergyWise |
| Measure Name | SF Air Sealing |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed air sealing project. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 3.22 |
| Gas Heat MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.28 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 135.83 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR067 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Air Sealing/Infiltration |
| Program Name | EnergyWise |
| Measure Name | SF Air Sealing Kit (Gas) |
| Measure Description | The installation of recessed lighting cans that provide air sealing benefits. |
| Baseline Description | The baseline is leaky recessed lighting cans on thermal boundaries. |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST). |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed kit |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.39 |
| Gas Heat MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Rise Engineering (2015). Memo on Pilot Findings for LED inserts for Recessed Light Cans. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 2.34 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 16.45 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| TRM Reference Number | RIGR075 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Other |
| Program Name | EnergyWise |
| Measure Name | SF Insulation |
| Measure Description | Insulation upgrades (other than basement, roofs, and walls) applied in existing facilities. |
| Baseline Description | The baseline efficiency case is the existing facility or equipment prior to the implementation of additional insulation. |
| Savings Principle | The high efficiency case is the existing facility or equipment after the implementation of additional insulation. |
| Energy Savings calculation method | Deemed |
| Savings unit | Completed insulation project. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 11.69 |
| Gas Heat MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.31 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 378.05 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR078 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Shell |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Shell Insulation |
| Measure Description | Insulation upgrades are applied in existing multifamily facilities. |
| Baseline Description | The baseline efficiency case is characterized by the total R-value of the existing attic, basement or sidewall (Rexist). This is calculated as the R-value of the existing insulation, estimated by the program contractor, plus the R-value of the ceiling, floor, or wall (for all projects: RCEILING = 3.36; RFLOOR = 6.16; RWALL = 6.65) |
| Savings Principle | The high efficiency case is characterized by the total R-value of the attic after the installation of additional attic, basement or sidewall insulation. This is calculated as the sum of the existing R-value (RBASE) plus the R-value of the added insulation (RADD). |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | $MMBTU_{annual} = (((1/R_{exist}) - (1/R_{new})) \times HDD \times 24 \times Area) / (1,000,000) \times \eta_{heat}$ $kWh_{annual} = MMBtu_{annual} \times 293.1$ $kW = kWh_{annual} \times kW/kWh_{heating}$ <p>Where:</p> <p>Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft²-°F/Btuh</p> <p>Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft²-°F/Btuh</p> <p>Area = Square footage of insulated area</p> <p>ηheat = Efficiency of the heating system (AFUE or COP)</p> <p>293.1 = Conversion constant (1MMBtu = 293.1 kWh)</p> <p>24 = Conversion for hours per day</p> <p>HDD = Heating Degree Days; dependent on location, see table below</p> <p>1,000,000 = Conversion from Btu to MMBtu</p> <p>kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |

| | |
|--|---|
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 44.26 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 223.63 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 390.45 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 390/audit with multiple installed measures |

| TRM Reference Number | RIGR079 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Shell |
| Program Name | EnergyWise MultiFamily |
| Measure Name | MF Shell Insulation |
| Measure Description | Insulation upgrades are applied in existing multifamily facilities. |
| Baseline Description | The baseline efficiency case is characterized by the total R-value of the existing attic, basement or sidewall (Rexist). This is calculated as the R-value of the existing insulation, estimated by the program contractor, plus the R-value of the ceiling, floor, or wall (for all projects: RCEILING = 3.36; RFLOOR = 6.16; RWALL = 6.65) |
| Savings Principle | The high efficiency case is characterized by the total R-value of the attic after the installation of additional attic, basement or sidewall insulation. This is calculated as the sum of the existing R-value (RBASE) plus the R-value of the added insulation (RADD). |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | $MMBTU_{\text{annual}} = (((1/R_{\text{exist}}) - (1/R_{\text{new}})) \times HDD \times 24 \times \text{Area}) / (1,000,000) \times \eta_{\text{heat}}$ $kWh_{\text{annual}} = MMBtu_{\text{annual}} \times 293.1$ $kW = kWh_{\text{annual}} \times kW/kWh_{\text{heating}}$ <p>Where:</p> <p>Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft²-°F/Btu</p> <p>Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft²-°F/Btu</p> <p>Area = Square footage of insulated area</p> <p>ηheat = Efficiency of the heating system (AFUE or COP)</p> <p>293.1 = Conversion constant (1MMBtu = 293.1 kWh)</p> <p>24 = Conversion for hours per day</p> <p>HDD = Heating Degree Days; dependent on location, see table below</p> <p>1,000,000 = Conversion from Btu to MMBtu</p> <p>kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |

| | |
|--|---|
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.31 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 378.05 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.19 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.81 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| TRM Reference Number | RIGR083 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation & Air sealing |
| Sub-type | Weatherization |
| Program Name | Single Family Appliance Management |
| Measure Name | Weatherization |
| Measure Description | Installation of weatherization measures such as air sealing and insulation in gas heated homes. Electric savings are achieved from reduced run time of the HVAC system fan(s). |
| Baseline Description | The baseline efficiency case is the existing home shell. |
| Savings Principle | The high efficiency case can be a combination of increased insulation, air sealing, duct sealing, and other improvements to the home shell. |
| Energy Savings calculation method | Deemed |
| Savings unit | Household with weatherization measures installed |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 344 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.009 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 18.8 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.03 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.03 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 128.80 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 368.56 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 4500.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 4500 per job |

| TRM Reference Number | RIGR087 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Custom |
| Type | Custom |
| Sub-type | Custom |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Custom |
| Measure Description | Vendors install a variety of measures at multifamily facilities. Measures include |
| Baseline Description | For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the |
| Savings Principle | The high efficiency scenario is specific to the facility and may include one or more energy efficiency |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 0 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 27.81 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR088 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Custom |
| Type | Custom |
| Sub-type | Custom |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Custom |
| Measure Description | Vendors install a variety of measures at multifamily facilities. Measures include |
| Baseline Description | For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the |
| Savings Principle | The high efficiency scenario is specific to the facility and may include one or more energy efficiency |
| Energy Savings calculation method | Calc |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--------|
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR090 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Boiler Control |
| Program Name | EnergyStar HVAC |
| Measure Name | Boiler Reset Controls |
| Measure Description | Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand. |
| Baseline Description | The baseline efficiency case is a boiler without reset or load controls. |
| Savings Principle | The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of boiler reset control on existing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 4.5 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|---|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 300.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR094 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 1.01 |
| Gas Heat MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| TRM Reference Number | RIGR095 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.24 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.76 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR096 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 13.54 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 36.34 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 390.45 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 390/audit with multiple installed measures |

| TRM Reference Number | RIGR098 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyStar HVAC |
| Measure Name | WiFi Enabled Thermostat |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 6.6 |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |

| | |
|--|---|
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit | 200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit | \$ 50 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR099 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyStar HVAC |
| Measure Name | WiFi Enabled Thermostat with Cooling |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 104 |
| kWh/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.231 |
| kW reduction source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 6.6 |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 1.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit☐ | 270.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit☐ | \$ 50 per measure |

| TRM Reference Number | RIGR100 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise |
| Measure Name | WiFi programmable thermostat |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 6.6 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | #N/A |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR101 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Wi-Fi programmable thermostat (controls gas heat only) |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|---|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| TRM Reference Number | RIGR102 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Wi-Fi Thermostat (controls gas heat only) |
| Measure Description | A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems Primary Energy Impact: Natural Gas |
| Baseline Description | The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a Wi-Fi thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of WiFi programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 4.7 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2011). Memo: Wi-fi Programmable Thermostat Billing Analysis. Prepared for Keith Miller and Whitney Domigan, National Grid. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 14.30 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 36.34 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR103 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ducting |
| Sub-type | Duct Sealing |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Duct Sealing |
| Measure Description | Ducts are sealed by reconnecting disconnected duct joints and sealing gaps or seams with mastic and fiber-mesh tape as appropriate |
| Baseline Description | The baseline efficiency case is the existing facility or equipment prior to the implementation of duct sealing. |
| Savings Principle | The baseline efficiency case is the existing facility or equipment after the implementation of duct sealing. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 2.51 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR104 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ducting |
| Sub-type | Duct Sealing |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Duct Sealing |
| Measure Description | Ducts are sealed by reconnecting disconnected duct joints and sealing gaps or seams with mastic and fiber-mesh tape as appropriate |
| Baseline Description | The baseline efficiency case is the existing facility or equipment prior to the implementation of duct sealing. |
| Savings Principle | The baseline efficiency case is the existing facility or equipment after the implementation of duct sealing. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|------------------------------------|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.20 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 5.11 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR113 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating |
| Sub-type | Efficient Heating |
| Program Name | Single Family Appliance Management |
| Measure Name | Heating system replacement (gas) |
| Measure Description | Replacement of an existing gas heating system with a new high efficiency system. Electric savings are achieved from reduced run time of the heating system fan(s). |
| Baseline Description | The baseline efficiency case is the existing inefficient heating equipment. |
| Savings Principle | The high efficiency case is the new efficient heating equipment. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of new high-efficiency gas heating system |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times \text{deltakWh}$ $\text{Gross kW} = \text{Qty} \times \text{deltakW}$ $\text{Gross MMBtu}_{\text{Gas}} = \text{Qty} \times \text{deltaMMBtu}_{\text{Gas}}$ <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_{Gas} = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 172 |
| kWh/yr savings source | The Cadmus Group (2009). Impact Evaluation of the 2007 Appliance Management Program and Low Income Weatherization Program. Prepared for National Grid. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.024 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 18.4 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|---|
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.03 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.03 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 134.82 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 249.20 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 4500.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 4500 per measure |

| TRM Reference Number | RIGR114 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating System |
| Sub-type | Retrofit Boiler |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Heating System Retrofit, Boiler |
| Measure Description | Installation of high efficiency heating equipment to replace the existing inefficient furnace, hydronic boiler or steam boiler. |
| Baseline Description | The baseline efficiency is determined based on the type of heating equipment installed. For boilers it is 75% AFUE and for furnaces it is 78% AFUE.. |
| Savings Principle | The high efficiency case is characterized by the rated efficiency (AFUEEE) of the new high efficiency furnace or boiler. |
| Energy Savings calculation method | Calc |
| Savings unit | Heating system |
| Savings Equation | $\Delta \text{MMBtu} = (\text{Btu/hr}) \times ((1/\text{AFUEbase}) - (1/\text{AFUEee})) \times \text{EFLHheat} \times (1/1000000)$ <p>Where:</p> <p>Btu/hr = Nominal heating capacity of the installed equipment (Btu/hr) AFUEBASE = Average fuel utilization efficiency of the existing equipment (%) AFUEEE = Average fuel utilization efficiency of the efficient equipment (%) EFLHHeat = Equivalent full load heating hours for the facility (Hr) 1/1,000,000 = Conversion from Btu to MMBtu</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|--|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 179.08 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 249.20 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR115 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating System |
| Sub-type | Retrofit Furnace |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Heating System Retrofit, Furnace |
| Measure Description | Installation of high efficiency heating equipment to replace the existing inefficient furnace, hydronic boiler or steam boiler. |
| Baseline Description | The baseline efficiency is determined based on the type of heating equipment installed. For boilers it is 75% AFUE and for furnaces it is 78% AFUE.. |
| Savings Principle | The high efficiency case is characterized by the rated efficiency (AFUEEE) of the new high efficiency furnace or boiler. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | $\Delta \text{MMBtu} = (\text{Btu/hr}) \times ((1/\text{AFUE}_{\text{base}}) - (1/\text{AFUE}_{\text{ee}})) \times \text{EFLH}_{\text{heat}} \times (1/1000000)$ <p>Where:</p> <p>Btu/hr = Nominal heating capacity of the installed equipment (Btu/hr) AFUEBASE = Average fuel utilization efficiency of the existing equipment (%) AFUEEE = Average fuel utilization efficiency of the efficient equipment (%) EFLHHeat = Equivalent full load heating hours for the facility (Hr) 1/1,000,000 = Conversion from Btu to MMBtu</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|--|
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 138.18 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 249.20 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR116 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Heating System |
| Sub-type | Retrofit Boiler |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Heating System Retrofit, Commercial Boiler |
| Measure Description | Installation of high efficiency heating equipment to replace the existing inefficient furnace, hydronic boiler or steam boiler. |
| Baseline Description | The baseline efficiency is determined based on the type of heating equipment installed. For boilers it is 75% AFUE and for furnaces it is 78% AFUE.. |
| Savings Principle | The high efficiency case is characterized by the rated efficiency (AFUEEE) of the new high efficiency furnace or boiler. |
| Energy Savings calculation method | Calc |
| Savings unit | Heating system |
| Savings Equation | $\Delta \text{MMBtu} = (\text{Btu/hr}) \times ((1/\text{AFUEbase}) - (1/\text{AFUEee})) \times \text{EFLHheat} \times (1/1000000)$ <p>Where:</p> <p>Btu/hr = Nominal heating capacity of the installed equipment (Btu/hr) AFUEBASE = Average fuel utilization efficiency of the existing equipment (%) AFUEEE = Average fuel utilization efficiency of the efficient equipment (%) EFLHHeat = Equivalent full load heating hours for the facility (Hr) 1/1,000,000 = Conversion from Btu to MMBtu</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |

| | |
|--|------------------------------------|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 179.08 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 249.20 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR117 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Pipe Wrap (Heating) |
| Measure Description | Insulation upgrades to existing heating system pipes |
| Baseline Description | The baseline efficiency case is the existing equipment prior to the implementation of additional insulation. |
| Savings Principle | The high efficiency case includes pipe insulation. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.16 |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR118 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Pipe Wrap (Heating) |
| Measure Description | Insulation upgrades to existing heating system pipes |
| Baseline Description | The baseline efficiency case is the existing equipment prior to the implementation of additional insulation. |
| Savings Principle | The high efficiency case includes pipe insulation. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.16 |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.07 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 5.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR120 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ventilation |
| Sub-type | Heat Recovery Ventilator |
| Program Name | EnergyStar HVAC |
| Measure Name | Heat Recovery Ventilator |
| Measure Description | Heat Recovery Ventilators (HRV) can help make mechanical ventilation more cost effective by reclaiming energy from exhaust airflows. An electric penalty results due to the increased electricity consumed by the system fans. |
| Baseline Description | The baseline efficiency case is an ASHRAE 62.2-compliant exhaust fan system with no heat recovery. |
| Savings Principle | The high efficiency case is an exhaust fan system with heat recovery. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of heat recovery ventilation system |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times \text{deltakWh}$ $\text{Gross kW} = \text{Qty} \times \text{deltakW}$ $\text{Gross MMBtu}_{\text{Gas}} = \text{Qty} \times \text{deltaMMBtu}_{\text{Gas}}$ <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_{Gas} = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | -133 |
| kWh/yr savings source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| kWh/yr savings note | #N/A |
| kW reduction | -0.07 |
| kW reduction source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 7.7 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |

| | |
|--|---|
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Estimated using the demand allocation methodology described in: Cadmus Demand Impact Model (2012). Prepared for the Massachusetts Program Administrators. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 1.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit☐ | 960.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit☐ | \$ 250 per measure |

| TRM Reference Number | RIGR122 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Participant |
| Type | Participant |
| Sub-type | Participant |
| Program Name | Single Family Appliance Management |
| Measure Name | Participants |
| Measure Description | This row identifies a participant for tracking and cost purposes. |
| Baseline Description | 0 |
| Savings Principle | 0 |
| Energy Savings calculation method | 0 |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0.00 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |

| | |
|--|------------------------------------|
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 7.70 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR123 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Participant |
| Type | Participant |
| Sub-type | EW MF |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Participant |
| Measure Description | This row identifies a participant for tracking and cost purposes. |
| Baseline Description | 0 |
| Savings Principle | 0 |
| Energy Savings calculation method | 0 |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17.2 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |

| | |
|--|------|
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR124 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Faucet aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| TRM Reference Number | RIGR125 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Faucet aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow. |
| Baseline Description | The baseline efficiency case is an existing faucet with a high flow. |
| Savings Principle | The high efficiency is a low-flow faucet aerator. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.12 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 26.61 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 390.45 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 390/audit with multiple installed measures |

| TRM Reference Number | RIGR126 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 1768.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR127 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2888.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| TRM Reference Number | RIGR128 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 1768.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.65 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.72 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 390.45 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 390/audit with multiple installed measures |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR129 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise |
| Measure Name | Low Flow Showerhead thermo Control (ladybug gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 296.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| TRM Reference Number | RIGR132 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise |
| Measure Name | Low-flow showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3696.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR133 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Low-flow showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3696.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 601.18 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 553/audit with multiple installed measures |

| TRM Reference Number | RIGR134 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Low-flow showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3696.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.31 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.72 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 390.45 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 390/audit with multiple installed measures |

| TRM Reference Number | RIGR136 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Aerator |
| Program Name | EnergyWise |
| Measure Name | SF Aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a residential setting with service water heated by electricity. |
| Baseline Description | The baseline efficiency case is 2.2 GPM or greater faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed aerator |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.08 |
| Gas Heat MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| TRM Reference Number | RIGR137 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Demand Circulator |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Demand Circulator |
| Measure Description | Installation of a demand controller on a re-circulation loop. |
| Baseline Description | Full time operation of re-circ pump. |
| Savings Principle | The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs. |
| Energy Savings calculation method | Calc |
| Savings unit | Installed recirc controller |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR138 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Demand Circulator |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Demand Circulator |
| Measure Description | Installation of a demand controller on a re-circulation loop. |
| Baseline Description | Full time operation of re-circ pump. |
| Savings Principle | The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs. |
| Energy Savings calculation method | Calc |
| Savings unit | Installed recirc controller |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|------------------------------------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 54.41 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR139 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | LF Showerhead |
| Program Name | EnergyWise |
| Measure Name | Energy Wise Single Family Showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less. |
| Baseline Description | The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. |
| Savings Principle | The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed showerhead. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 0.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|------|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR140 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise |
| Measure Name | SF Pipe Wrap |
| Measure Description | Installation of insulation to reduce water heating energy. |
| Baseline Description | The baseline case is uninsulated heated water pipes. |
| Savings Principle | The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed pipe wrap job |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.06 |
| Gas Heat MMBtu/yr savings source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | DNV GL RI EnergyWise Single Family Evaluation, July 2016 |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 2537.08 |
| Gross Measure TRC source | Cadmus, Inc., LED Incremental Cost Study - Modeling Light Tracker LED and Halogen Pricing Data, June 2015 |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1776/audit with multiple installed measures |

| TRM Reference Number | RIGR141 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | EnergyWise MultiFamily |
| Measure Name | Pipe Wrap (Water Heating) |
| Measure Description | Installation of DHW pipe wraps |
| Baseline Description | The baseline efficiency case is the existing hot water equipment. |
| Savings Principle | The high efficiency case includes pipe wrap. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 1.14 |
| Gas Heat MMBtu/yr savings source | Illume and Navigant Consulting (2014). Rhode Island Behaviorial Program and Pilot Impacts and Process Evaluation. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR142 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Pipe Wrap (Water Heating) |
| Measure Description | Installation of DHW pipe wraps |
| Baseline Description | The baseline efficiency case is the existing hot water equipment. |
| Savings Principle | The high efficiency case includes pipe wrap. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 1.14 |
| Gas Heat MMBtu/yr savings source | Illume and Navigant Consulting (2014). Rhode Island Behaviorial Program and Pilot Impacts and Process Evaluation. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|------------------------------------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.53 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 5.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR144 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Efficient Water Heater |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Tankless Water Heater |
| Measure Description | Installation of high efficiency water heating equipment to replace the existing inefficient water heater. |
| Baseline Description | The baseline efficiency case is a stand-alone tank water heater with an energy factor of 0.575. |
| Savings Principle | The high efficiency case includes the new efficient water heater with an Energy Factor > 0.60. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | $\Delta \text{MMBtu} = \text{Units} \times (18 \text{ MMBtu/Units}) \times ((1/\text{EF}_{\text{base}}) - (1/\text{EF}_{\text{ee}}))$ Unit = Total number of dwelling units utilizing the water heater 18 MMBtu/Unit = Average annual water heating energy demand per dwelling unit EFBASE = Energy Factor for the baseline water heater EFEE = Energy Factor for the new efficient water heater |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.58 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.82 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGR145 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Efficient Water Heater |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Indirect Water Heater |
| Measure Description | Installation of high efficiency water heating equipment to replace the existing inefficient water heater. |
| Baseline Description | The baseline efficiency case is a stand-alone tank water heater with an energy factor of 0.575. |
| Savings Principle | The high efficiency case includes the new efficient water heater with an Energy Factor > 0.60. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | $\Delta \text{MMBtu} = \text{Units} \times (18 \text{ MMBtu/Units}) \times ((1/\text{EF}_{\text{base}}) - (1/\text{EF}_{\text{ee}}))$ Unit = Total number of dwelling units utilizing the water heater 18 MMBtu/Unit = Average annual water heating energy demand per dwelling unit EFBASE = Energy Factor for the baseline water heater EFEE = Energy Factor for the new efficient water heater |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 55.14 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.82 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGR146 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Efficient Water Heater |
| Program Name | Income Eligible MultiFamily |
| Measure Name | Stand Alone Water Heater |
| Measure Description | Installation of high efficiency water heating equipment to replace the existing inefficient water heater. |
| Baseline Description | The baseline efficiency case is a stand-alone tank water heater with an energy factor of 0.575. |
| Savings Principle | The high efficiency case includes the new efficient water heater with an Energy Factor > 0.60. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | $\Delta \text{MMBtu} = \text{Units} \times (18 \text{ MMBtu/Units}) \times ((1/\text{EF}_{\text{base}}) - (1/\text{EF}_{\text{ee}}))$ Unit = Total number of dwelling units utilizing the water heater 18 MMBtu/Unit = Average annual water heating energy demand per dwelling unit EFBASE = Energy Factor for the baseline water heater EFEE = Energy Factor for the new efficient water heater |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 143.02 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 1.82 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGR147 |
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | New Movers |
| Measure Description | A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | A control group of homes that does not receive Home Energy Reports. |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Customer receiving energy reports |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 0.93 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate will be determined by an independent evaluation. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |

