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NEW HAMPSHIRE STRATEGIC EVALUATION PLAN  
2018-2020

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New Hampshire  
Evaluation, Measurement, and Verification (EM&V) Working Group

FINAL PLAN, 2018

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## I. Introduction

Evaluation, Measurement and Verification (EM&V) has been an integral component of the energy efficiency programs in New Hampshire since their inception. EM&V has many objectives, including verifying program and portfolio energy savings, estimating future energy savings of specific measures and behaviors, and identifying ways to improve program delivery and results. EM&V guides program administrators, policy makers and stakeholders to better understand the extent to which program activities are successfully addressing market barriers to the adoption of energy efficiency measures, and to determine whether they are meeting other goals and objectives.

This New Hampshire 2018-2020 Strategic Evaluation Plan (SEP)—as well as annual updates for 2019 and 2020—reflects a collaborative effort of the EM&V Working Group to identify evaluation needs and priorities for the 2018-2020 period. The 2018-2020 plan is based on significant research, including review of TecMarket Work's Evaluation Plan,<sup>1</sup> and discussions with settling parties and stakeholders during the 2018-2020 Statewide Energy Efficiency Plan proceedings. The EM&V Working Group will collaboratively develop 2019 and 2020 annual SEP updates, based on the progress and findings of ongoing evaluations; evolving priorities and emerging issues identified by EM&V Working Group members and other program stakeholders; changes in programs, markets, or technologies that merit further research; and available resources for evaluations. The SEP contains a description of the EM&V process and descriptions of planned impact, process, and other studies. These studies were identified and prioritized based on the following criteria:

- Impact evaluations
  - the length of time since the most recent impact evaluation of a program, in order to have updated savings amounts and meet ISO-NE requirements
  - the relative contribution of program or end use savings to the portfolio
  - the degree of innovation within the program, reflecting the risk that conditions have changed since the most recent review
  - recent changes in market conditions, codes, or other factors that might affect savings
  - planned or ongoing evaluations in neighboring states that allow for leveraging resources
- Process evaluations
  - highest priority is given to process evaluations that can be undertaken in conjunction with planned impact evaluations, to support efficient use of evaluation resources
  - the relative size of program savings in the portfolio
  - programs experiencing shifts in markets or technologies (including new approaches in other jurisdictions that NH is considering adopting)
- Other evaluation activities (e.g., market effects/characterization, non-energy impact studies, etc.)
  - studies meeting regulatory requirements or responding to political/stakeholder interest
  - programs experiencing shifts in markets or technologies

For each study, the SEP includes a utility staff study lead, who will a) act as the primary point of contact for the independent evaluator, b) facilitate meetings specific to the evaluation topic, c) work to ensure pre-established deadlines are met, d) facilitate the data request process between the evaluator and the NH Utilities, and e) ensure that all Working Group members have signed off before moving on to the next step in the process.

All studies will be performed at a statewide level to the maximum extent possible, while enabling results for individual utilities to the extent necessary. Evaluation of programs will include both gas and electric end uses to the extent feasible and cost-effective; however, in some cases it may be more feasible to focus on similar end uses or measure types across programs rather than a variety of measure types within a single program.

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<sup>1</sup> TecMarket Works (2014, September 15). "Six Year Evaluation Plan for Core EE Programs: Final Report." <http://www.puc.state.nh.us/Electric/Monitoring%20and%20Evaluation%20Reports/NHPUC%20-%20Six-Year%20Evaluation%20Plan%2009-15-2014%20Final%20Report.pdf>

Table 1. Planned New Hampshire EM&V Studies and Activities for 2018-2020, as of 2018

Study/activity	Included in February 2018 RFP	Utility Staff study lead	Planned Timing	Publication Date of Last Impact Evaluation	% of 2018 Statewide Budget	% of 2018 Statewide Savings (Lifetime kWh)	% of 2018 Statewide Savings (Lifetime MMBtu)	Other prioritization factors
<b>Residential studies</b>								
HEA impact, process, and low-income NEI evaluation	Yes	Miles Ingram	Q2 2018–Q1 2019	2006	18.4%	1.2%	17.3%	Low-income NEIs are a stakeholder and regulatory priority, per Settlement
HPwES impact and process evaluation	Yes	Carol Woods	Q2 2018–Q1 2019	2011	10.2%	0.9%	18.3%	
<b>C&amp;I studies</b>								
Non-Lighting Impact and Process Evaluation for Multiple C&I Programs <sup>a</sup>	Yes	Mary Downes	Q2 2018–Q3 2019	2012 (Sm. Bus)	23.2%	28.7%	19.2%	Evaluation of RGGI retail & large business measures required per grant terms
Large Business impact and process evaluation	No	TBD	Q2 2019–Q2 2020	2015	28.4%	58.5%	26.6%	Potential for leveraging MA study for impact results
<b>Cross-cutting studies and activities</b>								
Cross-cutting NEI evaluation	Yes	Miles Ingram	Q2 2018–Q4 2018 (Phase 1) TBD (Phase 2)	NA	NA	NA	NA	Per Settlement, develop NH-specific, evidence-based NEIs with a goal to apply results to the 2020 Plan update.
Energy Efficiency Market Assessment	Yes	Eric Stanley	Q2 2018–Q4 2018	NA	NA	NA	NA	
Energy Efficiency Potential Study	No	TBD	Q1 2019–Q1 2020	NA	NA	NA	NA	
Technical Reference Manual	No	TBD	Q1 2019–Q1 2020	NA	NA	NA	NA	Per Settlement, the TRM is to be completed by end of 2020.