| | |
|--|--|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 3.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 3.71 per participant |

| TRM Reference Number | RIGR151 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | Opt-out dual fuel |
| Measure Description | A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | No Home Energy Report. |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Per participant |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate will be determined by an independent evaluation. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |

| | |
|--|--|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 3.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 3.71 per participant |

| TRM Reference Number | RIGR152 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | Opt-out gas |
| Measure Description | A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | No Home Energy Report. |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Per participant |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 0.89 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate will be determined by an independent evaluation. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |

| | |
|--|--|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 3.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 3.71 per participant |

| TRM Reference Number | RIGR153 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Behavior |
| Sub-type | Home Energy Reports |
| Program Name | Home Energy Reports |
| Measure Name | New movers dual fuel |
| Measure Description | A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior. |
| Baseline Description | No Home Energy Report. |
| Savings Principle | A home that receives Home Energy Reports. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Per participant |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts Energy Efficiency Advisory Council & Behavioral Research Team |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is 100% since measure life is 1 year. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate will be determined by an independent evaluation. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |

| | |
|--|--|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | Free-ridership and spillover are not applicable as customers cannot participate without the utility program. |
| Gross Measure TRC unit ² | 3.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 3.71 per participant |

| TRM Reference Number | RIGR154 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | Residential |
| Project Type | Retrofit |
| Category | Whole Home |
| Type | Weatherization |
| Sub-type | EW SF |
| Program Name | EnergyWise |
| Measure Name | Energy Wise Single FamilyWeatherization |
| Measure Description | Installation of weatherization measures such as air sealing and insulation in gas heated homes. Electric savings are achieved from reduced run time of the HVAC system fan(s). |
| Baseline Description | The baseline efficiency case is the existing home shell. |
| Savings Principle | The high efficiency case can be a combination of increased insulation, air sealing, duct sealing, and other improvements to the home shell. |
| Energy Savings calculation method | Deemed |
| Savings unit | Household with weatherization measures installed |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 11.09 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 0.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 0.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------------------------------------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 66.59 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 513.88 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC038 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Direct Install |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 3.2 |
| Gas Heat MMBtu/yr savings source | E-mail correspondence among MA PAs and Ralph Pahl |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.02 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 180.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 126 per measure |

| TRM Reference Number | RIGC040 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | HVAC |
| Type | Controls |
| Sub-type | Boiler Control |
| Program Name | Direct Install |
| Measure Name | Boiler Reset Control |
| Measure Description | Boiler reset controls are devices that automatically control boiler water temperature based on outdoor temperature using a software program. |
| Baseline Description | Fixed boiler water temperature. |
| Savings Principle | The high efficiency case is a boiler with reset controls. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed boiler reset control |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 35.5 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|--|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 600.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 420 per measure |

| TRM Reference Number | RIGC041 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | HVAC |
| Type | Insulation |
| Sub-type | Duct |
| Program Name | Direct Install |
| Measure Name | INS_DUCT_SF |
| Measure Description | The installation of duct insulation and air sealing. |
| Baseline Description | Un-insulated ductwork with air leaks |
| Savings Principle | Insulating and air sealing ductwork reduces heat loss / gain, thereby saving energy. |
| Energy Savings calculation method | Deemed |
| Savings unit | SF of installed insulation |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 1.3 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.02 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$1.50/SF |

| TRM Reference Number | RIGC042 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | HVAC |
| Type | Steam Traps |
| Sub-type | Steam Trap |
| Program Name | Direct Install |
| Measure Name | Steam trap HVAC |
| Measure Description | The repair or replacement of malfunctioning steam traps. |
| Baseline Description | The baseline efficiency case is a failed steam trap. |
| Savings Principle | The high efficiency case is a repaired or replaced steam trap. |
| Energy Savings calculation method | Deemed |
| Savings unit | Repaired or replaced steam trap. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 25.7 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 6 |
| measure life source | DNV GL MA 2013 Prescriptive Gas Impact Evaluation: Steam Trap Evaluation Phase 1 |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.03 |
| Spill-Over (participant) | 0.02 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$50 per trap |

| TRM Reference Number | RIGC046 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Controls |
| Sub-type | Recirc |
| Program Name | Direct Install |
| Measure Name | DEMAND CIRCULATOR |
| Measure Description | Installation of a demand controller on a re-circulation loop. |
| Baseline Description | Full time operation of re-circ pump. |
| Savings Principle | The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed recirc controller |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 96 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.16 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGC047 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | Direct Install |
| Measure Name | Faucet aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas. |
| Baseline Description | The baseline efficiency case is a 2.2 GPM faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 130 |
| Hours Source | Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 5460.00 |
| Sewer savings: gallons/yr | 5460.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 11.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 11 per measure |

| TRM Reference Number | RIGC048 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Direct Install |
| Measure Name | Low-flow showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas. |
| Baseline Description | The baseline efficiency case is a 2.5 GPM showerhead. |
| Savings Principle | The high efficiency case is a 1.5 GPM showerhead. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 121.6 |
| Hours Source | Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 10 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 7300.00 |
| Sewer savings: gallons/yr | 7300.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 35.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 24.5 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGC049 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Spray Valve |
| Program Name | Direct Install |
| Measure Name | Pre-rinse spray valve |
| Measure Description | Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM. |
| Baseline Description | The baseline efficiency case is a standard efficiency spray valve. |
| Savings Principle | The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed pre-rinse spray valve. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 6410.00 |
| Sewer savings: gallons/yr | 6410.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 100.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| TRM Reference Number | RIGC050 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Spray Valve |
| Program Name | Direct Install |
| Measure Name | Salon Nozzle |
| Measure Description | The installation of a high efficiency salon nozzle. |
| Baseline Description | Standard salon nozzle. |
| Savings Principle | An efficient salon nozzle. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed salon nozzle |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|--|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 28639.00 |
| Sewer savings: gallons/yr | 28639.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 100.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC051 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Water Heater Insulation |
| Sub-type | Insulation |
| Program Name | Direct Install |
| Measure Name | Insulation Pipe Diameter 1.5in H2O |
| Measure Description | Install insulation on hot water piping located in non-conditioned spaces. |
| Baseline Description | Existing uninsulated pipe. |
| Savings Principle | The high efficiency condition is hot water piping in unconditional space with insulation installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed LF of pipe insulation |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.21 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 5.6 per measure |

| TRM Reference Number | RIGC052 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Water Heater Insulation |
| Sub-type | Insulation |
| Program Name | Direct Install |
| Measure Name | Insulation Pipe Diameter 1.5in Steam |
| Measure Description | Install insulation on steam piping located in non-conditioned spaces. |
| Baseline Description | Existing uninsulated pipe. |
| Savings Principle | The high efficiency condition is steam piping in unconditional space with insulation installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed LF of pipe insulation |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.21 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 5.6 per measure |

| TRM Reference Number | RIGC053 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Water Heater Insulation |
| Sub-type | Insulation |
| Program Name | Direct Install |
| Measure Name | Insulation Pipe Diameter 2in H2O |
| Measure Description | Install insulation on hot water piping located in non-conditioned spaces. |
| Baseline Description | Existing uninsulated pipe. |
| Savings Principle | The high efficiency condition is hot water piping in unconditional space with insulation installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed LF of pipe insulation |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.36 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 11.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 7.7 per measure |

| TRM Reference Number | RIGC054 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Direct Install |
| Category | Water Heating |
| Type | Water Heater Insulation |
| Sub-type | Insulation |
| Program Name | Direct Install |
| Measure Name | Insulation Pipe Diameter 2in Steam |
| Measure Description | Install insulation on steam piping located in non-conditioned spaces. |
| Baseline Description | Existing uninsulated pipe. |
| Savings Principle | The high efficiency condition is steam piping in unconditional space with insulation installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed LF of pipe insulation |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.37 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Energy & Resource Solutions (2005). Measure Life Study. Prepared for The Massachusetts Joint Utilities. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.05 |
| Spill-Over (participant) | 0.01 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.97 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 11.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 7.7 per measure |

| TRM Reference Number | RIGC055 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Codes and Standards |
| Type | Codes and Standards |
| Sub-type | Codes and Standards |
| Program Name | Commercial New Construction |
| Measure Name | CODES AND STANDARDS |
| Measure Description | Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island. |
| Baseline Description | Un-influenced adoption curve of federal minimum codes and standards. |
| Savings Principle | Accelerated adoption of advancing energy codes and equipment standards. |
| Energy Savings calculation method | Calculated based on attribution study |
| Savings unit | 0 |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | KEMA Rhode Island Energy Code Compliance Baseline Study |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | KEMA Rhode Island Energy Code Compliance Baseline Study |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |

| | |
|--|---|
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC056 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Boiler, Condensing Blend |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC057 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Boiler, Condensing Heating |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC058 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Boiler, Condensing Year round |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC059 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Boiler, Non-Condensing Blend |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC060 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Boiler, Non-Condensing Heating |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC061 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Boiler, Non-Condensing Year round |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC062 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Boiler |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Steam boiler |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC063 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | CHP |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Combined Heat and Power (Gas) |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC064 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Cooling |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Gas driven cooling |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC065 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | DHW |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Domestic Hot Water |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC066 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Food Service |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Food Service |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC067 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Food Service |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Kitchen Equipment |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC068 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Furnace |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Furnace, Blend |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC069 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Furnace |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Furnace, Heating |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC070 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Furnace |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Furnace, Year-round |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC071 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Heat Pump |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Heat Pump |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC072 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Heat Recovery |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Heat Recovery, Blend |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC073 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Heat Recovery |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Heat Recovery, Heating |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC074 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Heat Recovery |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Heat Recovery, Year Round |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC075 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | HVAC |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Energy Management System (building) |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC076 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | HVAC |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | HVAC |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC077 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | HVAC |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | HVAC insulation |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC078 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Other |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Other Heating |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.03 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC079 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Other |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Other Year Round |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.03 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC080 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Other |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Other Blend |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.03 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC081 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Process |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Process |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC082 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Solar heat |
| Sub-type | Blend |
| Program Name | Commercial New Construction |
| Measure Name | Solar Heat Blend |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC083 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Solar heat |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Solar Heating |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC084 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Solar heat |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | Solar Heat Year Round (DHW) |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC085 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Steam Traps |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Steam Trap |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 6 |
| measure life source | DNV GL MA 2013 Prescriptive Gas Impact Evaluation: Steam Trap Evaluation Phase 1 |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC086 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Ventilation |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Ventilation Reduction |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC087 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | VSD |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | VSDs on HVAC |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC088 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | VSD |
| Sub-type | Year round |
| Program Name | Commercial New Construction |
| Measure Name | VSDs on non-HVAC |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC101 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Whole Building |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Advanced Building |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC102 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Whole Building |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Building Shell |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC104 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Custom |
| Type | Whole Building |
| Sub-type | Heating |
| Program Name | Commercial New Construction |
| Measure Name | Comprehensive Design |
| Measure Description | The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings. |
| Baseline Description | For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case is based on site-specific information. |
| Savings Principle | The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives. |
| Energy Savings calculation method | Custom |
| Savings unit | Installed custom efficiency application. |
| Savings Equation | Gross kWh = ΔkWh_{custom} Gross Summer kW = ΔkW_{sp_custom} Gross Winter kW = ΔkW_{wp_custom} Gross MMBtu Gas = $\Delta MMBtu_{Gas_custom}$ Gross MMBtu Oil = $\Delta MMBtu_{Oil_custom}$ |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | DNV GL (2016) Impact Evaluation of 2014 Custom Gas Installations in Rhode Island |

| | |
|--|--|
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | Calc |
| Sewer savings: gallons/yr | Calc |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.01 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.09 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.91 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 8863.71 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 6647.78 per measure |

| TRM Reference Number | RIGC105 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Fryer |
| Program Name | Commercial New Construction |
| Measure Name | Commercial gas fryer |
| Measure Description | The installation of a natural-gas fired fryer that is either ENERGY Star rated or has a heavy-load cooking efficiency of at least 50%. Qualified fryers use advanced burner and heat exchanger designs to use fuel more efficiently, as well as increased insulation to reduce standby heat loss. |
| Baseline Description | The baseline efficiency case is a typical low-efficiency gas-fired fryer with 35% cooking efficiency, 16,000 Btu preheat energy, 14,000 Btu/h Idle Energy rate, and 60 lbs/h production capacity. |
| Savings Principle | The high efficiency case cooking efficiency and Idle Energy Rate are site specific and can be determined on a case-by-case basis. To simplify the savings algorithm, typical values for food load (150 lbs/day) and preheat energy (15,500 Btu) are assumed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired fryer. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Gas Fryer. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |

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|--|--|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 3400.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGC106 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Griddle |
| Program Name | Commercial New Construction |
| Measure Name | Commercial gas griddle |
| Measure Description | Installation of a high efficiency gas-fired griddle. |
| Baseline Description | The baseline efficiency case is a standard efficiency (30% efficient) gas griddle. |
| Savings Principle | The high efficiency case is a gas griddle with an efficiency of 38%. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired griddle |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Food Service Technology Center (2011). Gas Griddle Life-Cycle Cost Calculation. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1165.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIGC107 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Oven |
| Program Name | Commercial New Construction |
| Measure Name | Gas-fired combination oven ($\geq 44\%$ efficiency) |
| Measure Description | Installation of high efficiency gas-fired ovens. |
| Baseline Description | The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15. |
| Savings Principle | The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired oven. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Food Service Technology Center (2011). Gas Combination Oven Life-Cycle Cost Calculator. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|--|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1300.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGC108 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Oven |
| Program Name | Commercial New Construction |
| Measure Name | Gas-fired convection oven ($\geq 44\%$ efficiency) |
| Measure Description | Installation of high efficiency gas-fired ovens. |
| Baseline Description | The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15. |
| Savings Principle | The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired oven. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Food Service Technology Center (2012). Gas Convection Oven Life-Cycle Cost Calculator. http://www.fishnick.com/saveenergy/tools/calculators/govencalc.php . |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1886.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGC109 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Oven |
| Program Name | Commercial New Construction |
| Measure Name | Gas-fired conveyer oven ($\geq 44\%$ efficiency) |
| Measure Description | Installation of high efficiency gas-fired ovens. |
| Baseline Description | The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15. |
| Savings Principle | The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired oven. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|--|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2100.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGC110 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Oven |
| Program Name | Commercial New Construction |
| Measure Name | Gas-fired rack oven ($\geq 50\%$ efficiency) |
| Measure Description | Installation of high efficiency gas-fired ovens. |
| Baseline Description | The baseline efficiency case is a standard oven that meets the baseline cooking energy efficiency requirements shown in Table 15. |
| Savings Principle | The high efficiency case is an oven that meets or exceeds the high efficiency ratings shown in Table 15. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired oven. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Food Service Technology Center (2011). Gas Conveyor Oven Life-Cycle Cost Calculator. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|--|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 4000 per measure |

| TRM Reference Number | RIGC111 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Food Service |
| Type | Cooking Equipment |
| Sub-type | Steamer |
| Program Name | Commercial New Construction |
| Measure Name | Commercial gas steamer (>= 38% efficiency) |
| Measure Description | The baseline efficiency case is a typical boiler-based steamer with the following operating parameters: Preheat Energy rate = 72,000 Btu/hour, Idle Energy Rate = 18,000 Btu/hour, Heavy Load Efficiency = 18.0%, Production Capacity per pan = 23.3 lbs/hour, Average Water Consumption Rate = 40 gal/hour, and Percentage of Time in Constant Steam Mode = 40%. |
| Baseline Description | The baseline efficiency case is a typical boiler-based steamer with the following operating parameters: cooking energy efficiency = 18%, production capacity per pan = 23.3 lbs/hr, preheat energy rate = 72,000 Btu/hr, idle energy rate = 18,000 Btu/h, water consumption of 40gal/h, and Percentage of Time in Constant Steam Mode = 40%. |
| Savings Principle | The high efficiency case is an ENERGY STAR® qualified gas-fired steamer with the following operating parameters for a 6 pan steamer: Preheat Energy Rate = 36,000 Btu/hour, Idle Energy Rate = 12,500 Btu/hour, Heavy Load Efficiency = 38.0%, Production Capacity per pan = 20 lbs/hour, and Average Water Consumption Rate = 3 gallons/hour, and Percentage of Time in Constant Steam Mode = 40%. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency gas-fired steamer. |
| Savings Equation | Gross MMBtu_Gas = Qty × deltaMMBtu_Gas Where: Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit. |
| Hours | 4380 |
| Hours Source | Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 12 |
| measure life source | Environmental Protection Agency (2011). Savings Calculator for ENERGY STAR Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|--|
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | 100% realization rates are assumed because savings are based on researched assumptions by FSTC. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 162060.00 |
| Sewer savings: gallons/yr | 162060.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.26 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2000.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGC112 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Boiler |
| Sub-type | Combo Condensing |
| Program Name | Commercial New Construction |
| Measure Name | COMBO COND BOIL/WTR HTR 95+ |
| Measure Description | This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank. |
| Baseline Description | The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater. |
| Savings Principle | The high efficiency case is a condensing, integrated water heater/boiler with an AFUE $\geq 90\%$. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing combination DHW heater / boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 31.8 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC113 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Controls |
| Sub-type | Boiler Control |
| Program Name | Commercial New Construction |
| Measure Name | BOILER RESET 1 STAGE |
| Measure Description | Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand. |
| Baseline Description | The baseline efficiency case is a boiler without reset or load controls. |
| Savings Principle | The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of boiler reset control on existing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 35.5 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|--|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC115 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial Retrofit |
| Measure Name | Boiler95 |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that meets or exceeds 95% efficiency. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 27.8 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC116 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Boiler96 |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that meets or exceeds 96% efficiency. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 29.3 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC117 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Furnace |
| Program Name | Commercial New Construction |
| Measure Name | Furnace96ECM |
| Measure Description | The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motors significantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors. |
| Baseline Description | The baseline efficiency case is a 85% AFUE furnace in the <150 kBTuh size category. |
| Savings Principle | The high efficiency case is a new furnace with AFUE >= 96% and an electronically commutated motor. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency warm air furnace with ECM fan motor |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 168 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0.124 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 9.5 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |

| | |
|--|--|
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.06 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC119 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Condensing boiler <= 300 MBH 90% |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 30.6 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |

| | |
|--|--|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 3479.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1000 per measure |

| TRM Reference Number | RIGC120 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Condensing boiler <= 300 MBH 95% |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 27.8 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |

| | |
|--|--|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 3848.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1500 per measure |

| TRM Reference Number | RIGC121 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Condensing boiler 1000 |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 197.2 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |

| | |
|--|--|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 7874.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 7500 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGC122 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Condensing boiler 1701+ MBH |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 345.1 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |

| | |
|--|--|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 10601.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 10000 per measure |

| TRM Reference Number | RIGC123 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Condensing boiler 301 |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 58.4 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |

| | |
|--|--|
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 3879.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 2000 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGC124 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Condensing boiler 500 |
| Measure Description | The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensing boilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.) |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 107.3 |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2013). 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |

| | |
|--|--|
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 5077.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 4000 per measure |

| TRM Reference Number | RIGC125 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Boiler |
| Program Name | Commercial New Construction |
| Measure Name | Integrated water heater/condensing boiler (EF 0.90; AFUE 90%) |
| Measure Description | This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank. |
| Baseline Description | The baseline efficiency case is an 80% AFUE boiler with a 0.594 EF water heater. |
| Savings Principle | The high efficiency case is a condensing, integrated water heater/boiler with an AFUE \geq 90%. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high efficiency integrated boiler/water heater unit. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | ASHRAE Applications Handbook (2003); Page 36.3, assumes combined boiler and water heating systems have a measure life similar to a typical boiler. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|--|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | -0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1273.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1500 per measure |

| TRM Reference Number | RIGC126 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Furnace |
| Program Name | Commercial New Construction |
| Measure Name | Furnace 95+ AFUE (<150) w/ECM Motor |
| Measure Description | The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motors significantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors. |
| Baseline Description | The baseline efficiency case is a 85% AFUE furnace in the <150 kBTuh size category. |
| Savings Principle | The high efficiency case is a new furnace with AFUE \geq 95% and an electronically commutated motor. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency warm air furnace with ECM fan motor |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times \text{deltakWh}$ $\text{Gross kW} = \text{Qty} \times \text{deltakW}$ $\text{Gross MMBtu}_{\text{Gas}} = \text{Qty} \times \text{deltaMMBtu}_{\text{Gas}}$ <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_{Gas} = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 168 |
| kWh/yr savings source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.124 |
| kW reduction source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 9 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|--|
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.06 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1626.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIGC127 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Furnace |
| Program Name | Commercial New Construction |
| Measure Name | Furnace 97+ AFUE (<150) w/ECM Motor |
| Measure Description | The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motors significantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors. |
| Baseline Description | The baseline efficiency case is a 85% AFUE furnace in the <150 kBTuh size category. |
| Savings Principle | The high efficiency case is a new furnace with AFUE $\geq 97\%$ and an electronically commutated motor. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency warm air furnace with ECM fan motor |
| Savings Equation | $\text{Gross kWh} = \text{Qty} \times \text{deltakWh}$ $\text{Gross kW} = \text{Qty} \times \text{deltakW}$ $\text{Gross MMBtu}_{\text{Gas}} = \text{Qty} \times \text{deltaMMBtu}_{\text{Gas}}$ <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_{Gas} = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 168 |
| kWh/yr savings source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kWh/yr savings note | #N/A |
| kW reduction | 0.124 |
| kW reduction source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 9.9 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |

| | |
|--|--|
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts. |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.16 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.06 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1707.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 800 per measure |

| TRM Reference Number | RIGC128 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Infrared Heater |
| Program Name | Commercial New Construction |
| Measure Name | Infrared heater |
| Measure Description | The installation of a gas-fired low intensity infrared heating system in place of a unit heater, furnace, or other standard efficiency equipment. Infrared heating uses radiant heat as opposed to warm air to heat buildings. In commercial environments with high air exchange rates, heat loss is minimal because the space's heat comes from surfaces rather than air. |
| Baseline Description | The baseline efficiency case is a standard efficiency gas-fired unit heater with combustion efficiency of 80%. |
| Savings Principle | The high efficiency case is a gas-fired low-intensity infrared heating unit. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed infrared heater |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 12 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 17 |
| measure life source | Nexant (2006). DSM Market Characterization Report. Prepared for Questar Gas. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|--|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.06 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2982.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 750 per measure |

| TRM Reference Number | RIGC129 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | HVAC |
| Type | Heating |
| Sub-type | Unit Heater |
| Program Name | Commercial New Construction |
| Measure Name | Condensing Unit heater |
| Measure Description | The baseline efficiency case is a standard efficiency gas fired unit heater with minimum combustion efficiency of 80%, interrupted or intermittent ignition device (IID), and either power venting or an automatic flue damper. |
| Baseline Description | The baseline efficiency case is a standard efficiency unit heater. |
| Savings Principle | The high efficiency case is a condensing gas unit heater with 90% AFUE or greater. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed condensing unit heater. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 40.9 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 18 |
| measure life source | Ecotrope, Inc. (2003). Natural Gas Efficiency and Conservation Measure Resource Assessment for the Residential and Commercial Sectors. Prepared for the Energy Trust of Oregon. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.06 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2400.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 750 per measure |

| TRM Reference Number | RIGC130 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | DHW |
| Sub-type | Tank 0.67 EF |
| Program Name | Commercial New Construction |
| Measure Name | WATER HEATER TANK 0.67 EF |
| Measure Description | The installation of a high-efficiency tank water heater over 0.67 EF. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a tank water heater that is ENERGY STAR® rated with an Energy Factor of at least .67 and a nominal input of 75,000 Btu/hour or less. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency DHW tank |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 13 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC131 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | DHW |
| Sub-type | Hot water boiler |
| Program Name | Commercial New Construction |
| Measure Name | Water Heating Boiler - 85% TE |
| Measure Description | The installation of a high efficiency natural gas fired DHW boilers. High efficiency boilers take advantage of improved design to achieve improved efficiency. |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that meets or exceeds 85% efficiency. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency DHW boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC132 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | DHW |
| Sub-type | Hot water boiler |
| Program Name | Commercial New Construction |
| Measure Name | Water Heating Boiler - 92% TE |
| Measure Description | The installation of a high efficiency natural gas fired condensing DHW boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. |
| Baseline Description | The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2012. Table 19 in Appendix A details the specific efficiency requirements by equipment type and capacity. |
| Savings Principle | The high efficiency case assumes a gas-fired boiler that meets or exceeds 92% efficiency. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency condensing DHW boiler |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC133 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | DHW |
| Sub-type | Condensing Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | COND WATER HEATER 90%MIN 75-800 |
| Measure Description | The installation of a high-efficiency condensing water heater over 95% and between 75-300 kBtu/h. |
| Baseline Description | The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%. |
| Savings Principle | The high efficiency case is a condensing stand-alone commercial water heater with a thermal efficiency of 95% or greater and a capacity between 75,000 Btu and 300,000 Btu. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency DHW tank |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.62 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC134 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Tankless Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | WATER HEATER - ON-DEMAND 94 |
| Measure Description | Tankless water heaters circulate water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.94. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency water heater. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|--|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC135 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Condensing Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | Condensing stand Alone Water Heater |
| Measure Description | The installation of a high-efficiency condensing water heater over 95% and between 75-300 kBtu/h. |
| Baseline Description | The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%. |
| Savings Principle | The high efficiency case is a condensing stand-alone commercial water heater with a thermal efficiency of 95% or greater and a capacity between 75,000 Btu and 300,000 Btu. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency water heater. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2340.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| TRM Reference Number | RIGC136 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Indirect Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | Indirect water heater (EF >= 0.82, CAE >= 85%) |
| Measure Description | The installation of a an indirect water heater that uses a storage tank that is heated by the main boiler. The energy stored by the water tank allows the boiler to turn off and on less often. |
| Baseline Description | The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%. |
| Savings Principle | The high efficiency case is an indirect water heater with a Combined Appliance Efficiency (CAE) of 85% or greater. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency water heater. |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |

| | |
|--|--|
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1749.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 400 per measure |

| TRM Reference Number | RIGC137 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Tankless Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | On-demand tankless water heater (EF>=0.82) |
| Measure Description | Tankless water heaters circulate water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.82. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency water heater. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 2817.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 500 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC138 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Tankless Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | On-demand tankless water heater (EF>=0.90) |
| Measure Description | Condensing tankless water heaters heat water more efficiently by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature below dewpoint, and heating water for immediate use, eliminating the standby heat loss associated with a storage tank. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.90. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency water heater. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

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|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 3449.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 800 per measure |

| TRM Reference Number | RIGC139 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | New Construction |
| Category | Water Heating |
| Type | Water Heater |
| Sub-type | Tankless Water Heater |
| Program Name | Commercial New Construction |
| Measure Name | On-demand tankless water heater (EF>=0.95) |
| Measure Description | Condensing tankless water heaters heat water more efficiently by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature below dewpoint, and heating water for immediate use, eliminating the standby heat loss associated with a storage tank. |
| Baseline Description | The baseline efficiency case is a standalone tank water heater with an energy factor of 0.61. |
| Savings Principle | The high efficiency case is a tankless water heater that is ENERGY STAR® rated with an Energy Factor of at least 0.95. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed high-efficiency water heater. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.09 |
| Annual \$ savings source / description | DNV GL (2015) Massachusetts Electric & Gas Program Administrators: C&I New Construction Non-Energy Impacts Study |
| Annual \$ savings note | NEI per Therm |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.42 |
| Spill-Over (participant) | 0.05 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.63 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 3449.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 800 per measure |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGC141 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Air Sealing |
| Sub-type | Air Sealing/Infiltration |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Air Sealing |
| Measure Description | Thermal shell air leaks are sealed through strategic use and location of air-tight materials. |
| Baseline Description | The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE) |
| Savings Principle | The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed air sealing project. |
| Savings Equation | <p>Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft³-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu)</p> <p>Where:</p> <p>CFM50_pre = CFM50 measurement before air sealing CFM50_post = CFM50 measurement after air sealing (cu.ft./min) LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol 4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov 24 Hours per Day = Conversion factor 60 Minutes per Hour = Conversion factor 0.018 Btu/ft³-°F = Heat capacity of 1 cubic foot of air at 70 °F 1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default 0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default 1,000,000 Btu per MMBtu = Conversion factor</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |

| | |
|--|---|
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 19.28 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 135.83 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.19 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.81 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIGC147 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Building Shell |
| Type | Insulation |
| Sub-type | Shell |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | MF Shell Insulation |
| Measure Description | Insulation upgrades are applied in existing multifamily facilities. |
| Baseline Description | The baseline efficiency case is characterized by the total R-value of the existing attic, basement or sidewall (Rexist). This is calculated as the R-value of the existing insulation, estimated by the program contractor, plus the R-value of the ceiling, floor, or wall (for all projects: RCEILING = 3.36; RFLOOR = 6.16; RWALL = 6.65) |
| Savings Principle | The high efficiency case is characterized by the total R-value of the attic after the installation of additional attic, basement or sidewall insulation. This is calculated as the sum of the existing R-value (RBASE) plus the R-value of the added insulation (RADD). |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | $MMBTU_{annual} = (((1/R_{exist}) - (1/R_{new})) \times HDD \times 24 \times Area) / (1,000,000) \times \eta_{heat}$ $kWh_{annual} = MMBtu_{annual} \times 293.1$ $kW = kWh_{annual} \times kW/kWh_{heating}$ <p>Where:</p> <p>Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft²-°F/Btuh</p> <p>Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft²-°F/Btuh</p> <p>Area = Square footage of insulated area</p> <p>ηheat = Efficiency of the heating system (AFUE or COP)</p> <p>293.1 = Conversion constant (1MMBtu = 293.1 kWh)</p> <p>24 = Conversion for hours per day</p> <p>HDD = Heating Degree Days; dependent on location, see table below</p> <p>1,000,000 = Conversion from Btu to MMBtu</p> <p>kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh</p> |
| Hours | 4644 |
| Hours Source | This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |

| | |
|--|---|
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Energy realization rate is 100% because deemed savings are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 47.31 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 378.05 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.19 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.81 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | The Net-to-Gross ratio is Assumed to be 100%. |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIGC154 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Custom |
| Type | Custom |
| Sub-type | Custom |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Custom |
| Measure Description | Vendors install a variety of measures at multifamily facilities. Measures include |
| Baseline Description | For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the |
| Savings Principle | The high efficiency scenario is specific to the facility and may include one or more energy efficiency |
| Energy Savings calculation method | Calc |
| Savings unit | Completed custom project |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | Calc |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | mult |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|--------|
| Coincidence factor (CF) summer peak | Custom |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | Custom |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIG186 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Boiler Control |
| Program Name | Commercial Retrofit |
| Measure Name | BOILER RESET 1 STAGE |
| Measure Description | Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand. |
| Baseline Description | The baseline efficiency case is a boiler without reset or load controls. |
| Savings Principle | The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of boiler reset control on existing boiler |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 35.5 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |

| | |
|--|------|
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC188 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Boiler Control |
| Program Name | Commercial Retrofit |
| Measure Name | Boiler reset control (multi |
| Measure Description | Boiler reset controls are devices that automatically control boiler water temperature based on outdoor temperature using a software program. |
| Baseline Description | The baseline efficiency case is a boiler without reset controls. |
| Savings Principle | The high efficiency case is a boiler with reset controls. |
| Energy Savings calculation method | Deemed |
| Savings unit | Boiler reset control installed on existing boiler. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 35.5 |
| Gas Heat MMBtu/yr savings source | Environmental Protection Agency (2011). Savings Calculator for ENERGY STAR Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|--|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 993.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 225 per measure |

| TRM Reference Number | RIGC190 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Commercial Retrofit |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation. |
| Baseline Description | The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 3.2 |
| Gas Heat MMBtu/yr savings source | E-mail correspondence among MA PAs and Ralph Pahl |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|--|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 184.97 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 184.97 per measure |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC191 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Programmable thermostat |
| Measure Description | Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule. |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | The Cadmus Group (2012). Home Energy Services Impact Evaluation. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.24 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.76 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC192 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | Thermostat |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Wi-Fi programmable thermostat (controls gas heat only) |
| Measure Description | A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems Primary Energy Impact: Natural Gas |
| Baseline Description | For the intallation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the intallation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of WiFi programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |

| | |
|--|---|
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 5.45 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 51.49 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC193 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | WiFi T-stat |
| Program Name | Commercial Retrofit |
| Measure Name | WiFi Thermostat - cooling and htg |
| Measure Description | A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems. |
| Baseline Description | The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a Wi-Fi thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of WiFi programmable thermostat |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 6.60 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|------|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC194 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Controls |
| Sub-type | WiFi T-stat |
| Program Name | Commercial Retrofit |
| Measure Name | WiFi Tstat-heat only |
| Measure Description | A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems Primary Energy Impact: Natural Gas |
| Baseline Description | The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat. |
| Savings Principle | The high efficiency case is an HVAC system that has a Wi-Fi thermostat installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installation of WiFi programmable thermostat |
| Savings Equation | $\text{Gross MMBtu_Gas} = \text{Qty} \times \text{deltaMMBtu_Gas}$ <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 6.60 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 1.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 1.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|------|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC195 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Ducting |
| Sub-type | Duct Sealing |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Duct Sealing |
| Measure Description | Ducts are sealed by reconnecting disconnected duct joints and sealing gaps or seams with mastic and fiber-mesh tape as appropriate |
| Baseline Description | The baseline efficiency case is the existing facility or equipment prior to the implementation of duct sealing. |
| Savings Principle | The baseline efficiency case is the existing facility or equipment after the implementation of duct sealing. |
| Energy Savings calculation method | Calc |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 20 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |

| | |
|--|---|
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.23 |
| Annual \$ savings source / description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| Annual \$ savings note | NEI per participant / treated unit |
| One time \$ savings | 2.51 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC198 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Pipe Wrap (Heating) |
| Measure Description | Insulation upgrades to existing heating system pipes |
| Baseline Description | The baseline efficiency case is the existing equipment prior to the implementation of additional insulation. |
| Savings Principle | The high efficiency case includes pipe insulation. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.16 |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |

| | |
|--|------|
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC200 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | HVAC |
| Type | Steam Traps |
| Sub-type | Steam Trap |
| Program Name | Commercial Retrofit |
| Measure Name | Steam trap HVAC |
| Measure Description | The repair or replacement of malfunctioning steam traps. |
| Baseline Description | The baseline efficiency case is a failed steam trap. |
| Savings Principle | The high efficiency case is a repaired or replaced steam trap. |
| Energy Savings calculation method | Deemed |
| Savings unit | Repaired or replaced steam trap. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 25.7 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 6 |
| measure life source | DNV GL MA 2013 Prescriptive Gas Impact Evaluation: Steam Trap Evaluation Phase 1 |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|--|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 250.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 75 per measure |

| TRM Reference Number | RIGC202 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | PArticipant |
| Type | Participant |
| Sub-type | C&I MF |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Participant |
| Measure Description | This row identifies a participant for tracking and cost purposes. |
| Baseline Description | 0 |
| Savings Principle | 0 |
| Energy Savings calculation method | 0 |
| Savings unit | 0 |
| Savings Equation | #N/A |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 1 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |

| | |
|--|------|
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|---|
| TRM Reference Number | RIGC204 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Faucet Aerator |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Faucet aerator |
| Measure Description | Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas. |
| Baseline Description | The baseline efficiency case is a 2.2 GPM faucet. |
| Savings Principle | The high efficiency case is a faucet with 1.5 GPM or less aerator installed. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed faucet aerator. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

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|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 332.00 |
| Sewer savings: gallons/yr | 332.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIGC205 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Low-flow showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas. |
| Baseline Description | The baseline efficiency case is a 2.5 GPM showerhead. |
| Savings Principle | The high efficiency case is a 1.5 GPM showerhead. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011. |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | GDS Associates, Inc. and Summit Blue Consulting (2009). Natural Gas Energy Efficiency Potential in Massachusetts. Prepared for GasNetworks. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

| | |
|--|---|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 3696.00 |
| Sewer savings: gallons/yr | 3696.00 |
| Water / Sewer savings Source | The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for the Massachusetts Program Administrators. |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | N/A |

| TRM Reference Number | RIGC207 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Spray Valve |
| Program Name | Commercial Retrofit |
| Measure Name | Pre-rinse spray valve |
| Measure Description | Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM. |
| Baseline Description | The baseline efficiency case is a standard efficiency spray valve. |
| Savings Principle | The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed pre-rinse spray valve. |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 8 |
| measure life source | Veritec Consulting (2005). Region of Waterloo Pre-Rinse Spray Valve Pilot Study. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | Realization rate is assumed to be 100% since evaluation adjusts deemed savings value |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |

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|--|--|
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 6410.00 |
| Sewer savings: gallons/yr | 6410.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 100.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 100 per measure |

| TRM Reference Number | RIGC211 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Commercial Retrofit |
| Measure Name | Low-Flow Showerhead |
| Measure Description | Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas. |
| Baseline Description | The baseline efficiency case is a 2.5 GPM showerhead. |
| Savings Principle | The high efficiency case is a 1.5 GPM showerhead. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |

| | |
|--|--------------------|
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 7300.00 |
| Sewer savings: gallons/yr | 7300.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 200.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 200 per measure |

| TRM Reference Number | RIGC212 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Low Flow Showerhead thermo Control (ladybug gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 435.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC213 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Low Flow Showerhead |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Low Flow Showerhead w/thermo Control (roadrunner gas DHW) |
| Measure Description | A showerhead with a control that limits flow once water is heated. |
| Baseline Description | The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less. |
| Savings Principle | The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated. |
| Energy Savings calculation method | Deemed |
| Savings unit | Installed low-flow showerhead |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units.</p> <p>deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0 |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 7 |
| measure life source | #N/A |
| measure life note | Massachusetts Common Assumption |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | National Grid assumption based on regional PA working groups. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|---|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 2888.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.03 |
| One time \$ savings source/description | NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators. |
| One time \$ savings note | NEI per participant / treated unit |
| Free-Ridership | 0.15 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.85 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC214 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Flow Control |
| Sub-type | Demand Circulator |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Demand Circulator |
| Measure Description | Installation of a demand controller on a re-circulation loop. |
| Baseline Description | Full time operation of re-circ pump. |
| Savings Principle | The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs. |
| Energy Savings calculation method | Calc |
| Savings unit | Installed recirc controller |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| TRM Reference Number | RIGC215 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Water Heating |
| Type | Insulation |
| Sub-type | Pipe Insulation |
| Program Name | Commercial and Industrial MultiFamily |
| Measure Name | Pipe Wrap (Water Heating) |
| Measure Description | Installation of DHW pipe wraps |
| Baseline Description | The baseline efficiency case is the existing hot water equipment. |
| Savings Principle | The high efficiency case includes pipe wrap. |
| Energy Savings calculation method | Deemed |
| Savings unit | 0 |
| Savings Equation | <p>Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltaMMBtu_Gas = Average annual natural gas reduction per unit.</p> |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 1.14 |
| Gas Heat MMBtu/yr savings source | Illume and Navigant Consulting (2014). Rhode Island Behaviorial Program and Pilot Impacts and Process Evaluation. |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 15 |
| measure life source | GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 1.00 |
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |

| | |
|--|------|
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | #N/A |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

| | |
|--------------------------------------|--|
| TRM Reference Number | RIGC216 |
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Whole Building |
| Type | BOC Training |
| Sub-type | Certification |
| Program Name | Commercial Retrofit |
| Measure Name | Building operator certification |
| Measure Description | The Building Operator Certification (BOC) class improves operators' ability to optimize / minimize gas and electricity use in buildings. |
| Baseline Description | The basecase is a building operator without specific training on efficient use of gas and electricity in buildings. |
| Savings Principle | The high efficiency case is a building operator attending a class on improving the efficiency of gas and electricity use in buildings. |
| Energy Savings calculation method | Deemed |
| Savings unit | MMBTU/SF/BOC completion |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.0007 |
| Gas Heat MMBtu/yr savings source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |

| | |
|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.06 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.94 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1695.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1250 per measure |