<sup>a</sup> C&I programs to be evaluated are Small Business, Municipal, and RGGI grant-funded Large Business and Retail projects.

## II. Process for RFP Development and Contractor Selection

### **RFP Development and Issuance:**

The five studies included in the February 2018 RFP (HEA, HPwES, Non-Lighting Evaluation for Multiple C&I Programs, Cross Cutting NEIs, and EE Market Assessment), were time sensitive in nature, having been identified as near-term priorities for 2018 by regulators and other settlement parties. For these studies, the EM&V Working Group used the following “mini RFP” process to solicit proposals:

- the 1-page summaries below were expanded into 2-3 page “mini RFPs” with additional information on the program being evaluated (e.g., program description, spreadsheet with actual/planned measure quantities and savings), and specific researchable questions and project deliverables.
- The set of mini RFPs were accompanied by a cover letter and general material with instructions to bidders, proposal schedules, budget spreadsheets, and criteria for selection, as well as language soliciting ideas for alternative approaches and project scopes for achieving the desired results.
- The full document was issued through Eversource “Ariba” procurement software to a full list of known, capable evaluation firms, and to the public via posting on the NHPUC website. Interested firms were invited to bid on all or any subset of the five planned studies.

This approach was based on the Connecticut “mini RFP” model, and the EM&V Working Group chose the approach because it is streamlined and well suited to the size of NH’s evaluation portfolio. Other approaches include (1) the MA “Research Area” model (i.e., selecting contractors for all work within a given research area, followed by contractors identifying and scoping specific studies to be conducted within that area), and (2) issuing separate, full RFPs for each evaluation, developed by the EM&V Working Group. The “mini RFP” model allows for economies of scale from issuing an RFP for multiple studies simultaneously, while still allowing the EM&V Working Group to guide the scope of work for the studies so they meet stakeholder needs.

The process for issuing RFPs and selecting firms for the other planned studies may differ from the process outlined here depending on the timing and needs of those studies.

### **Contractor Selection:**

The EM&V Working Group selected evaluation vendors using a collaborative and transparent approach in which each member of the Working Group provided input to a scoring matrix developed for each study. The matrix included scores for technical aspects of the proposal, including the bidder’s proposed evaluation approaches and solutions, related experience and demonstrated ability to achieve desired results, as well as the reasonableness of the proposed cost. The Working Group members convened and discussed the proposals and scores, and the highest scoring bidder was selected after providing responses to any followup questions or interviews, and negotiations on cost and scope.

### III. Process for Evaluation Execution

Following contractor selection and award, the utility staff Study Lead will, on behalf of the EM&V Working Group,

- a) act as the primary point of contact for the evaluator,
- b) facilitate meetings specific to the evaluation topic,
- c) work to ensure pre-established deadlines are met,
- d) facilitate the data request process between the evaluator and the NH Utilities,
- e) ensure the Working Group has reached consensus before moving to the next step in the process, and
- f) document decisions made during a study for review, if/when requested by Working Group members.

Each utility is responsible for reviewing and approving invoices for payments to evaluation contractors, based on the billing approach agreed to in the contract.

Evaluations will generally proceed in the following stages. The members of the EM&V Working Group will maintain close involvement during each stage of the process as outlined below, with the EESE Board member representing the Board's input, and the Commission staff and independent expert representing the Commission's input during each stage of the process:

Stage	Description
Stage 1: Conceptual Framework	The EM&V Working Group develops evaluation scopes of work with goals, objectives, and timing of evaluations, which are used as the basis for EM&V contractor RFPs. The third-party evaluator will assume responsibility for the study beginning with stage 2.
Stage 2: Work Plan Development	The third-party evaluator develops and provides a work plan with strategies to meet objectives, including more detail on the planned research design, sample design and analysis plans (number of surveys, site visits), detailed budget, staffing and milestone deliverables. This work plan is provided in parallel with a kick-off meeting for the study. Once the EM&V Working Group has reviewed and approved the high-level work plan, the evaluation moves to Stage 3.
Stage 3: Evaluation In Progress	The third-party evaluator conducts work in accordance with the approved stage 2 plan, and reports to the EM&V Working Group in periodic calls and/or status reports.
Stage 4: Reporting	The third-party evaluator provides an initial draft report including specific recommendations, followed by EM&V Working Group review and comment, meetings, and revised drafts based on feedback. Comments on the draft report will be tracked and responded to (even if not directly incorporated in the final report). Typically, the evaluator will present final evaluation results in a public meeting open to all stakeholders.
Stage 5: Final Report Completed	The third-party evaluator provides the final report for publication, to be disseminated and discussed with stakeholders, filed with the NHPUC and posted on the NHPUC website.
Stage 6: Implementation	Final Report recommendations are incorporated into program design and/or future plans. Recommendations that affect energy savings will be incorporated in an update filing for the following calendar year, provided that the final report is completed no later than two months prior to the date the Plan filing is due.