| TRM Reference Number | RIGC217 |
|--------------------------------------|--|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Whole Building |
| Type | BOC Training |
| Sub-type | Certification + capital improvements |
| Program Name | Commercial Retrofit |
| Measure Name | Building operator certification + capital improvements |
| Measure Description | The Building Operator Certification (BOC) class improves operators' ability to optimize / minimize gas and electricity use in buildings. |
| Baseline Description | The basecase is a building operator without specific training on efficient use of gas and electricity in buildings. |
| Savings Principle | The high efficiency case is a building operator attending a class on improving the efficiency of gas and electricity use in buildings, as well as capital investments in EE projects. |
| Energy Savings calculation method | Deemed |
| Savings unit | MMBTU/SF/BOC completion |
| Savings Equation | <p>Gross kWh = Qty × deltakWh Gross kW = Qty × deltakW Gross MMBtu_Gas = Qty × deltaMMBtu_Gas</p> <p>Where:</p> <p>Qty = Total number of units. deltakWh = Average annual kWh reduction per unit. deltakW = Average kW reduction per unit. deltaMMBtu_Gas = Average annual natural gas reduction per unit</p> |
| Hours | N/A |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | 0 |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | 0 |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | 0.0011 |
| Gas Heat MMBtu/yr savings source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | 0 |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 5 |
| measure life source | Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts Program Administrators and the Energy Efficiency Advisory Council |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | All installations have 100% in-service rate since programs include verification of equipment installations. |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | Savings persistence is assumed to be 100%. |
| Realization rate energy (RRe) | 0.00 |

| | |
|--|--|
| RRe source | #N/A |
| RRe note | Realization rate is 100% since gross savings values are based on evaluation results. |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.00 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 1.00 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 1695.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | \$ 1250 per measure |

| TRM Reference Number | RIGC220 |
|--------------------------------------|---|
| Fuel | Gas |
| Sector | C&I |
| Project Type | Retrofit |
| Category | Whole Building |
| Type | Insulation |
| Sub-type | Roof |
| Program Name | Commercial Retrofit |
| Measure Name | ROOF INSULATION |
| Measure Description | Installation of roof insulation in existing facilities. |
| Baseline Description | The basecase is the existing roof insulation level. |
| Savings Principle | The high efficiency case is the installed insulation level. |
| Energy Savings calculation method | Calculated using site-specific inputs |
| Savings unit | Completed insulation project. |
| Savings Equation | Gross kWh = deltakWh_custom Gross Summer kW = deltakW_sp_custom Gross Winter kW = deltakW_wp_custom Gross MMBtu Gas = deltaMMBtu_Gas_custom Gross MMBtu Oil = deltaMMBtu_Oil_custom |
| Hours | 0 |
| Hours Source | #N/A |
| Hours source note | #N/A |
| kWh/yr Savings | Calc |
| kWh/yr savings source | #N/A |
| kWh/yr savings note | #N/A |
| kW reduction | Calc |
| kW reduction source | #N/A |
| kW reduction note | #N/A |
| Gas Heat MMBtu/yr savings | Calc |
| Gas Heat MMBtu/yr savings source | #N/A |
| Gas Heat MMBtu/yr savings note | #N/A |
| Oil MMBtu/yr savings | Calc |
| Oil MMBtu/yr savings source | #N/A |
| Oil MMBtu/yr savings note | #N/A |
| Propane MMBtu/yr savings | 0 |
| Propane MMBtu/yr savings source | #N/A |
| Propane MMBtu/yr savings note | #N/A |
| Energy Reference(s) & table(s) notes | 0 |
| measure life | 25 |
| measure life source | #N/A |
| measure life note | #N/A |
| In-service rate (ISR) | 1.00 |
| In-service rate source | #N/A |
| In-service rate note | #N/A |
| Savings Persistence Factor (SPF) | 1.00 |
| Savings Persistence Factor source | #N/A |
| Savings Persistence Factor note | #N/A |
| Realization rate energy (RRe) | 0.00 |
| RRe source | #N/A |
| RRe note | #N/A |
| RR demand (RRd) summer peak | 0.00 |
| RRd summer peak source | #N/A |
| RRd summer peak note | #N/A |
| RR demand (RRd) winter peak | 0.00 |
| RRd winter peak source | #N/A |
| RRd winter peak note | #N/A |
| Coincidence factor (CF) summer peak | 0.00 |
| CF summer peak source | #N/A |
| CF summer peak note | #N/A |
| Coincidence factor (CF) winter peak | 0.00 |
| CF winter peak source | #N/A |

| | |
|--|--|
| CF winter peak note | #N/A |
| Water savings: gallons/yr | 0.00 |
| Sewer savings: gallons/yr | 0.00 |
| Water / Sewer savings Source | #N/A |
| Water / Sewer savings note | #N/A |
| Annual \$ savings | 0.00 |
| Annual \$ savings source / description | #N/A |
| Annual \$ savings note | #N/A |
| One time \$ savings | 0.00 |
| One time \$ savings source/description | #N/A |
| One time \$ savings note | #N/A |
| Free-Ridership | 0.23 |
| Spill-Over (participant) | 0.00 |
| Spill-Over (non-participant) | 0.00 |
| Net-to-Gross | 0.78 |
| Net-to-Gross source | TetraTech (2015) 2013-14 Rhode Island C&I Natural Gas Free Ridership and Spillover Study (Memorandum), August 2015 |
| Net-to-Gross note | #N/A |
| Gross Measure TRC unit ² | 0.00 |
| Gross Measure TRC source | #N/A |
| Gross Measure TRC note | #N/A |
| Incentive Unit ² | 0.00 |

Appendix A: Tables

Table 1: Lighting Power Densities Using the Building Area Method (WATTSb,i)

| Building Area Type | Lighting Power Density (W/ft ²) [1] |
|-----------------------------|--|
| Automotive Facility | 0.9 |
| Convention Center | 1.2 |
| Court House | 1.2 |
| Dining: Bar Lounge/Leisure | 1.3 |
| Dining: Cafeteria/Fast Food | 1.4 |
| Dining: Family | 1.6 |
| Dormitory | 1 |
| Fire Stations | 0.8 |
| Exercise Center | 1 |
| Gymnasium | 1.1 |
| Healthcare-Clinic | 1 |
| Hospital | 1.2 |
| Hotel | 1 |
| Library | 1.3 |
| Manufacturing Facility | 1.3 |
| Motel | 1 |
| Motion Picture Theatre | 1.2 |
| Multi-Family | 0.7 |
| Museum | 1.1 |
| Office | 0.9 |
| Parking Garage | 0.3 |
| Penitentiary | 1 |
| Performing Arts Theatre | 1.6 |
| Police/Fire Station | 1 |
| Post Office | 1.1 |
| Religious Building | 1.3 |
| Retail | 1.4 |
| School/University | 1.2 |
| Sports Arena | 1.1 |
| Town Hall | 1.1 |
| Transportation | 1 |
| Warehouse | 0.6 |
| Workshop | 1.4 |

[1] IECC 2012

Table 2: Lighting Power Densities Using the Space-by-Space Method (WATTSb,i)

| Common Space Types | Lighting Power Density (W/ft ²) |
|---|---|
| Atrium – First 40 feet in height | 0.03 per ft. ht. |
| Atrium – Above 40 feet in height | 0.02 per ft. ht. |
| Audience/seating | |
| For Auditorium | 0.9 |
| For performing arts theater | 2.6 |
| For motion picture theater | 1.2 |
| Classroom/lecture/training | 1.3 |
| Conference/meeting/multipurpose | 1.2 |
| Corridor/transition | 0.7 |
| Dining Area | 0.9 |
| Bar/lounge/leisure dining | 1.4 |
| Family dining area | 1.4 |
| Dressing/fitting room performing arts theater | 1.1 |
| Electrical/mechanical | 1.1 |
| Food preparation | 1.2 |
| Laboratory for classrooms | 1.3 |
| Laboratory for medical/industrial/research | 1.8 |
| Lobby | 1.1 |
| Lobby for performing arts theater | 3.3 |
| Lobby for motion picture theater | 1 |
| Locker room | 0.8 |
| Lounge/Recreation | 0.8 |
| Office - enclosed | 1.1 |
| Office – open plan | 1 |
| Restroom | 1 |
| Sales area | 1.6 |
| Stairway | 0.7 |
| Storage | 0.8 |
| Workshop | 1.6 |
| Courthouse/police station/penitentiary | |
| Courtroom | 1.9 |
| Confinement cells | 1.1 |
| Judge Chambers | 1.3 |
| Penitentiary audience seating | 0.5 |
| Penitentiary classroom | 1.3 |
| Penitentiary dining | 1.1 |
| BUILDING SPECIFIC SPACE-BY-SPACE TYPES | |
| Automotive – service/repair | 0.7 |
| Bank/office – banking activity area | 1.5 |
| Dormitory living quarters | 1.1 |
| Gymnasium/fitness center | |

| | |
|---|-----|
| Fitness area | 0.9 |
| Gymnasium audience/seating | 0.4 |
| Playing area | 1.4 |
| COMMON SPACE-BY-SPACE TYPES | 1.4 |
| Healthcare clinic/hospital | |
| Corridors/transition | 1 |
| Exam/treatment | 1.7 |
| Emergency | 0.8 |
| Public and staff lounge | 0.8 |
| Medical Supplies | 1.4 |
| Nursery | 0.9 |
| Nurse Station | 1 |
| Physical Therapy | 0.9 |
| Patient room | 0.7 |
| Pharmacy | 1.2 |
| Radiology/imaging | 1.3 |
| Operating room | 2.2 |
| Recovery | 1.2 |
| Lounge Recreation | 0.8 |
| Laundry – washing | 0.6 |
| Hotel | |
| Dining area | 1.3 |
| Guest rooms | 1.1 |
| Hotel lobby | 2.1 |
| Highway lodging dining | 1.2 |
| Highway lodging guest rooms | 1.1 |
| Library | |
| Stacks | 1.7 |
| Card File and cataloguing | 1.1 |
| Reading area | 1.2 |
| Manufacturing | |
| Corridors/transition | 0.4 |
| Detailed Manufacturing | 1.3 |
| Equipment Room | 1 |
| Extra high bay (> 50-foot floor-ceiling height) | 1.1 |
| High bay (25 – 50-foot floor-ceiling height) | 1.2 |
| Low bay (< 25-foot floor-ceiling height) | 1.2 |
| Museum | |
| General Exhibition | 1 |
| Restoration | 1.7 |
| Parking Garage – garage areas | 0.2 |
| Convention Center | |
| Exhibit space | 1.5 |
| Audience/seating area | 0.9 |
| Fire Stations | |
| Engine Room | 0.8 |
| Sleeping quarters | 0.3 |

| | |
|---|-----|
| Post Office | |
| Sorting area | 0.9 |
| Religious building | |
| Fellowship hall | 0.6 |
| Audience seating | 2.4 |
| Worship pulpit/choir | 2.4 |
| Retail | |
| Dressing/fitting area | 0.9 |
| Mall concourse | 1.6 |
| Sales area | 1.6 |
| BUILDING SPECIFIC SPACE-BY-SPACE TYPES | |
| Sports arena | |
| Audience seating | 0.4 |
| Court sports area – Class 4 | 0.7 |
| Court sports area – Class 3 | 1.2 |
| Court sports area – Class 2 | 1.9 |
| Court sports area – Class 1 | 3 |
| Ring sports area | 2.7 |
| Transportation | |
| Air/train/bus baggage area | 1 |
| Airport concourse | 0.6 |
| Terminal – ticket counter | 1.5 |
| Warehouse | |
| Fine material storage | 1.4 |
| Medium/bulky material | 0.6 |

[1] IECC 2012

Table 3: New Construction Proposed Lighting Wattage Tables

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|-------------------------------------|---------------------------|------------------------|
| LED Exit Signs | | |
| 1E0002 | 2.0 WATT LED | 2 |
| 1E0003 | 3.0 WATT LED | 3 |
| 1E0005 | 5.0 WLED | 5 |
| 1E0005C | 0.5 WATT LEC | 0.5 |
| 1E0008 | 8.0 WLED | 8 |
| 1E0015 | 1.5 WATT LED | 1.5 |
| 1E0105 | 10.5 WATT LED | 10.5 |
| Compact Fluorescents (CFL's) | | |
| 2C0007S | 2/7W COMPACT HW | 18 |
| 1C0005S | 5W COMPACT HW | 7 |
| 1C0007S | 7W COMPACT HW | 9 |
| 1C0009S | 9W COMPACT HW | 11 |
| 1C0011S | 11W COMPACT HW | 13 |
| 1C0013S | 13W COMPACT HW | 15 |
| 1C0018E | 18W COMPACT HW ELIG | 20 |
| 1C0018S | 18W COMPACT HW | 20 |
| 1C0022S | 22W COMPACT HW | 24 |
| 1C0023E | 1/23W COMPACT HW ELIG | 25 |
| 1C0026E | 26W COMPACT HW ELIG | 28 |
| 1C0026S | 26W COMPACT HW | 28 |
| 1C0028S | 28W COMPACT HW | 30 |
| 1C0032E | 32W COMPACT HW ELIG | 34 |
| 1C0032S | 32W CIRCLINE HW | 34 |
| 1C0042E | 1/42W COMPACT HW ELIG | 48 |
| 1C0044S | 44W CIRCLINE HW | 46 |
| 1C0057E | 1/57W COMPACT HW ELIG | 65 |
| 1C2232S | 22/32W CIRCLINE HW | 58 |
| 1C2D10E | 10W 2D COMPACT HW ELIG | 12 |
| 1C2D16E | 16W 2D COMPACT HW ELIG | 18 |
| 1C2D21E | 21W 2D COMPACT HW ELIG | 22 |
| 1C2D28E | 28W 2D COMPACT HW ELIG | 28 |
| 1C2D38E | 38W 2D COMP.HW ELIG | 36 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--|----------------------------------|---------------------------|
| Compact Fluorescents (CFL's) (cont) | | |
| 1C3240S | 32/40W CIRCLINE HW | 80 |
| 2C0005S | 2/5W COMPACT HW | 14 |
| 2C0009S | 2/9W COMPACT HW | 22 |
| 2C0011S | 2/11W COMPACT HW | 26 |
| 2C0013E | 2/13W COMPACT HW ELIG | 28 |
| 2C0013S | 2/13W COMPACT HW | 30 |
| 2C0018E | 2/18W COMP. HW ELIG | 40 |
| 2C0026E | 2/26W COMP. HW ELIG | 54 |
| 2C0032E | 2/32W COMPACT HW ELIG | 68 |
| 2C0042E | 2/42W COMPACT HW ELIG | 100 |
| 3C0009S | 3/9W COMPACT HW | 33 |
| 3C0013S | 3/13W COMPACT HW | 45 |
| 3C0018E | 3/18W COMPACT HW ELIG | 60 |
| 3C0026E | 3/26W COMPACT HW ELIG | 82 |
| 3C0032E | 3/32W COMPACT HW ELIG | 114 |
| 3C0042E | 3/42W COMPACT HW ELIG | 141 |
| 4C0018E | 4/18W COMPACT HW ELIG | 80 |
| 4C0026E | 4/26W COMPACT HW ELIG | 108 |
| 4C0032E | 4/32W COMPACT HW ELIG | 152 |
| 4C0042E | 4/42W COMPACT HW ELIG | 188 |
| 6C0026E | 6/26W COMPACT HW ELIG | 162 |
| 6C0032E | 6/32W COMPACT HW ELIG | 228 |
| 6C0042E | 6/42W COMPACT HW ELIG | 282 |
| 8C0026E | 8/26W COMPACT HW ELIG | 216 |
| 8C0032E | 8/32W COMPACT HW ELIG | 304 |
| 8C0042E | 8/42W COMPACT HW ELIG | 376 |
| T5 Systems | | |
| 1F14SSE | 1L2' 14W T5/ELIG | 16 |
| 2F14SSE | 2L2' 14W T5/ELIG | 32 |
| 3F14SSE | 3L2' 14W T5/ELIG | 50 |
| 4F14SSE | 4L2' 14W T5/ELIG | 68 |
| 1F24HSE | 1L2' 24W T5HO/ELIG | 29 |
| 2F24HSE | 2L2' 24W T5HO/ELIG | 52 |
| 3F24HSE | 3L2' 24W T5HO/ELIG | 80 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|----------------------------------|---------------------------|
| T5 Systems (cont.) | | |
| 1F21SSE | 1L3' 21W T5/ELIG | 24 |
| 2F21SSE | 2L3' 21W T5/ELIG | 47 |
| 1F39HSE | 1L3' 39W T5HO/ELIG | 42 |
| 2F39HSE | 2L3' 39W T5HO/ELIG | 85 |
| 1F28SSE | 1L4' 28W T5/ELIG | 32 |
| 2F28SSE | 2L4' 28W T5/ELIG | 63 |
| 3F28SSE | 3L4' 28W T5/ELIG | 95 |
| 4F28SSE | 4L4' 28W T5/ELIG | 126 |
| 6F28SSE | 6L4' 28W T5/ELIG | 189 |
| 1F47HSE | 1L4' 47W T5HO/ELIG | 53 |
| 2F47HSE | 2L4' 47W T5HO/ELIG | 103 |
| 3F47HSE | 3L4' 47W T5HO/ELIG | 157 |
| 4F47HSE | 4L4' 47W T5HO/ELIG | 200 |
| 5F47HSE | 5L4' 47W T5HO/ELIG | 260 |
| 6F47HSE | 6L4' 47W T5HO/ELIG | 303 |
| 1F50HSE | 1L4' 50W T5HO/ELIG | 58 |
| 2F50HSE | 2L4' 50W T5HO/ELIG | 110 |
| 3F50HSE | 3L4' 50W T5HO/ELIG | 168 |
| 4F50HSE | 4L4' 50W T5HO/ELIG | 215 |
| 5F50HSE | 5L4' 50W T5HO/ELIG | 278 |
| 6F50HSE | 6L4' 50W T5HO/ELIG | 325 |
| 1F54HSE | 1L4' 54W T5HO/ELIG | 59 |
| 2F54HSE | 2L4' 54W T5HO/ELIG | 117 |
| 3F54HSE | 3L4' 54W T5HO/ELIG | 177 |
| 4F54HSE | 4L4' 54W T5HO/ELIG | 234 |
| 5F54HSE | 5L4' 54W T5HO/ELIG | 294 |
| 6F54HSE | 6L4' 54W T5HO/ELIG | 351 |
| 8F54HSE | 8L4' 54W T5HO/ELIG | 468 |
| 10F54HSE | 10L4' 54W T5HO/ELIG | 585 |
| Two Foot High Efficient T8 Systems | | |
| 1F17ESL | 1L2' 17W T8EE/ELEE LOW PWR | 14 |
| 1F17ESN | 1L2' 17W T8EE/ELEE | 17 |
| 1F17ESH | 1L2' 17W T8EE/ELEE HIGH PWR | 20 |
| 1F28BXE | 1L2' F28BX/ELIG | 32 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|-----------------------------|--------------------|
| 2F17ESL | 2L2' 17W T8EE/ELEE LOW PWR | 27 |
| 2F17ESN | 2L2' 17W T8EE/ELEE | 32 |
| 2F17ESH | 2L2' 17W T8EE/ELEE HIGH PWR | 40 |
| 2F28BXE | 2L2' F28BX/ELIG | 63 |
| 3F17ESL | 3L2' 17W T8EE/ELEE LOW PWR | 39 |
| 3F17ESN | 3L2' 17W T8EE/ELEE | 46 |
| 3F17ESH | 3L2' 17W T8EE/ELEE HIGH PWR | 61 |
| 3F28BXE | 3L2' F28BX/ELIG | 94 |
| Three Foot High Efficient T8 Systems | | |
| 1F25ESL | 1L3' 25W T8EE/ELEE LOW PWR | 21 |
| 1F25ESN | 1L3' 25W T8EE/ELEE | 24 |
| 1F25ESH | 1L3' 25W T8EE/ELEE HIGH PWR | 30 |
| 2F25ESL | 2L3' 25W T8EE/ELEE LOW PWR | 40 |
| 2F25ESN | 2L3' 25W T8EE/ELEE | 45 |
| 2F25ESH | 2L3' 25W T8EE/ELEE HIGH PWR | 60 |
| 3F25ESL | 3L3' 25W T8EE/ELEE LOW PWR | 58 |
| 3F25ESN | 3L3' 25W T8EE/ELEE | 67 |
| 3F25ESH | 3L3' 25W T8EE/ELEE HIGH PWR | 90 |
| | | |
| Four Foot T8 High Efficient / Reduce Wattage Systems | | |
| 1F25EEH | 1L4' 25W T8EE/ELEE HIGH PWR | 30 |
| 1F25EEE | 1L4' 25W T8EE/ELEE | 22 |
| 1F25EEL | 1L4' 25W T8EE/ELEE LOW PWR | 19 |
| 2F25EEH | 2L4' 25W T8EE/ELEE HIGH PWR | 57 |
| 2F25EEE | 2L4' 25W T8EE/ELEE | 43 |
| 2F25EEL | 2L4' 25W T8EE/ELEE LOW PWR | 37 |
| 3F25EEH | 3L4' 25W T8EE/ELEE HIGH PWR | 86 |
| 3F25EEE | 3L4' 25W T8EE/ELEE | 64 |
| 3F25EEL | 3L4' 25W T8EE/ELEE LOW PWR | 57 |
| 4F25EEH | 4L4' 25W T8EE/ELEE HIGH PWR | 111 |
| 4F25EEE | 4L4' 25W T8EE/ELEE | 86 |
| 4F25EEL | 4L4' 25W T8EE/ELEE LOW PWR | 75 |
| 1F28EEH | 1L4' 28W T8EE/ELEE HIGH PWR | 33 |
| 1F28EEE | 1L4' 28W T8EE/ELEE | 24 |
| 1F28EEL | 1L4' 28W T8EE/ELEE LOW PWR | 22 |
| 2F28EEH | 2L4' 28WT8EE/ELEE HIGH PWR | 64 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|----------------------------------|---------------------------|
| 2F28EEE | 2L4' 28W T8EE/ELEE | 48 |
| 2F28EEL | 2L4' 28W T8EE/ELEE LOW PWR | 42 |
| 3F28EEH | 3L4' 28W T8EE/ELEE HIGH PWR | 96 |
| 3F28EEE | 3L4' 28W T8EE/ELEE | 72 |
| 3F28EEL | 3L4' 28W T8EE/ELEE LOW PWR | 63 |
| 4F28EEH | 4L4' 28W T8EE/ELEE HIGH PWR | 126 |
| 4F28EEE | 4L4' 28W T8EE/ELEE | 94 |
| 4F28EEL | 4L4' 28W T8EE/ELEE LOW PWR | 83 |
| 1F30EEH | 1L4' 30W T8EE/ELEE HIGH PWR | 36 |
| 1F30EEE | 1L4' 30W T8EE/ELEE | 26 |
| 1F30EEL | 1L4' 30W T8EE/ELEE LOW PWR | 24 |
| 2F30EEH | 2L4' 30WT8EE/ELEE HIGH PWR | 69 |
| 2F30EEE | 2L4' 30W T8EE/ELEE | 52 |
| 2F30EEL | 2L4' 30W T8EE/ELEE LOW PWR | 45 |
| 3F30EEH | 3L4' 30W T8EE/ELEE HIGH PWR | 103 |
| 3F30EEE | 3L4' 30W T8EE/ELEE | 77 |
| 3F30EEL | 3L4' 30W T8EE/ELEE LOW PWR | 68 |
| Four Foot T8 High Efficient / Reduce Wattage Systems (cont.) | | |
| 4F30EEH | 4L4' 30W T8EE/ELEE HIGH PWR | 133 |
| 4F30EEE | 4L4' 30W T8EE/ELEE | 101 |
| 4F30EEL | 4L4' 30W T8EE/ELEE LOW PWR | 89 |
| 1F32EEH | 1L4' 32W T8EE/ELEE HIGH PWR | 38 |
| 1F32EEE | 1L4' 32W T8EE/ELEE | 28 |
| 1F32EEL | 1L4' 32W T8EE/ELEE LOW PWR | 25 |
| 2F32EEH | 2L4' 32W T8EE/ELEE HIGH PWR | 73 |
| 2F32EEE | 2L4' 32W T8EE/ELEE | 53 |
| 2F32EEL | 2L4' 32W T8EE/ELEE LOW PWR | 47 |
| 3F32EEH | 3L4' 32W T8EE/ELEE HIGH PWR | 109 |
| 3F32EEE | 3L4' 32W T8EE/ELEE | 82 |
| 3F32EEL | 3L4' 32W T8EE/ELEE LOW PWR | 72 |
| 4F32EEH | 4L4' 32W T8EE/ELEE HIGH PWR | 141 |
| 4F32EEE | 4L4' 32W T8EE/ELEE | 107 |
| 4F32EEL | 4L4' 32W T8EE/ELEE LOW PWR | 95 |
| 6F32EEH | 6L4' 32W T8EE/ELEE HIGH PWR | 218 |
| 6F32EEE | 6L4' 32W T8EE/ELEE | 168 |
| 6F32EEL | 6L4' 32W T8EE/ELEE LOW PWR | 146 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--------------------------------------|---------------------------|------------------------|
| Eight Foot T8 Systems | | |
| 1F59SSE | 1L8' T8/ELIG | 60 |
| 1F80SSE | 1L8' T8 HO/ELIG | 85 |
| 2F59SSE | 2L8' T8/ELIG | 109 |
| 2F59SSL | 2L8' T8/ELIG LOW PWR | 100 |
| 2F80SSE | 2L8' T8 HO/ELIG | 160 |
| LED Lighting Fixtures | | |
| 1L002 | 2 WATT LED | 2 |
| 1L003 | 3 WATT LED | 3 |
| 1L004 | 4 WATT LED | 4 |
| 1L005 | 5 WATT LED | 5 |
| 1L006 | 6 WATT LED | 6 |
| 1L007 | 7 WATT LED | 7 |
| 1L008 | 8 WATT LED | 8 |
| 1L009 | 9 WATT LED | 9 |
| 1L010 | 10 WATT LED | 10 |
| 1L011 | 11 WATT LED | 11 |
| 1L012 | 12 WATT LED | 12 |
| 1L013 | 13 WATT LED | 13 |
| 1L014 | 14 WATT LED | 14 |
| 1L015 | 15 WATT LED | 15 |
| 1L016 | 16 WATT LED | 16 |
| 1L017 | 17 WATT LED | 17 |
| LED Lighting Fixtures (cont.) | | |
| 1L018 | 18 WATT LED | 18 |
| 1L019 | 19 WATT LED | 19 |
| 1L020 | 20 WATT LED | 20 |
| 1L021 | 21 WATT LED | 21 |
| 1L022 | 22 WATT LED | 22 |
| 1L023 | 23 WATT LED | 23 |
| 1L024 | 24 WATT LED | 24 |
| 1L025 | 25 WATT LED | 25 |
| 1L026 | 26 WATT LED | 26 |
| 1L027 | 27 WATT LED | 27 |
| 1L028 | 28 WATT LED | 28 |
| 1L029 | 29 WATT LED | 29 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--------------------------------------|---------------------------|--------------------|
| 1L030 | 30 WATT LED | 30 |
| 1L031 | 31 WATT LED | 31 |
| 1L032 | 32 WATT LED | 32 |
| 1L033 | 33 WATT LED | 33 |
| 1L034 | 34 WATT LED | 34 |
| 1L035 | 35 WATT LED | 35 |
| 1L036 | 36 WATT LED | 36 |
| 1L037 | 37 WATT LED | 37 |
| 1L038 | 38 WATT LED | 38 |
| 1L039 | 39 WATT LED | 39 |
| 1L040 | 40 WATT LED | 40 |
| 1L041 | 41 WATT LED | 41 |
| 1L042 | 42 WATT LED | 42 |
| 1L043 | 43 WATT LED | 43 |
| 1L044 | 44 WATT LED | 44 |
| 1L045 | 45 WATT LED | 45 |
| 1L046 | 46 WATT LED | 46 |
| 1L047 | 47 WATT LED | 47 |
| 1L048 | 48 WATT LED | 48 |
| 1L049 | 49 WATT LED | 49 |
| 1L050 | 50 WATT LED | 50 |
| 1L055 | 55 WATT LED | 55 |
| 1L060 | 60 WATT LED | 60 |
| 1L070 | 70 WATT LED | 70 |
| 1L073 | 73 WATT LED | 73 |
| 1L075 | 75 WATT LED | 75 |
| 1L080 | 90 WATT LED | 90 |
| 1L085 | 85 WATT LED | 85 |
| 1L090 | 90 WATT LED | 90 |
| LED Lighting Fixtures (cont.) | | |
| 1L095 | 95 WATT LED | 95 |
| 1L100 | 100 WATT LED | 100 |
| 1L106 | 106 WATT LED | 106 |
| 1L107 | 107 WATT LED | 107 |
| 1L116 | 116 WATT LED | 116 |
| 1L120 | 120 WATT LED | 120 |
| 1L125 | 125 WATT LED | 125 |

| | | |
|--------------------------------------|----------------------|-----|
| 1L130 | 130 WATT LED | 130 |
| 1L135 | 135 WATT LED | 135 |
| 1L140 | 140 WATT LED | 140 |
| 1L145 | 145 WATT LED | 145 |
| 1L150 | 150 WATT LED | 150 |
| 1L155 | 155 WATT LED | 155 |
| 1L160 | 160 WATT LED | 160 |
| 1L165 | 165 WATT LED | 165 |
| 1L170 | 170 WATT LED | 170 |
| 1L175 | 175 WATT LED | 175 |
| 1L180 | 180 WATT LED | 180 |
| 1L185 | 185 WATT LED | 185 |
| 1L190 | 190 WATT LED | 190 |
| 1L200 | 200 WATT LED | 200 |
| 1L210 | 210 WATT LED | 210 |
| 1L220 | 220 WATT LED | 220 |
| 1L240 | 240 WATT LED | 240 |
| Electronic Metal Halide Lamps | | |
| 1M0150E | 150W METAL HALIDE EB | 160 |
| 1M0200E | 200W METAL HALIDE EB | 215 |
| 1M0250E | 250W METAL HALIDE EB | 270 |
| 1M0320E | 320W METAL HALIDE EB | 345 |
| 1M0350E | 350W METAL HALIDE EB | 375 |
| 1M0400E | 400W METAL HALIDE EB | 430 |
| 1M0450E | 400W METAL HALIDE EB | 480 |
| MH Track Lighting | | |
| 1M0020E | 20W MH SPOT | 25 |
| 1M0025E | 25W MH SPOT | 25 |
| 1M0035E | 35W MH SPOT | 44 |
| 1M0039E | 39W MH SPOT | 47 |
| 1M0050E | 50W MH SPOT | 60 |
| 1M0070E | 70W MH SPOT | 80 |
| 1M0100E | 100W MH SPOT | 111 |
| 1M0150E | 150W MH SPOT | 162 |

Table 4: Retrofit Existing Lighting Wattage Tables

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--|---------------------------|------------------------|
| Incandescent Lamps | | |
| 1I0015 | 15W INC | 15 |
| 1I0020 | 20W INC | 20 |
| 1I0025 | 25W INC | 25 |
| 1I0034 | 34W INC | 34 |
| 1I0036 | 36W INC | 36 |
| 1I0040 | 40W INC | 40 |
| 1I0042 | 42W INC | 42 |
| 1I0045 | 45W INC | 45 |
| 1I0050 | 50W INC | 50 |
| 1I0052 | 52W INC | 52 |
| 1I0054 | 54W INC | 54 |
| 1I0055 | 55W INC | 55 |
| 1I0060 | 60W INC | 60 |
| 1I0065 | 65W INC | 65 |
| 1I0067 | 67W INC | 67 |
| 1I0069 | 69W INC | 69 |
| 1I0072 | 72W INC | 72 |
| 1I0075 | 75W INC | 75 |
| 1I0080 | 80W INC | 80 |
| 1I0085 | 85W INC | 85 |
| 1I0090 | 90W INC | 90 |
| 1I0093 | 93W INC | 93 |
| 1I0100 | 100W INC | 100 |
| 1I0120 | 120W INC | 120 |
| 1I0125 | 125W INC | 125 |
| 1I0135 | 135W INC | 135 |
| 1I0150 | 150W INC | 150 |
| 1I0200 | 200W INC | 200 |
| 1I0300 | 300W INC | 300 |
| 1I0448 | 448W INC | 448 |
| 1I0500 | 500W INC | 500 |
| 1I0750 | 750W INC | 750 |
| 1I1000 | 1000W INC | 1000 |
| 1I1500 | 1500W INC | 1500 |
| Low Voltage Halogen Fixture (includes Transformer) | | |
| 1R0020 | 20W LV HALOGEN FIXT | 30 |
| 1R0025 | 25W LV HALOGEN FIXT | 35 |
| 1R0035 | 35W LV HALOGEN FIXT | 45 |
| Low Voltage Halogen Fixture (includes Transformer) (cont.) | | |
| 1R0042 | 42W LV HALOGEN FIXT | 52 |
| 1R0050 | 50W LV HALOGEN FIXT | 60 |
| 1R0065 | 65W LV HALOGEN FIXT | 75 |
| 1R0075 | 75W LV HALOGEN FIXT | 85 |
| Halogen/Quartz Lamps | | |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|-----------------------------------|---------------------------|--------------------|
| 1T0035 | 35W HALOGEN LAMP | 35 |
| 1T0040 | 40W HALOGEN LAMP | 40 |
| 1T0042 | 42W HALOGEN LAMP | 42 |
| 1T0045 | 45W HALOGEN LAMP | 45 |
| 1T0047 | 47W HALOGEN LAMP | 47 |
| 1T0050 | 50W HALOGEN LAMP | 50 |
| 1T0052 | 52W HALOGEN LAMP | 52 |
| 1T0055 | 55W HALOGEN LAMP | 55 |
| 1T0060 | 60W HALOGEN LAMP | 60 |
| 1T0072 | 72W HALOGEN LAMP | 72 |
| 1T0075 | 75W HALOGEN LAMP | 75 |
| 1T0090 | 90W HALOGEN LAMP | 90 |
| 1T0100 | 100W HALOGEN LAMP | 100 |
| 1T0150 | 150W HALOGEN LAMP | 150 |
| 1T0200 | 200W HALOGEN LAMP | 200 |
| 1T0250 | 250W HALOGEN LAMP | 250 |
| 1T0300 | 300W HALOGEN LAMP | 300 |
| 1T0350 | 350W HALOGEN LAMP | 350 |
| 1T0400 | 400W HALOGEN LAMP | 400 |
| 1T0425 | 425W HALOGEN LAMP | 425 |
| 1T0500 | 500W HALOGEN LAMP | 500 |
| 1T0750 | 750W HALOGEN LAMP | 750 |
| 1T0900 | 900W HALOGEN LAMP | 900 |
| 1T1000 | 1000W HALOGEN LAMP | 1000 |
| 1T1200 | 1200W HALOGEN LAMP | 1200 |
| 1T1500 | 1500W HALOGEN LAMP | 1500 |
| | | |
| Mercury Vapor (MV) | | |
| 1V0040S | 40W MERCURY | 50 |
| 1V0050S | 50W MERCURY | 75 |
| 1V0075S | 75W MERCURY | 95 |
| 1V0100S | 100W MERCURY | 120 |
| 1V0175S | 175W MERCURY | 205 |
| 1V0250S | 250W MERCURY | 290 |
| 1V0400S | 400W MERCURY | 455 |
| | | |
| Low Pressure Sodium (LPS) | | |
| 1V0700S | 700W MERCURY | 775 |
| 1V1000S | 1000W MERCURY | 1075 |
| 2V0400S | 2/400W MERCURY | 880 |
| 1L0035S | 35W LPS | 60 |
| 1L0055S | 55W LPS | 85 |
| 1L0090S | 90W LPS | 130 |
| 1L0135S | 135W LPS | 180 |
| 1L0180S | 180W LPS | 230 |
| | | |
| High Pressure Sodium (HPS) | | |
| 1H0035S | 35W HPS | 45 |
| 1H0050S | 50W HPS | 65 |
| 1H0070S | 70W HPS | 90 |
| 1H0100S | 100W HPS | 130 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--|---------------------------|--------------------|
| 1H0150S | 150W HPS | 190 |
| 1H0200S | 200W HPS | 240 |
| 1H0225S | 225W HPS | 275 |
| 1H0250S | 250W HPS | 295 |
| 1H0310S | 310W HPS | 350 |
| 1H0360S | 360W HPS | 435 |
| 1H0400S | 400W HPS | 460 |
| 1H0600S | 600W HPS | 675 |
| 1H0750S | 750W HPS | 835 |
| 1H1000S | 1000W HPS | 1085 |
| Metal Halide (MH) | | |
| 1M0032S | 32W METAL HALIDE | 40 |
| 1M0050S | 50W METAL HALIDE | 65 |
| 1M0070S | 70W METAL HALIDE | 95 |
| 1M0100S | 100W METAL HALIDE | 120 |
| 1M0150S | 150W METAL HALIDE | 190 |
| 1M0175S | 175W METAL HALIDE | 205 |
| 1M0250S | 250W METAL HALIDE | 295 |
| 1M0360S | 360W METAL HALIDE | 430 |
| 1M0400S | 400W METAL HALIDE | 455 |
| 1M0750S | 750W METAL HALIDE | 825 |
| 1M1000S | 1000W METAL HALIDE | 1075 |
| 1M1500S | 1500W METAL HALIDE | 1615 |
| 1M1800S | 1800W METAL HALIDE | 1875 |
| Pulse Start Metal Halide Lamp/Ballast | | |
| 1M0100P | 100W MH CWA | 128 |
| 1M0100R | 100W MH LINEAR | 118 |
| 1M0150P | 150W MH CWA | 190 |
| 1M0150R | 150W MH LINEAR | 172 |
| 1M0175P | 175W MH CWA | 208 |
| 1M0175R | 175W MH LINEAR | 190 |
| 1M0200P | 200W MH CWA | 232 |
| 1M0200R | 200W MH LINEAR | 218 |
| 1M0250P | 250W MH CWA | 288 |
| 1M0250R | 250W MH LINEAR | 265 |
| 1M0300P | 300W MH CWA | 342 |
| 1M0300R | 300W MH LINEAR | 324 |
| 1M0320P | 320W MH CWA | 365 |
| 1M0320R | 320W MH LINEAR | 345 |
| 1M0350P | 350W MH CWA | 400 |
| 1M0350R | 350W MH LINEAR | 375 |
| 1M0400P | 400W MH CWA | 455 |
| 1M0400R | 400W MH LINEAR | 430 |
| 1M0450P | 450W MH CWA | 508 |
| 1M0450R | 450W MH LINEAR | 480 |
| 1M0750P | 750W MH CWA | 815 |
| 1M0750R | 750W MH LINEAR | 805 |
| 1M0875P | 875W MH CWA | 950 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--|----------------------------|--------------------|
| 1M0875R | 875W MH LINEAR | 927 |
| 1M1000P | 1000W MH CWA | 1080 |
| Two Foot T8 / T12 Systems | | |
| 1F20SSS | F20T12/HPF(1) | 32 |
| 1F80BXE | 1L2' F80BXE/ELIG | 90 |
| 1F55BXE | 1L2' F55BX/ELIG | 56 |
| 2F17SSE | 2L2' 17W T8/ELIG | 37 |
| 2F17SSL | 2L2' 17W T8/ELIG LOW POWER | 27 |
| 2F17SSM | 2L2' 17W T8/EEMAG | 45 |
| 2F20SSS | F20T12/HPF(2) | 56 |
| 2F24HSS | 2L2' 24 T12HO/STD/STD | 85 |
| 2F40BXE | 2L2' F40BX/ELIG | 72 |
| 2F50BXE | 2L2' F50BX/ELIG | 108 |
| 2F55BXE | 2L2' F55BX/ELIG | 112 |
| 3F17SSE | 3L2' 17W T8/ELIG | 53 |
| 3F17SSL | 3L2' 17W T8/ELIG LOW POWER | 39 |
| Two Foot T8 / T12 Systems (cont.) | | |
| 3F20SSS | F20T12/HPF(3) | 78 |
| 3F40BXE | 3L2' F40BX/ELIG | 102 |
| 3F50BXE | 3L2' F50BX/ELIG | 162 |
| 3F55BXE | 3L2' F55BX/ELIG | 168 |
| 4F17SSE | 4L2' 17W T8/ELIG | 62 |
| 4F36BXE | 4L2' F36BX/ELIG | 148 |
| 4F40BXE | 4L2' F40BX/ELIG | 144 |
| 4F40BXH | 4L 40W T5 (Std.) HIGH LMN | 170 |
| 4F50BXE | 4L2' F50BX/ELIG | 216 |
| 4F55BXE | 4L2' F55BX/ELIG | 224 |
| 5F40BXE | 5L2' F40BX/ELIG | 190 |
| 5F50BXE | 5L2' F50BX/ELIG | 270 |
| 5F55BXE | 5L2' F55BX/ELIG | 280 |
| 6F36BXE | 6L2' F36BX/ELIG | 212 |
| 6F40BXE | 6L2' F40BX/ELIG | 204 |
| 6F50BXE | 6L2' F50BX/ELIG | 324 |
| 6F55BXE | 6L2' F55BX/ELIG | 336 |
| 8F36BXE | 8L2' F36BX/ELIG | 296 |
| 8F40BXE | 8L2' F40BX/ELIG | 288 |
| 8F50BXE | 8L2' F50BX/ELIG | 432 |
| 8F55BXE | 8L2' F55BX/ELIG | 448 |
| 9F36BXE | 9L2' F36BX/ELIG | 318 |
| 9F40BXE | 9L2' F40BX/ELIG | 306 |
| 9F50BXE | 9L2' F50BX/ELIG | 486 |
| 9F55BXE | 9L2' F55BX/ELIG | 504 |
| 12F40BE | 12L2' F40BX/ELIG | 408 |
| 12F50BE | 12L2' F50BX/ELIG | 648 |
| 12F55BE | 12L2' F55BX/ELIG | 672 |
| Three Foot T8 / T12 Systems | | |
| 1F30SEM | 1L3' 30W T12 EE/EEMAG | 38 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|-------------------------------------|---------------------------|--------------------|
| 1F30SES | 1L3' 30W T12 EE/STD | 42 |
| 1F30SSS | 1L3' 30W T12 STD/STD | 46 |
| 1F25SSE | 1L3' 25W T8/ELIG | 24 |
| 1F25SSH | 1L3' 25W T8/ELIG HIGH LMN | 28 |
| 2F30SEE | 2L3' 30W T12 EE/ELIG | 49 |
| 2F30SEM | 2L3' 30W T12 EE/EEMAG | 66 |
| 2F30SES | 2L3' 30W T12 EE/STD | 73 |
| 2F30SSS | 2L3' 30W T12 STD/STD | 80 |
| 2F25SSE | 2L3' 25W T8/ELIG | 47 |
| 2F25SSM | 2L3' 25W T8/EEMAG | 65 |
| Three Foot T8 / T12 Systems | | |
| 3F30SSS | 3L3' 30W T12 STD/STD | 140 |
| 3F30SES | 3L3' 30W T12 EE/STD | 127 |
| 3F25SSE | 3L3' 25W T8/ELIG | 68 |
| 4F25SSE | 4L3' 25W T8/ELIG | 88 |
| Four Foot F48 T8 Systems | | |
| 1F48SES | 1L4' F48T12EE/STD | 50 |
| 1F48SSS | 1L4' F48T12/STD | 60 |
| 2F48SES | 2L4' F48T12EE/STD | 82 |
| 2F48SSS | 2L4' F48T12/STD | 102 |
| 3F48SES | 3L4' F48T12EE/STD | 132 |
| 3F48SSS | 3L4' F48T12/STD | 162 |
| 4F48SES | 4L4' F48T12EE/STD | 164 |
| 4F48SSS | 4L4' F48T12/STD | 204 |
| 1F48HES | 1L4' F48HO/EE/STD | 80 |
| 1F48HSS | 1L4' F48HO/STD/STD | 85 |
| 2F48HES | 2L4' F48HO/EE/STD | 135 |
| 2F48HSS | 2L4' F48HO/STD/STD | 145 |
| 3F48HES | 3L4' F48HO/EE/STD | 215 |
| 3F48HSS | 3L4' F48HO/STD/STD | 230 |
| 4F48HES | 4L4' F48HO/EE/STD | 270 |
| 4F48HSS | 4L4' F48HO/STD/STD | 290 |
| Four Foot F48VHO T12 Systems | | |
| 1F48VES | 1L4' F48VHO/EE/STD | 123 |
| 1F48VSS | 1L4' F48VHO/STD/STD | 138 |
| 2F48VES | 2L4' F48VHO/EE/STD | 210 |
| 2F48VSS | 2L4' F48VHO/STD/STD | 240 |
| 3F48VES | 3L4' F48VHO/EE/STD | 333 |
| 3F48VSS | 3L4' F48VHO/STD/STD | 378 |
| 4F48VES | 4L4' F48VHO/EE/STD | 420 |
| 4F48VSS | 4L4' F48VHO/STD/STD | 480 |
| Four Foot T12 Systems | | |
| 1F40SEE | 1L4' EE/ELIG | 38 |
| 1F40SEM | 1L4' EE/EEMAG | 40 |
| 1F40SES | 1L4' EE/STD | 50 |
| 1F40SSE | 1L4' STD/ELIG | 46 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--------------------------------------|---------------------------|--------------------|
| 1F40SSM | 1L4' STD/EEMAG | 50 |
| 1F40SSS | 1L4' STD/STD | 57 |
| 1F40HSE | 1L4' HO/STD/ELIG | 59 |
| Four Foot T12 Systems (cont.) | | |
| 2F40SEE | 2L4' EE/ELIG | 60 |
| 2F40SEM | 2L4' EE/EEMAG | 70 |
| 2F40SES | 2L4' EE/STD | 80 |
| 2F40SSE | 2L4' STD/ELIG | 72 |
| 2F40SSM | 2L4' STD/EEMAG | 86 |
| 2F40SSS | 2L4' STD/STD | 94 |
| 3F40SEE | 3L4' EE/ELIG | 90 |
| 3F40SEM | 3L4' EE/EEMAG | 110 |
| 3F40SES | 3L4' EE/STD | 130 |
| 3F40SSE | 3L4' STD/ELIG | 110 |
| 3F40SSM | 3L4' STD/EEMAG | 136 |
| 3F40SSS | 3L4' STD/STD | 151 |
| 4F40SEE | 4L4' EE/ELIG | 120 |
| 4F40SEM | 4L4' EE/EEMAG | 140 |
| 4F40SES | 4L4' EE/STD | 160 |
| 4F40SSE | 4L4' STD/ELIG | 144 |
| 4F40SSM | 4L4' STD/EEMAG | 172 |
| 4F40SSS | 4L4' STD/STD | 188 |
| 6F40SSS | 6L4' STD/STD | 282 |
| Four Foot T8 Systems | | |
| 1F32SSE | 1L4' T8/ELIG | 30 |
| 1F32SSL | 1L4' T8/ELIG LOW POWER | 26 |
| 1F32SSM | 1L4' T8/EEMAG | 37 |
| 1F32SSH | 1L4' T8/ELIG HIGH LMN | 36 |
| 2F32SSE | 2L4' T8/ELIG | 60 |
| 2F32SSH | 2L4' T8/ELIG HIGH LMN | 78 |
| 2F32SSL | 2L4' T8/ELIG LOW PWR | 52 |
| 2F32SSM | 2L4' T8/EEMAG | 70 |
| 3F32SSE | 3L4' T8/ELIG | 88 |
| 3F32SSH | 3L4' T8/ELIG HIGH LMN | 112 |
| 3F32SSL | 3L4' T8/ELIG LOW POWER | 76 |
| 3F32SSM | 3L4' T8/EEMAG | 107 |
| 4F32SSE | 4L4' T8/ELIG | 112 |
| 4F32SSH | 4L4' T8/ELIG HIGH LMN | 156 |
| 4F32SSL | 4L4' T8/ELIG LOW PWR | 98 |
| 4F32SSM | 4L4' T8/EEMAG | 140 |
| 5F32SSE | 5L4' T8/ELIG | 148 |
| 5F32SSH | 5L4' T8/ELIG HIGH LMN | 190 |
| 6F32SSE | 6L4' T8/ELIG | 174 |
| 8F32SSH | 8L4' T8/ELIG HIGH LMN | 312 |
| Five Foot T8 / T12 Systems | | |
| 1F60HSM | 1L5' HO/STD/EEMAG | 90 |
| 1F60HSE | 1L5' HO/STD/ELIG | 70 |
| 1F60SSM | 1L5' STD/EEMAG | 73 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|---------------------------|--------------------|
| 1F60TSM | 1L5' T10HO/STD/EEMAG | 135 |
| 2F40HSE | 2L5' HO/STD/ELIG | 123 |
| 2F40TSE | 2L5'T8/ELIG | 68 |
| 2F60HSM | 2L5' HO/STD/EEMAG | 178 |
| 2F60SSM | 2L5'/STD/EEMAG | 122 |
| 3F40TSE | 3L5'T8/ELIG | 106 |
| Six Foot T12 & T12HO Systems | | |
| 1F72HSE | 1L6' T8HO/ELIG | 80 |
| 1F72HSS | 1L6' F72HO/STD/STD | 113 |
| 1F72SSM | 1L6' STD/EEMAG | 80 |
| 1F72SSS | 1L6' STD/STD | 95 |
| 2F72HSE | 2L6'T8 HO/ELIG | 160 |
| 2F72HSM | 2L6' F72HO/STD/EEMAG | 193 |
| 2F72HSS | 2L6' F72HO/STD | 195 |
| 2F72SSM | 2L6' STD/EEMAG | 135 |
| 2F72SSS | 2L6' STD/STD | 173 |
| Eight Foot T12HO Systems | | |
| 1F96HES | 1L8' HO/EE/STD | 125 |
| 1F96HSS | 1L8' HO/STD/STD | 135 |
| 2F96HEE | 2L8' HO/EE/ELIG | 170 |
| 2F96HEM | 2L8' HO/EE/EEMAG | 207 |
| 2F96HES | 2L8' HO/EE/STD | 227 |
| 2F96HSE | 2L8' HO/STD/ELIG | 195 |
| 2F96HSM | 2L8' HO/STD/EEMAG | 237 |
| 2F96HSS | 2L8' HO/STD/STD | 257 |
| 3F96HES | 3L8' HO/EE/STD | 352 |
| 3F96HSS | 3L8' HO/STD/STD | 392 |
| 4F96HEE | 4L8' HO/EE/ELIG | 340 |
| 4F96HEM | 4L8' HO/EE/EEMAG | 414 |
| 4F96HES | 4L8' HO/EE/STD | 454 |
| 4F96HSE | 4L8' HO/STD/ELIG | 390 |
| 4F96HSM | 4L8' HO/STD/EEMAG | 474 |
| 4F96HSS | 4L8' HO/STD/STD | 514 |
| Eight Foot T12VHO Systems | | |
| 1F96VES | 1L8' VHO/EE/STD | 200 |
| 1F96VSS | 1L8' VHO/STD/STD | 230 |
| 2F96VES | 2L8' VHO/EE/STD | 390 |
| 2F96VSS | 2L8' VHO/STD/STD | 450 |
| 3F96VES | 3L8' VHO/EE/STD | 590 |
| 3F96VSS | 3L8' VHO/STD/STD | 680 |
| 4F96VES | 4L8' VHO/EE/STD | 780 |
| 4F96VSS | 4L8' VHO/STD/STD | 900 |
| Eight Foot T8 Systems | | |
| 1F59SSE | 1L8' T8/ELIG | 60 |
| 1F80SSE | 1L8' T8 HO/ELIG | 85 |
| 2F59SSE | 2L8' T8/ELIG | 109 |
| 2F59SSL | 2L8' T8/ELIG LOW PWR | 100 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|-------------------------------|---------------------------|--------------------|
| 2F80SSE | 2L8' T8 HO/ELIG | 160 |
| Eight Foot T12 Systems | | |
| 1F96SEE | 1L8' EE/ELIG | 60 |
| 1F96SES | 1L8' EE/STD | 83 |
| 1F96SSE | 1L8' STD/ELIG | 70 |
| 1F96SSS | 1L8' STD/STD | 100 |
| 2F96SEE | 2L8' EE/ELIG | 109 |
| 2F96SEM | 2L8' EE/EEMAG | 123 |
| 2F96SES | 2L8' EE/STD | 138 |
| 2F96SSE | 2L8' STD/ELIG | 134 |
| 2F96SSM | 2L8' STD/EEMAG | 158 |
| 2F96SSS | 2L8' STD/STD | 173 |
| 3F96SES | 3L8' EE/STD | 221 |
| 3F96SSS | 3L8' STD/STD | 273 |
| 4F96SEE | 4L8' EE/ELIG | 218 |
| 4F96SEM | 4L8' EE/EEMAG | 246 |
| 4F96SES | 4L8' EE/STD | 276 |
| 4F96SSE | 4L8' STD/ELIG | 268 |
| 4F96SSM | 4L8' STD/EEMAG | 316 |
| 4F96SSS | 4L8' STD/STD | 346 |

Table 5: Retrofit Proposed Lighting Wattage Tables

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|-------------------------------------|---------------------------|------------------------|
| LED Exit Signs | | |
| 1E0002 | 2.0 WATT LED | 2 |
| 1E0003 | 3.0 WATT LED | 3 |
| 1E0005 | 5.0 WLED | 5 |
| 1E0005C | 0.5 WATT LEC | 0.5 |
| 1E0008 | 8.0 WLED | 8 |
| 1E0015 | 1.5 WATT LED | 1.5 |
| 1E0105 | 10.5 WATT LED | 10.5 |
| Compact Fluorescents (CFL's) | | |
| 2C0007S | 2/7W COMPACT HW | 18 |
| 1C0005S | 5W COMPACT HW | 7 |
| 1C0007S | 7W COMPACT HW | 9 |
| 1C0009S | 9W COMPACT HW | 11 |
| 1C0011S | 11W COMPACT HW | 13 |
| 1C0013S | 13W COMPACT HW | 15 |
| 1C0018E | 18W COMPACT HW ELIG | 20 |
| 1C0018S | 18W COMPACT HW | 20 |
| 1C0022S | 22W COMPACT HW | 24 |
| 1C0023E | 1/23W COMPACT HW ELIG | 25 |
| 1C0026E | 26W COMPACT HW ELIG | 28 |
| 1C0026S | 26W COMPACT HW | 28 |
| 1C0028S | 28W COMPACT HW | 30 |
| 1C0032E | 32W COMPACT HW ELIG | 34 |
| 1C0032S | 32W CIRCLINE HW | 34 |
| 1C0042E | 1/42W COMPACT HW ELIG | 48 |
| 1C0044S | 44W CIRCLINE HW | 46 |
| 1C0057E | 1/57W COMPACT HW ELIG | 65 |
| 1C2232S | 22/32W CIRCLINE HW | 58 |
| 1C2D10E | 10W 2D COMPACT HW ELIG | 12 |
| 1C2D16E | 16W 2D COMPACT HW ELIG | 18 |
| 1C2D21E | 21W 2D COMPACT HW ELIG | 22 |
| 1C2D28E | 28W 2D COMPACT HW ELIG | 28 |
| 1C2D38E | 38W 2D COMP.HW ELIG | 36 |
| 1C3240S | 32/40W CIRCLINE HW | 80 |
| 2C0005S | 2/5W COMPACT HW | 14 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|---------------------------|--------------------|
| 2C0009S | 2/9W COMPACT HW | 22 |
| 2C0011S | 2/11W COMPACT HW | 26 |
| 2C0013E | 2/13W COMPACT HW ELIG | 28 |
| 2C0013S | 2/13W COMPACT HW | 30 |
| Compact Fluorescents (CFL's) (cont.) | | |
| 2C0018E | 2/18W COMP. HW ELIG | 40 |
| 2C0026E | 2/26W COMP. HW ELIG | 54 |
| 2C0032E | 2/32W COMPACT HW ELIG | 68 |
| 2C0042E | 2/42W COMPACT HW ELIG | 100 |
| 3C0009S | 3/9W COMPACT HW | 33 |
| 3C0013S | 3/13W COMPACT HW | 45 |
| 3C0018E | 3/18W COMPACT HW ELIG | 60 |
| 3C0026E | 3/26W COMPACT HW ELIG | 82 |
| 3C0032E | 3/32W COMPACT HW ELIG | 114 |
| 3C0042E | 3/42W COMPACT HW ELIG | 141 |
| 4C0018E | 4/18W COMPACT HW ELIG | 80 |
| 4C0026E | 4/26W COMPACT HW ELIG | 108 |
| 4C0032E | 4/32W COMPACT HW ELIG | 152 |
| 4C0042E | 4/42W COMPACT HW ELIG | 188 |
| 6C0026E | 6/26W COMPACT HW ELIG | 162 |
| 6C0032E | 6/32W COMPACT HW ELIG | 228 |
| 6C0042E | 6/42W COMPACT HW ELIG | 282 |
| 8C0026E | 8/26W COMPACT HW ELIG | 216 |
| 8C0032E | 8/32W COMPACT HW ELIG | 304 |
| 8C0042E | 8/42W COMPACT HW ELIG | 376 |
| T5 Systems | | |
| 1F14SSE | 1L2' 14W T5/ELIG | 16 |
| 2F14SSE | 2L2' 14W T5/ELIG | 32 |
| 3F14SSE | 3L2' 14W T5/ELIG | 50 |
| 4F14SSE | 4L2' 14W T5/ELIG | 68 |
| 1F24HSE | 1L2' 24W T5HO/ELIG | 29 |
| 2F24HSE | 2L2' 24W T5HO/ELIG | 52 |
| 3F24HSE | 3L2' 24W T5HO/ELIG | 80 |
| 1F21SSE | 1L3' 21W T5/ELIG | 24 |
| 2F21SSE | 2L3' 21W T5/ELIG | 47 |
| 1F39HSE | 1L3' 39W T5HO/ELIG | 42 |
| 2F39HSE | 2L3' 39W T5HO/ELIG | 85 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|----------------------------------|---------------------------|
| 1F28SSE | 1L4' 28W T5/ELIG | 32 |
| 2F28SSE | 2L4' 28W T5/ELIG | 63 |
| 3F28SSE | 3L4' 28W T5/ELIG | 95 |
| 4F28SSE | 4L4' 28W T5/ELIG | 126 |
| 6F28SSE | 6L4' 28W T5/ELIG | 189 |
| 1F47HSE | 1L4' 47W T5HO/ELIG | 53 |
| 2F47HSE | 2L4' 47W T5HO/ELIG | 103 |
| 3F47HSE | 3L4' 47W T5HO/ELIG | 157 |
| T5 Systems (cont.) | | |
| 4F47HSE | 4L4' 47W T5HO/ELIG | 200 |
| 5F47HSE | 5L4' 47W T5HO/ELIG | 260 |
| 6F47HSE | 6L4' 47W T5HO/ELIG | 303 |
| 1F50HSE | 1L4' 50W T5HO/ELIG | 58 |
| 2F50HSE | 2L4' 50W T5HO/ELIG | 110 |
| 3F50HSE | 3L4' 50W T5HO/ELIG | 168 |
| 4F50HSE | 4L4' 50W T5HO/ELIG | 215 |
| 5F50HSE | 5L4' 50W T5HO/ELIG | 278 |
| 6F50HSE | 6L4' 50W T5HO/ELIG | 325 |
| 1F54HSE | 1L4' 54W T5HO/ELIG | 59 |
| 2F54HSE | 2L4' 54W T5HO/ELIG | 117 |
| 3F54HSE | 3L4' 54W T5HO/ELIG | 177 |
| 4F54HSE | 4L4' 54W T5HO/ELIG | 234 |
| 5F54HSE | 5L4' 54W T5HO/ELIG | 294 |
| 6F54HSE | 6L4' 54W T5HO/ELIG | 351 |
| 8F54HSE | 8L4' 54W T5HO/ELIG | 468 |
| 10F54HSE | 10L4' 54W T5HO/ELIG | 585 |
| Two Foot High Efficient T8 Systems | | |
| 1F17ESL | 1L2' 17W T8EE/ELEE LOW PWR | 14 |
| 1F17ESN | 1L2' 17W T8EE/ELEE | 17 |
| 1F17ESH | 1L2' 17W T8EE/ELEE HIGH PWR | 20 |
| 1F28BXE | 1L2' F28BX/ELIG | 32 |
| 2F17ESL | 2L2' 17W T8EE/ELEE LOW PWR | 27 |
| 2F17ESN | 2L2' 17W T8EE/ELEE | 32 |
| 2F17ESH | 2L2' 17W T8EE/ELEE HIGH PWR | 40 |
| 2F28BXE | 2L2' F28BX/ELIG | 63 |
| 3F17ESL | 3L2' 17W T8EE/ELEE LOW PWR | 39 |
| 3F17ESN | 3L2' 17W T8EE/ELEE | 46 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|-----------------------------|--------------------|
| 3F17ESH | 3L2' 17W T8EE/ELEE HIGH PWR | 61 |
| 3F28BXE | 3L2' F28BX/ELIG | 94 |
| Three Foot High Efficient T8 Systems | | |
| 1F25ESL | 1L3' 25W T8EE/ELEE LOW PWR | 21 |
| 1F25ESN | 1L3' 25W T8EE/ELEE | 24 |
| 1F25ESH | 1L3' 25W T8EE/ELEE HIGH PWR | 30 |
| 2F25ESL | 2L3' 25W T8EE/ELEE LOW PWR | 40 |
| 2F25ESN | 2L3' 25W T8EE/ELEE | 45 |
| 2F25ESH | 2L3' 25W T8EE/ELEE HIGH PWR | 60 |
| 3F25ESL | 3L3' 25W T8EE/ELEE LOW PWR | 58 |
| 3F25ESN | 3L3' 25W T8EE/ELEE | 67 |
| 3F25ESH | 3L3' 25W T8EE/ELEE HIGH PWR | 90 |
| Four Foot T8 High Efficient / Reduce Wattage Systems | | |
| 1F25EEH | 1L4' 25W T8EE/ELEE HIGH PWR | 30 |
| 1F25EEE | 1L4' 25W T8EE/ELEE | 22 |
| 1F25EEL | 1L4' 25W T8EE/ELEE LOW PWR | 19 |
| 2F25EEH | 2L4' 25W T8EE/ELEE HIGH PWR | 57 |
| 2F25EEE | 2L4' 25W T8EE/ELEE | 43 |
| 2F25EEL | 2L4' 25W T8EE/ELEE LOW PWR | 37 |
| 3F25EEH | 3L4' 25W T8EE/ELEE HIGH PWR | 86 |
| 3F25EEE | 3L4' 25W T8EE/ELEE | 64 |
| 3F25EEL | 3L4' 25W T8EE/ELEE LOW PWR | 57 |
| 4F25EEH | 4L4' 25W T8EE/ELEE HIGH PWR | 111 |
| 4F25EEE | 4L4' 25W T8EE/ELEE | 86 |
| 4F25EEL | 4L4' 25W T8EE/ELEE LOW PWR | 75 |
| 1F28EEH | 1L4' 28W T8EE/ELEE HIGH PWR | 33 |
| 1F28EEE | 1L4' 28W T8EE/ELEE | 24 |
| 1F28EEL | 1L4' 28W T8EE/ELEE LOW PWR | 22 |
| 2F28EEH | 2L4' 28WT8EE/ELEE HIGH PWR | 64 |
| 2F28EEE | 2L4' 28W T8EE/ELEE | 48 |
| 2F28EEL | 2L4' 28W T8EE/ELEE LOW PWR | 42 |
| 3F28EEH | 3L4' 28W T8EE/ELEE HIGH PWR | 96 |
| 3F28EEE | 3L4' 28W T8EE/ELEE | 72 |
| 3F28EEL | 3L4' 28W T8EE/ELEE LOW PWR | 63 |
| 4F28EEH | 4L4' 28W T8EE/ELEE HIGH PWR | 126 |
| 4F28EEE | 4L4' 28W T8EE/ELEE | 94 |
| 4F28EEL | 4L4' 28W T8EE/ELEE LOW PWR | 83 |
| 1F30EEH | 1L4' 30W T8EE/ELEE HIGH PWR | 36 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|---|----------------------------------|---------------------------|
| 1F30EEE | 1L4' 30W T8EE/ELEE | 26 |
| 1F30EEL | 1L4' 30W T8EE/ELEE LOW PWR | 24 |
| 2F30EEH | 2L4' 30WT8EE/ELEE HIGH PWR | 69 |
| 2F30EEE | 2L4' 30W T8EE/ELEE | 52 |
| 2F30EEL | 2L4' 30W T8EE/ELEE LOW PWR | 45 |
| 3F30EEH | 3L4' 30W T8EE/ELEE HIGH PWR | 103 |
| 3F30EEE | 3L4' 30W T8EE/ELEE | 77 |
| 3F30EEL | 3L4' 30W T8EE/ELEE LOW PWR | 68 |
| 4F30EEH | 4L4' 30W T8EE/ELEE HIGH PWR | 133 |
| 4F30EEE | 4L4' 30W T8EE/ELEE | 101 |
| 4F30EEL | 4L4' 30W T8EE/ELEE LOW PWR | 89 |
| 1F32EEH | 1L4' 32W T8EE/ELEE HIGH PWR | 38 |
| 1F32EEE | 1L4' 32W T8EE/ELEE | 28 |
| 1F32EEL | 1L4' 32W T8EE/ELEE LOW PWR | 25 |
| 2F32EEH | 2L4' 32W T8EE/ELEE HIGH PWR | 73 |
| 2F32EEE | 2L4' 32W T8EE/ELEE | 53 |
| Four Foot T8 High Efficient / Reduce Wattage Systems (cont.) | | |
| 2F32EEL | 2L4' 32W T8EE/ELEE LOW PWR | 47 |
| 3F32EEH | 3L4' 32W T8EE/ELEE HIGH PWR | 109 |
| 3F32EEE | 3L4' 32W T8EE/ELEE | 82 |
| 3F32EEL | 3L4' 32W T8EE/ELEE LOW PWR | 72 |
| 4F32EEH | 4L4' 32W T8EE/ELEE HIGH PWR | 141 |
| 4F32EEE | 4L4' 32W T8EE/ELEE | 107 |
| 4F32EEL | 4L4' 32W T8EE/ELEE LOW PWR | 95 |
| 6F32EEH | 6L4' 32W T8EE/ELEE HIGH PWR | 218 |
| 6F32EEE | 6L4' 32W T8EE/ELEE | 168 |
| 6F32EEL | 6L4' 32W T8EE/ELEE LOW PWR | 146 |
| Eight Foot T8 Systems | | |
| 1F59SSE | 1L8' T8/ELIG | 60 |
| 1F80SSE | 1L8' T8 HO/ELIG | 85 |
| 2F59SSE | 2L8' T8/ELIG | 109 |
| 2F59SSL | 2L8' T8/ELIG LOW PWR | 100 |
| 2F80SSE | 2L8' T8 HO/ELIG | 160 |
| LED Lighting Fixtures | | |
| 1L002 | 2 WATT LED | 2 |
| 1L003 | 3 WATT LED | 3 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--------------------------------------|---------------------------|------------------------|
| 1L004 | 4 WATT LED | 4 |
| 1L005 | 5 WATT LED | 5 |
| 1L006 | 6 WATT LED | 6 |
| 1L007 | 7 WATT LED | 7 |
| 1L008 | 8 WATT LED | 8 |
| 1L009 | 9 WATT LED | 9 |
| 1L010 | 10 WATT LED | 10 |
| 1L011 | 11 WATT LED | 11 |
| 1L012 | 12 WATT LED | 12 |
| 1L013 | 13 WATT LED | 13 |
| 1L014 | 14 WATT LED | 14 |
| 1L015 | 15 WATT LED | 15 |
| 1L016 | 16 WATT LED | 16 |
| 1L017 | 17 WATT LED | 17 |
| 1L018 | 18 WATT LED | 18 |
| 1L019 | 19 WATT LED | 19 |
| 1L020 | 20 WATT LED | 20 |
| 1L021 | 21 WATT LED | 21 |
| 1L022 | 22 WATT LED | 22 |
| 1L023 | 23 WATT LED | 23 |
| LED Lighting Fixtures (cont.) | | |
| 1L024 | 24 WATT LED | 24 |
| 1L025 | 25 WATT LED | 25 |
| 1L026 | 26 WATT LED | 26 |
| 1L027 | 27 WATT LED | 27 |
| 1L028 | 28 WATT LED | 28 |
| 1L029 | 29 WATT LED | 29 |
| 1L030 | 30 WATT LED | 30 |
| 1L031 | 31 WATT LED | 31 |
| 1L032 | 32 WATT LED | 32 |
| 1L033 | 33 WATT LED | 33 |
| 1L034 | 34 WATT LED | 34 |
| 1L035 | 35 WATT LED | 35 |
| 1L036 | 36 WATT LED | 36 |
| 1L037 | 37 WATT LED | 37 |
| 1L038 | 38 WATT LED | 38 |
| 1L039 | 39 WATT LED | 39 |
| 1L040 | 40 WATT LED | 40 |

| <u>Device Code</u> | <u>Device Description</u> | <u>Rated Watts</u> |
|--------------------------------------|---------------------------|--------------------|
| 1L041 | 41 WATT LED | 41 |
| 1L042 | 42 WATT LED | 42 |
| 1L043 | 43 WATT LED | 43 |
| 1L044 | 44 WATT LED | 44 |
| 1L045 | 45 WATT LED | 45 |
| 1L046 | 46 WATT LED | 46 |
| 1L047 | 47 WATT LED | 47 |
| 1L048 | 48 WATT LED | 48 |
| 1L049 | 49 WATT LED | 49 |
| 1L050 | 50 WATT LED | 50 |
| 1L055 | 55 WATT LED | 55 |
| 1L060 | 60 WATT LED | 60 |
| 1L070 | 70 WATT LED | 70 |
| 1L073 | 73 WATT LED | 73 |
| 1L075 | 75 WATT LED | 75 |
| 1L080 | 90 WATT LED | 90 |
| 1L085 | 85 WATT LED | 85 |
| 1L090 | 90 WATT LED | 90 |
| 1L095 | 95 WATT LED | 95 |
| 1L100 | 100 WATT LED | 100 |
| 1L106 | 106 WATT LED | 106 |
| 1L107 | 107 WATT LED | 107 |
| 1L116 | 116 WATT LED | 116 |
| 1L120 | 120 WATT LED | 120 |
| LED Lighting Fixtures (cont.) | | |
| 1L125 | 125 WATT LED | 125 |
| 1L130 | 130 WATT LED | 130 |
| 1L135 | 135 WATT LED | 135 |
| 1L140 | 140 WATT LED | 140 |
| 1L145 | 145 WATT LED | 145 |
| 1L150 | 150 WATT LED | 150 |
| 1L155 | 155 WATT LED | 155 |
| 1L160 | 160 WATT LED | 160 |
| 1L165 | 165 WATT LED | 165 |
| 1L170 | 170 WATT LED | 170 |
| 1L175 | 175 WATT LED | 175 |
| 1L180 | 180 WATT LED | 180 |
| 1L185 | 185 WATT LED | 185 |

| | | |
|--------------------------------------|----------------------|-----|
| 1L190 | 190 WATT LED | 190 |
| 1L200 | 200 WATT LED | 200 |
| 1L210 | 210 WATT LED | 210 |
| 1L220 | 220 WATT LED | 220 |
| 1L240 | 240 WATT LED | 240 |
| | | |
| Electronic Metal Halide Lamps | | |
| 1M0150E | 150W METAL HALIDE EB | 160 |
| 1M0200E | 200W METAL HALIDE EB | 215 |
| 1M0250E | 250W METAL HALIDE EB | 270 |
| 1M0320E | 320W METAL HALIDE EB | 345 |
| 1M0350E | 350W METAL HALIDE EB | 375 |
| 1M0400E | 400W METAL HALIDE EB | 430 |
| 1M0450E | 400W METAL HALIDE EB | 480 |
| | | |
| MH Track Lighting | | |
| 1M0020E | 20W MH SPOT | 25 |
| 1M0025E | 25W MH SPOT | 25 |
| 1M0035E | 35W MH SPOT | 44 |
| 1M0039E | 39W MH SPOT | 47 |
| 1M0050E | 50W MH SPOT | 60 |
| 1M0070E | 70W MH SPOT | 80 |
| 1M0100E | 100W MH SPOT | 111 |
| 1M0150E | 150W MH SPOT | 162 |

Table 6: Upstream Lighting Savings and Measure Lives

| Product type | Annual Savings, kWh | Watts saved | Measure Life | RI Annual HOU |
|-----------------------------|---------------------|-------------|--------------|---------------|
| T8 | 13.0 | 3.5 | 10 | 3,684 |
| T5HO | 14.7 | 4.0 | 10 | 3,684 |
| T8 - 28 | 13.0 | 3.5 | 10 | 3,684 |
| T8 - 25 | 22.7 | 6.2 | 10 | 3,684 |
| U-Bend T8 - 28 | 13.0 | 3.5 | 7 | 3,684 |
| U-Bend T8 - 25 | 22.7 | 6.2 | 7 | 3,684 |
| PAR20 | 115.3 | 29.8 | 11 | 3,870 |
| PAR30 | 156.3 | 40.4 | 11 | 3,870 |
| PAR38 | 181.1 | 46.8 | 11 | 3,870 |
| MR16 | 90.6 | 23.4 | 11 | 3,870 |
| A-line, 40/60w | 129.8 | 33.5 | 6 | 3,870 |
| A-line, 75/100w | 182.3 | 47.1 | 6 | 3,870 |
| Decoratives | 81.5 | 21.1 | 5 | 3,870 |
| TLED, 4ft | 31.4 | 8.5 | 12 | 3,684 |
| TLED, 2ft | 15.7 | 4.3 | 12 | 3,684 |
| G24 LED | 50.1 | 12.8 | 13 | 3,870 |
| LED Retrofit kit, <25W | 157.4 | 40.7 | 11 | 3,870 |
| LED Retrofit kit, >25W | 232.0 | 60.0 | 12 | 3,870 |
| Stairwell Kit, 2ft w/sensor | 467.8 | 53.4 | 7 | 8,760 |
| Stairwell Kit, 4ft w/sensor | 403.0 | 46.0 | 7 | 8,760 |

Table 7: Baseline Efficiency Requirements for C&I Unitary Air Conditioners^c

| Equipment Type | Size Category | Subcategory or Rating Condition | Baseline Efficiency After 1/2014 |
|--|-----------------------------------|---------------------------------|---|
| Air conditioners, air cooled | <65,000 Btu/h ^b | Split system | 13.0 SEER |
| | | Single package | 13.0 SEER |
| | ≥65,000 Btu/h and <135,000 Btu/h | Split system and single package | 11.2 EER ^a 11.4 IEER ^a |
| | ≥135,000 Btu/h and <240,000 Btu/h | Split system and single package | 11.0 EER ^a 11.2 IEER ^a |
| | ≥240,000 Btu/h and <760,000 Btu/h | Split system and single package | 10.0 EER ^a 10.1 IEER ^a |
| | ≥760,000 Btu/h | Split system and single package | 9.7 EER ^a 9.8 IEER ^a |
| Air conditioners, Water cooled | <65,000 Btu/h | Split system and single package | 12.1 EER 12.3 IEER |
| | ≥65,000 Btu/h and <135,000 Btu/h | Split system and single package | 12.1 EER ^a 12.3 IEER ^a |
| | ≥135,000 Btu/h and <240,000 Btu/h | Split system and single package | 12.5 EER ^a 12.7 IEER ^a |
| | ≥240,000 Btu/h | Split system and single package | 12.4 EER ^a 12.6 IEER ^a |
| Air conditioners, evaporatively cooled | <65,000 Btu/h | Split system and single package | 12.1 EER 12.3 IEER |
| | ≥65,000 Btu/h and <135,000 Btu/h | Split system and single package | 12.1 EER ^a 12.3 IEER ^a |
| | ≥135,000 Btu/h and <240,000 Btu/h | Split system and single package | 12.0 EER ^a 12.2 IEER ^a |
| | ≥240,000 Btu/h | Split system and single package | 11.9 EER ^a 12.1 IEER ^a |

a. Deduct 0.2 from the required EERs for units with a heating section other than electric heat.[1]

b. Single-phase air-cooled air conditioners <65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

c. Baseline determined by International Code Council (2012). *2012 International Energy Conservation Code*; Page C-38, Table C403.2.3(1)

Baseline determined by International Code Council (2012). *2012 International Energy Conservation Code*; Page C-38, Table C403.2.3(1)

The Program does not differentiate units by heating section types, therefore the highest baseline efficiency is assumed for all heating section types in each equipment category

Table 8: Baseline Efficiency Requirements for C&I Heat Pumps

| Equipment Type | Size Category (Cooling Capacity) | Subcategory or Rating Condition | Baseline Efficiency | |
|--------------------|-------------------------------------|---|---|--------------|
| | | | After 1/1/2014[i] | |
| | | | Cooling Mode | Heating Mode |
| Air cooled | <65,000 Btu/h ^b | Split system | 13.0 SEER | 7.7 HSPF |
| | | Single package | 13.0 SEER | 7.7 HSPF |
| | ≥65,000 Btu/h and <135,000 Btu/h | Split system and single package / 47°F db/43°F wb outdoor air | 11.0 EER ^a 11.2 IEER ^a | 3.3 COP |
| | ≥135,000 Btu/h and <240,000 Btu/h | Split system and single package / 47°F db/43°F wb outdoor air | 10.6 EER ^a 10.7 IEER ^a | 3.2 COP |
| | ≥240,000 Btu/h | Split system and single package / 47°F db/43°F wb outdoor air | 9.5 EER ^a 9.6 IEER ^a | 3.2 COP |
| Water source | <17,000 Btu/h | 86°F entering water (Cooling Mode) / 68°F entering water (Heating Mode) | 11.2 EER | 4.2 COP |
| | ≥17,000 Btu/h and <135,000 Btu/h | 86°F entering water / 68°F entering water (Heating Mode) | 12.0 EER | 4.2 COP |
| Groundwater source | <135,000 Btu/h | 59°F entering water (Cooling Mode) / 50°F entering water (Heating Mode) | 16.2 EER | 3.6 COP |
| Ground source | <135,000 Btu/h | 77°F entering water / 32°F entering water (Heating Mode) | 13.4 EER | 3.1 COP |

db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F.

a. Deduct 0.2 from the required EERs for units with a heating section other than electric heat[1].

b. Single-phase air-cooled air conditioners <65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

[i] International Code Council (2012). 2012 International Energy Conservation Code. Page C-40, Table C403.2.3(2)

The Program does not differentiate units by heating section types, therefore the highest baseline efficiency is assumed for all heating section types in each equipment category

Table 9: Water Chilling Packages - Minimum Efficiency Requirements

| Equipment Type | Size Category (Tons) | Units | Path A | | Path B | |
|--|----------------------|--------|-----------|-------|-----------|-------|
| | | | Full Load | IPLV | Full Load | IPLV |
| Air-cooled chillers | < 150 | EER | 9.562 | 12.5 | NA | NA |
| | ≥ 150 | EER | 9.562 | 12.75 | NA | NA |
| Water cooled, electrically operated, positive displacement (rotary screw and scroll) | < 75 | kW/ton | 0.78 | 0.63 | 0.8 | 0.6 |
| | ≥ 75 and < 150 | kW/ton | 0.775 | 0.615 | 0.79 | 0.586 |
| | ≥ 150 and < 300 | kW/ton | 0.68 | 0.58 | 0.718 | 0.54 |
| | ≥ 300 | kW/ton | 0.62 | 0.54 | 0.639 | 0.49 |
| Water cooled, electrically operated, centrifugal | < 150 | kW/ton | 0.634 | 0.596 | 0.639 | 0.45 |
| | ≥ 150 and < 300 | kW/ton | 0.634 | 0.596 | 0.639 | 0.45 |
| | ≥ 300 and < 600 | kW/ton | 0.576 | 0.549 | 0.6 | 0.4 |
| | ≥ 600 | kW/ton | 0.57 | 0.539 | 0.59 | 0.4 |

Note: Compliance with this standard may be obtained by meeting the minimum requirements of Path A or B, however, both the Full Load and IPLV must be met to fulfill the requirements of Path A or B.

Table 10: Chiller Load Factors

| Equipment Type | Full Load | IPLV |
|---------------------------------|-----------|-------|
| Air-cooled chillers | 0.715 | 0.715 |
| Water cooled chillers <300 Tons | 0.882 | 0.823 |
| Water cooled chillers >300 Tons | 0.762 | 0.765 |

National Grid load factors based on a 1994 study.

Table 11: Cooling and Heating Equivalent Full Load Hours

| Building (or Space) Type | Cooling Full Load Hours (EFLH _{cool}) | Heating Full Load Hours (EFLH _{heat}) |
|--|---|---|
| National Grid RI (NE – South Coastal) | 817 | 1137 |

Average Cooling EFLHs from the 2010 NEEP HVAC Loadshape study.[1]

Average Heating EFLHs derived from 2010 NEEP HVAC Loadshape study^[2] and the Connecticut Program Savings Document for 2011 Program Year.^[3]

[1] KEMA (2011). C&I Unitary AC LoadShape Project – Final Report. Prepared for the Regional Evaluation, Measurement & Verification Forum.

[2] Ibid.

[3] United Illuminating Company, Connecticut Light & Power Company (2010). UI and CL&P Program Savings Documentation for 2011 Program Year.

Table 12: Savings Factors for ECM HVAC Fan Motors

| Factor | Box Size | Value | Units |
|-------------------------|------------|-------|-----------|
| Box Size Factor | < 1000 CFM | 0.32 | Watts/CFM |
| Box Size Factor | ≥ 1000 CFM | 0.21 | Watts/CFM |
| %Flow _{ANNUAL} | ALL | 0.52 | - |
| %Flow _{SP} | ALL | 0.63 | - |
| %Flow _{WP} | ALL | 0.33 | - |

Factors based on engineering analyses developed at National Grid

Table 13: Savings Factors for Cooler Night Covers

| Cooler Case Temperature | Savings Factor (ΔkW/foot) |
|----------------------------------|---------------------------|
| Low Temperature (-35 F to -5 F) | 0.03 |
| Medium Temperature (0 F to 30 F) | 0.02 |
| High Temperature (35 F to 55F) | 0.01 |

CL&P Program Savings Documentation for 2011 Program Year (2010). Factors based on Southern California Edison (1997). *Effects of the Low Emissive Shields on Performance and Power Use of a Refrigerated Display Case.*

Table 14: Savings Factors for C&I VSDs (kWh/HP and kW/HP)

| | Building Exhaust Fan | Cooling Tower Fan | Chilled Water Pump | Boiler Feed Water Pump | Hot Water Circulating Pump | MAF - Make-up Air Fan | Return Fan | Supply Fan | WS Heat Pump Circulating Loop |
|---|----------------------|-------------------|--------------------|------------------------|----------------------------|-----------------------|------------|------------|-------------------------------|
| Annual Energy Savings Factors (kWh/HP) | | | | | | | | | |
| University/College | 3,641 | 449 | 745 | 2,316 | 2,344 | 3,220 | 1,067 | 1,023 | 3,061 |
| Elm/H School | 3,563 | 365 | 628 | 1,933 | 1,957 | 3,402 | 879 | 840 | 2,561 |
| Multi-Family | 3,202 | 889 | 1,374 | 2,340 | 2,400 | 3,082 | 1,374 | 1,319 | 3,713 |
| Hotel/Motel | 3,151 | 809 | 1,239 | 2,195 | 2,239 | 3,368 | 1,334 | 1,290 | 3,433 |
| Health | 3,375 | 1,705 | 2,427 | 2,349 | 2,406 | 3,002 | 1,577 | 1,487 | 3,670 |
| Warehouse | 3,310 | 455 | 816 | 2,002 | 2,087 | 3,229 | 1,253 | 1,205 | 2,818 |
| Restaurant | 3,440 | 993 | 1,566 | 1,977 | 2,047 | 2,628 | 1,425 | 1,363 | 3,542 |
| Retail | 3,092 | 633 | 1,049 | 1,949 | 2,000 | 2,392 | 1,206 | 1,146 | 2,998 |
| Grocery | 3,126 | 918 | 1,632 | 1,653 | 1,681 | 2,230 | 1,408 | 1,297 | 3,285 |
| Offices | 3,332 | 950 | 1,370 | 1,866 | 1,896 | 3,346 | 1,135 | 1,076 | 3,235 |
| Summer Demand Savings Factors (kW/HP_{SP}) | | | | | | | | | |
| University/College | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.056 |
| Elm/H School | 0.377 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.275 |
| Multi-Family | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.056 |
| Hotel/Motel | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.056 |
| Health | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.056 |
| Warehouse | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.261 | 0.102 | 0.064 | 0.056 |
| Restaurant | 0.261 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.178 |
| Retail | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.056 |
| Grocery | 0.261 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.178 |
| Offices | 0.109 | -0.023 | 0.056 | 0.457 | 0.457 | 0.109 | 0.102 | 0.064 | 0.056 |
| Winter Demand Savings Factors (kW/HP_{WP}) | | | | | | | | | |
| University/College | 0.377 | -0.006 | 0.457 | 0.457 | 0.457 | 0.109 | 0.113 | 0.113 | 0.457 |
| Elementary/High School | 0.457 | -0.006 | 0.457 | 0.457 | 0.457 | 0.109 | 0.113 | 0.113 | 0.457 |
| Multi-Family | 0.109 | -0.006 | 0.457 | 0.355 | 0.384 | 0.109 | 0.113 | 0.113 | 0.355 |
| Hotel/Motel | 0.109 | -0.006 | 0.457 | 0.418 | 0.444 | 0.109 | 0.113 | 0.113 | 0.418 |
| Health | 0.377 | -0.006 | 0.457 | 0.275 | 0.298 | 0.109 | 0.113 | 0.113 | 0.275 |
| Warehouse | 0.377 | -0.006 | 0.457 | 0.178 | 0.193 | 0.261 | 0.113 | 0.113 | 0.178 |
| Restaurant | 0.109 | -0.006 | 0.457 | 0.355 | 0.384 | 0.109 | 0.113 | 0.113 | 0.355 |
| Retail | 0.109 | -0.006 | 0.457 | 0.275 | 0.298 | 0.109 | 0.113 | 0.113 | 0.275 |
| Grocery | 0.457 | -0.006 | 0.457 | 0.418 | 0.444 | 0.109 | 0.113 | 0.113 | 0.418 |
| Offices | 0.457 | -0.006 | 0.457 | 0.418 | 0.444 | 0.109 | 0.113 | 0.113 | 0.418 |

Chan, Tumin (2010). Formulation of a Prescriptive Incentive for the VFD and Motors & VFD impact tables at NSTAR. Prepared for NSTAR.

Table 15: Baseline Efficiency Requirements for Gas and Electric Commercial Ovens

| Equipment Type | Baseline Efficiency | Efficiency Requirement |
|----------------------------|--|------------------------|
| Gas-Fired Convection Oven | 30% | $\geq 44\%$ |
| Gas-Fired Combination Oven | 35% | $\geq 44\%$ |
| Gas-Fired Conveyor Oven | 20% Heavy Load | $\geq 44\%$ |
| Gas-Fired Rack Oven | 30% | $\geq 50\%$ |
| Commercial Electric Oven | Convection Cooking: 65% at 80lb/hr, 3.0 kW idle mode, 3.0 kW preheat Steam Cooking: 40% at 100lb/hr, 10.0 kW idle mode, 3.0kW preheat | |

Table 16: HVAC Interactive Effects for C&I Lighting

| Program | Lighting Type | Gas Impact (MMBtu/ Δ kWh)[i] | Oil Impact (MMBtu/ Δ kWh)[ii] |
|----------------------|----------------------------------|--|---|
| C&I New Construction | Lighting Systems | -0.00043 | -0.00083 |
| | Lighting Controls | -0.00028 | -0.00055 |
| | Upstream Lighting - LEDs | -0.0003 | -0.0006 |
| | Upstream Lighting - Fluorescents | -0.00039 | -0.00077 |
| C&I Retrofit | Lighting Systems | -0.00043 | -0.00083 |
| | Lighting Controls | -0.00028 | -0.00055 |

[i] C&I Lighting Interactive Effects 2015

[ii] C&I Lighting Interactive Effects 2015

Table 17: Default kW Reduction per CFM by CAIR Dryer Capacity

| Dryer Capacity (CFM _{DRYER}) | kW Reduction per CFM [1] |
|--|--------------------------|
| <100 | 0.00474 |
| ≥ 100 and <200 | 0.00359 |
| ≥ 200 <300 | 0.00316 |
| ≥ 300 <400 | 0.0029 |
| ≥ 400 | 0.00272 |

Table 18: CAIR Compressor kW Reduction per Horsepower

| Control Type | Nominal Horsepower (HP) | kW Reduction per Horsepower [1] | |
|-----------------------|-------------------------|---------------------------------|----------|
| | | New Construction | Retrofit |
| Load/No Load | ≥15 and <25 | 0.076 | 0.102 |
| Load/No Load | ≥25 and <75 | 0.114 | 0.102 |
| VSD | ≥15 and <25 | 0.159 | 0.207 |
| VSD | ≥25 and <75 | 0.228 | 0.206 |
| Variable Displacement | ≥50 and <75 | 0.11 | 0.116 |

Table 19: Baseline Efficiency Requirements for C&I Gas-Fired Boilers

| Equipment Type | Subcategory | Size Category (Input) | Minimum Efficiency ^a | Test Procedure |
|--------------------|-------------|--|---------------------------------|-----------------|
| Boilers, hot water | Gas-fired | <300,000 Btu/h | 80% AFUE | 10 CFR Part 430 |
| | | ≥300,000 Btu/h and ≤2,500,000 Btu/h ^b | 80% E _t | 10 CFR Part 431 |
| | | >2,500,000 Btu/h ^c | 82% E _c | 10 CFR Part 430 |

a. Annual Fuel Utilization Efficiency (AFUE), Thermal efficiency (E_t), Combustion efficiency (E_c)

b. Maximum capacity – min. and max. ratings as provided for and allowed by the units controls

c. These requirements apply to boilers with rated input of 8 MMBtu/h or less that are not packaged boilers and to all packaged boilers. Minimum efficiency requirements for boilers cover all capacities of packaged boilers

Adapted from 2012 International Energy Conservation Code; Table 6.8.1F

Appendix B: Sources

| Source Descriptions |
|--|
| ADM Associated, Inc. (2009). Residential Central AC Regional Evaluation. Prepared for NSTAR, National Grid, Connecticut Light & Power and United Illuminating. |
| Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators. |
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Appendix C: Acronyms

| ACRONYM | DESCRIPTION |
|----------------|---|
| AC | Air Conditioning |
| AFUE | Annual Fuel Utilization Efficiency (see the Glossary) |
| AHU | Air Handling Unit |
| Btu | British Thermal Unit (see the Glossary) |
| CF | Coincidence Factor (see the Glossary) |
| CFL | Compact Fluorescent Lamp |
| CHP | Combined Heat and Power |
| COP | Coefficient of Performance (see the Glossary) |
| DCV | Demand Controlled Ventillation |
| DHW | Domestic Hot Water |
| DOER | Department of Energy Resources |
| DSM | Demand Side Management (see the Glossary) |
| ECM | Electrically Commutated Motor |
| EER | Energy Efficiency Ratio (see the Glossary) |
| EF | Efficiency Factor |
| EFLH | Equivalent Full Load Hours (see the Glossary) |
| ES | ENERGY STAR® (see the Glossary) |
| FCM | Forward Capacity Market |
| FR | Free-Ridership (see the Glossary) |
| HE | High-Efficiency |
| HID | High-Intensity Discharge (a lighting technology) |
| HP | Horse Power (see the Glossary) |
| HSPF | Heating Seasonal Performance Factor (see the Glossary) |
| HVAC | Heating, Ventilating, and Air Conditioning |
| ISO | Independent System Operator |
| ISR | In-Service Rate (see the Glossary) |
| kW | Kilo-Watt, a unit of electric demand equal to 1,000 watts |
| kWh | Kilowatt-Hour, a unit of energy (1 kilowatt of power supplied for one hour) |
| LED | Light-Emitting Diode (one type of solid-state lighting) |
| LCD | Liquid Crystal Display (a technology used for computer monitors and similar displays) |
| MMBtu | One million British Thermal Units (see “Btu” in the Glossary) |
| MW | Megawatt – a measure of electric demand equal to 1,000 kilowatts |
| MWh | Megawatt-hour – a measure of energy equal to 1,000 kilowatt-hours |
| NEB | Non-Electric Benefit (see the Glossary) |
| NEI | Non-Energy Impact |
| NE-ISO | New England Independent System Operator |
| NTG | Net-to-Gross (see the Glossary) |
| O&M | Operations and Maintenance |
| PA | Program Administrator (see the Glossary) |
| PC | Personal Computer |
| RR | Realization Rate (see the Glossary) |
| SEER | Seasonal Energy Efficiency Ratio (see the Glossary) |
| SO | Spillover (see the Glossary) |
| SPF | Savings Persistence Factor (see the Glossary) |
| SSL | Solid-State Lighting (e.g., LED lighting) |
| VSD | Variable-Speed Drive |

Appendix D: Glossary

This glossary provides definitions as they are applied in this TRM for Rhode Island' energy efficiency programs. Alternate definitions may be used for some terms in other contexts.

| TERM | DESCRIPTION |
|----------------------------------|--|
| Adjusted Gross Savings | Gross savings (as calculated by the measure savings algorithms) that have been subsequently adjusted by the application of all impact factors except the net-to-gross factors (free-ridership and spillover). |
| AFUE | Annual Fuel Utilization Efficiency. The measure of seasonal or annual efficiency of a furnace or boiler. AFUE takes into account the cyclic on/off operation and associated energy losses of the heating unit as it responds to changes in the load, which in turn is affected by changes in weather and occupant controls. |
| Baseline Efficiency | The level of efficiency of the equipment that would have been installed without any influence from the program or, for retrofit cases where site-specific information is available, the actual efficiency of the existing equipment. |
| Btu | British thermal unit. A Btu is approximately the amount of energy needed to heat one pound of water by one degree Fahrenheit. |
| Coefficient of Performance (COP) | Coefficient of Performance is a measure of the efficiency of a heat pump, air conditioner, or refrigeration system. A COP value is given as the Btu output of a device divided by the Btu input of the device. The input and output are determined at AHRI testing standards conditions designed to reflect peak load operation. |
| Coincidence Factor (CF) | Coincidence Factors represent the fraction of connected load expected to occur concurrent to a particular system peak period; separate CF are found for summer and winter peaks. The CF given in the TRM includes both coincidence and diversity factors multiplied into one number. Coincidence factors are provided for peak periods defined by the NE-ISO for FCM purposes and calculated consistent with the FCM methodology. |
| Connected Load kW Savings | The connected load kW savings is the power saved by the equipment while in use. In some cases the savings reflect the maximum power draw of equipment at full load. In other cases the connected load may be variable, which must be accounted for in the savings algorithm. |
| Deemed Savings | Savings values (electric, fossil fuel and/or non-energy benefits) determined from savings algorithms with assumed values for all algorithm parameters. Alternatively, deemed savings values may be determined from evaluation studies. A measure with deemed savings will have the same savings per unit since all measure assumptions are the same. Deemed savings are used by program administrators to report savings for measures with well-defined performance characteristics relative to baseline efficiency cases. Deemed savings can simplify program planning and design, but may lead to over- or under-estimation of savings depending on product performance. |
| Deemed Calculated Savings | Savings values (electric, fossil fuel and/or non-energy benefits) that depend on a standard savings algorithm and for which at least one of the algorithm parameters (e.g., hours of operation) is project specific. |
| Demand Savings | The reduction in demand due to installation of an energy efficiency measure, usually expressed as kW and measured at the customer's meter (see Connected Load kW Savings). |
| Demand Side Management (DSM) | Strategies used to manage energy demand including energy efficiency, load management, fuel substitution, and load building. |
| Diversity | A characteristic of a variety of electric loads whereby individual maximum demands occur at different times. For example, 50 efficient light fixtures may be installed, but they are not necessarily all on at the same time. See Coincidence Factor. |

| TERM | DESCRIPTION | | | | | | | | | | |
|-----------------------------------|---|----------|------|---------------|-----------|--------------|----------|----------------|-----------------|----------|--------|
| Diversity Factor | This TRM uses coincidence factors that incorporate diversity (See Coincidence Factor), thus this TRM has no separate diversity factors. A diversity factor is typically calculated as: 1) the percent of maximum demand savings from energy efficiency measures available at the time of the company's peak demand, or 2) the ratio of the sum of the demands of a group of users to their coincident maximum demand. | | | | | | | | | | |
| End Use | Refers to the category of end use or service provided by a measure or technology (e.g., lighting, cooling, etc.). For the purpose of this manual, the list of end-uses include: <table> <tr> <td>Lighting</td><td>HVAC</td></tr> <tr> <td>Refrigeration</td><td>Hot Water</td></tr> <tr> <td>Food Service</td><td>Behavior</td></tr> <tr> <td>Compressed Air</td><td>Motors & Drives</td></tr> <tr> <td>Products</td><td>Custom</td></tr> </table> | Lighting | HVAC | Refrigeration | Hot Water | Food Service | Behavior | Compressed Air | Motors & Drives | Products | Custom |
| Lighting | HVAC | | | | | | | | | | |
| Refrigeration | Hot Water | | | | | | | | | | |
| Food Service | Behavior | | | | | | | | | | |
| Compressed Air | Motors & Drives | | | | | | | | | | |
| Products | Custom | | | | | | | | | | |
| Energy Efficiency Ratio (EER) | The Energy Efficiency Ratio is a measure of the efficiency of a cooling system at a specified peak, design temperature, or outdoor temperature. In technical terms, EER is the steady-state rate of heat energy removal (i.e. cooling capacity) of a product measured in Btuh output divided by watts input. | | | | | | | | | | |
| ENERGY STAR® (ES) | Brand name for the voluntary energy efficiency labeling initiative sponsored by the U.S. Environmental Protection Agency. | | | | | | | | | | |
| Energy Costing Period | A period of relatively high or low system energy cost, by season. The energy periods defined by ISO-NE are: <ul style="list-style-type: none"> • Summer Peak: 6am–10pm, Monday–Friday (except ISO holidays), June–September • Summer Off-Peak: Summer hours not included in the summer peak hours: 10pm–6am, Monday–Friday, all day on Saturday and Sunday, and ISO holidays, June–September • Winter Peak: 6am–10pm, Monday–Friday (except ISO holidays), January–May and October–December • Winter Off-Peak: Winter hours not included in the winter peak hours: 10pm–6am, Monday–Friday, all day on Saturday and Sunday, and ISO holidays, January–May and October–December. | | | | | | | | | | |
| Equivalent Full Load Hours (EFLH) | The equivalent hours that equipment would need to operate at its peak capacity in order to consume its estimated annual kWh consumption (annual kWh/connected kW). | | | | | | | | | | |
| Free Rider | A customer who participates in an energy efficiency program, but would have installed some or all of the same measure(s) on their own, with no change in timing of the installation, if the program had not been available. | | | | | | | | | | |
| Free-Ridership Rate | The percentage of savings attributable to participants who would have installed the measures in the absence of program intervention. | | | | | | | | | | |
| Gross kW | Expected demand reduction based on a comparison of standard or replaced equipment and equipment installed through an energy efficiency program. | | | | | | | | | | |
| Gross kWh | Expected kWh reduction based on a comparison of standard or replaced equipment and equipment installed through an energy efficiency program. | | | | | | | | | | |
| Gross Savings | A saving estimate calculated from objective technical factors. In this TRM, “gross savings” are calculated with the measure algorithms and do not include any application of impact factors. Once impact factors are applied, the savings are called “Adjusted Gross Savings”. | | | | | | | | | | |
| High Efficiency (HE) | Refers to the efficiency measures that are installed and promoted by the energy efficiency programs. | | | | | | | | | | |
| Horsepower (HP) | A unit for measuring the rate of doing work. One horsepower equals about three-fourths of a kilowatt (745.7 watts). | | | | | | | | | | |

| TERM | DESCRIPTION |
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| Heating Seasonal Performance Factor (HSPF) | A measure of the seasonal heating mode efficiencies of heat pumps expressed as the ratio of the total heating output to the total seasonal input energy. |
| Impact Factor | Generic term for a value used to adjust the gross savings estimated by the savings algorithms in order to reflect the actual savings attributable to the efficiency program. In this TRM, impact factors include realization rates, in-service rates, savings persistence, peak demand coincidence factors, free-ridership, spillover and net-to-gross factors. See the section on Impact Factors for more detail. |
| In-Service Rate | The percentage of units that are actually installed. For example, efficient lamps may have an in-service rate less than 100% since some lamps are purchased as replacement units and are not immediately installed. The in-service rate for most measures is 100%. |
| Measure Life | The number of years that an efficiency measure is expected to garner savings. These are generally based on engineering lives, but sometimes adjusted based on observations of market conditions. |
| Lost Opportunity | Refers to a measure being installed at the time of planned investment in new equipment or systems. Often this reflects either new construction, renovation, remodeling, planned expansion or replacement, or replacement of failure. |
| Measure | A product (a piece of equipment), combination of products, or process designed to provide energy and/or demand savings. Measure can also refer to a service or a practice that provides savings. Measure can also refer to a specific combination of technology and market/customer/practice/strategy (e.g., direct install low income CFL). |
| Net Savings | The final value of savings that is attributable to a program or measure. Net savings differs from gross savings (or adjusted gross savings) because it includes adjustments due to free-ridership and/or spillover. Net savings is sometimes referred to as "verified" or "final" savings. |
| Net-to-Gross Ratio | The ratio of net savings to the adjusted gross savings (for a measure or program). The adjusted gross savings include any adjustment by the impact factors other than free-ridership or spillover. Net-to-gross is usually expressed as a percent. |
| Non-Electric Benefits (NEBs) | Quantifiable benefits (beyond electric savings) that are the result of the installation of a measure. Fossil fuel, water, and maintenance are examples of non-electric benefits. Non-electric benefits can be negative (i.e. increased maintenance or increased fossil fuel usage which results from a measure) and therefore are sometimes referred to as "non-electric impacts". |
| Non-Participant | A customer who is eligible to participate in a program, but does not. A non-participant may install a measure because of a program, but the installation of the measure is not through regular program channels; as a result, their actions are normally only detected through evaluations. |
| On-Peak kW | See Summer/Winter On-peak kW |
| Operating Hours | Hours that a piece of equipment is expected to be in operation, not necessarily at full load (typically expressed per year). |
| Participant | A customer who installs a measure through regular program channels and receives any benefit (i.e. incentive) that is available through the program because of their participation. Free-riders are a subset of this group. |
| Prescriptive Measure | A prescriptive measure is generally offered by use of a prescriptive form with a prescribed incentive based on the parameters of the efficient equipment or practice. |
| Realization Rate (RR) | The ratio of measure savings developed from impact evaluations to the estimated measure savings derived from the TRM savings algorithms. This factor is used to adjust the estimated savings when significant justification for such adjustment exists. The components of the realization rate are described in detail in the section on Impact Factors. |

| TERM | DESCRIPTION |
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| Retrofit | The replacement of a piece of equipment or device before the end of its useful or planned life for the purpose of achieving energy savings. "Retrofit" measures are sometimes referred to as "early retirement" when the removal of the old equipment is aggressively pursued. |
| Savings Persistence Factor (SPF) | Percentage of first-year energy or demand savings expected to persist over the life of the installed energy efficiency equipment. The SPF is developed by conducting surveys of installed equipment several years after installation to determine the operational capability of the equipment. In contrast, <i>measure persistence</i> takes into account business turnover, early retirement of installed equipment, and other reasons the installed equipment might be removed or discontinued. Measure persistence is generally incorporated as part of the measure life, and therefore is not included as a separate impact factor. |
| Seasonal Energy Efficiency Ratio (SEER) | A measurement of the efficiency of a central air conditioner over an entire season. In technical terms, SEER is a measure of equipment the total cooling of a central air conditioner or heat pump (in Btu) during the normal cooling season as compared to the total electric energy input (in watt-hours) consumed during the same period. |
| Sector | A system for grouping customers with similar characteristics. For the purpose of this manual, the sectors are Commercial and Industrial (C&I), Small Business, Residential, and Low Income. |
| Spillover Rate | The percentage of savings attributable to the program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of (a) participants in the program who install additional energy efficient measures outside of the program as a result of hearing about the program and (b) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program. |
| Summer/Winter On-Peak kW | The average demand reduction during the summer/winter on-peak period. The summer on-peak period is 1pm-5pm on non-holiday weekdays in June, July and August; the winter on-peak period is 5pm-7pm on non-holiday weekdays in December and January. |
| Ton | Unit of measure for determining cooling capacity. One ton equals 12,000 Btu. |
| Watt | A unit of electrical power. Equal to 1/1000 of a kilowatt. |