The EM&V Working Group will communicate results and recommendations to the full range of stakeholders in a timely manner and act on them as appropriate. Working Group members are responsible for communicating results to the stakeholders they represent—i.e., Commission staff, utility staff, or the EESE Board—and should do so in a clear and understandable manner, in order to maintain a strong feedback loop between EM&V and policy, planning, and program administration functions.

#### IV. Planned Residential Studies

<b>Study Name:</b>	<b>Home Energy Assistance Impact and Process Evaluation</b>
<b>Study Manager/PA:</b>	Miles Ingram, Eversource
<b>Evaluation Vendor:</b>	<b>Opinion Dynamics</b>
<b>Primary Contact @ Vendor:</b>	Paul Wasmund
<b>Type of Study:</b>	Impact and Process, including low-income NEIs
<b>Applicable Fuel(s):</b>	Electric and Gas

##### **Overall Study Goal:**

The primary goal of the impact evaluation for the Home Energy Assistance Program is to assess the accuracy of claimed energy and demand savings during the 2016 and 2017 program years, for measures offered through the program including air sealing, insulation, health & safety measures (bathroom fans/vents, etc.), programmable thermostats, and space and water heating equipment—as well as refrigerators and lighting, utilizing results from the ongoing Energy Star Products evaluation as appropriate. The evaluation will include single-family and multi-family electric and natural gas savings, and to the extent possible, savings for delivered fuels such as oil, propane, and wood. The evaluation will compare evaluated savings and claimed savings, and recommendations will be made to improve on a prospective basis the accuracy of claimed savings through appropriate changes to savings calculations and assumptions such as equipment baselines and assumed hours of use (both on and off peak). The evaluation will address:

- a) electric energy usage (kWh),
- b) fossil fuel savings (MMBtu)
- c) connected load reductions (kW)
- d) demand savings coincident with ISO summer and winter peak periods

The primary goal of the process evaluation is to assess the effectiveness of program design and delivery, identify opportunity for further engaging partner agencies and effectively integrating emerging technologies during the 3-year term. Given increased funding and goals for the program, the process evaluation should identify opportunities to expand the reach of the program and help reduce waiting lists for weatherization services at the Community Action Agencies that deliver the programs in coordination with the NH Utilities. In addition, the process evaluation will assess participant and utility non-energy impacts (NEIs), such as impacts on health and safety, property value, utility arrearages and debt write-offs, terminations/reconnections, and other impacts.

The most recent impact evaluation of the Home Energy Assistance Program was completed by Opinion Dynamic Corporation in 2006, and low-income NEIs have not been studied in New Hampshire.

##### **High-Level Description of Approach/Methodology:**

The proposed approach and methodology should strive to be consistent with the [Department of Energy's Uniform Methods Project](#), with exceptions discussed and approved by the EM&V Working Group. Impact methodologies may include equipment metering, billing analysis, building simulation, engineering algorithms, or a combination of methods. Samples should be designed to meet ISO-NE requirements for statistical significance of demand savings estimates. Assessing savings for delivered fuels has been a challenge in prior evaluations due to limitations in available data and customer survey responses. Proposals should include methods for addressing these challenges. The process evaluation may include interviews with utility and vendor implementation staff, reviews of similar programs in other jurisdictions, and interviews or surveys of participating and non-participating customers.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Work Plan
<b>Timeline:</b>	Q2 2018 – Q1 2019
<b>Application of Results:</b>	Changes to savings calculations and NEIs: 2020 Plan Update Process changes: Upon approval of the EM&V Working Group

<b>Study Name:</b>	<b>Home Performance with Energy Star (HPwES) Impact and Process Evaluation</b>
<b>Study Manager/PA:</b>	Carol Woods, NHEC
<b>Evaluation Vendor:</b>	Opinion Dynamics
<b>Primary Contact @ Vendor:</b>	Paul Wasmund
<b>Type of Study:</b>	Impact and Process
<b>Applicable Fuel(s):</b>	Electric and Gas

**Overall Study Goal:**

The primary goal of the impact evaluation for the HPwES program is to assess the accuracy of the claimed energy and demand savings during the 2016 and 2017 program years for measures offered through the program including air sealing, insulation, hot water savings measures, thermostats, and refrigerators. For lighting and appliances, the evaluation will utilize results from the ongoing Energy Star Products evaluation as appropriate. The evaluation will include single-family and multi-family electric and natural gas savings, as well as savings for delivered fuels such as oil, propane, kerosene and wood (pellets and cord). The evaluation will compare evaluated savings and deemed savings for weatherization measures and water saving measures, and it will compare evaluated savings and claimed savings for lighting and appliances. Recommendations will be made to improve on a prospective basis the accuracy of savings estimates through appropriate changes to deemed savings values, and calculations and assumptions such as equipment baselines and assumed hours of use (both on and off peak). The evaluation will address:

- a) Electric energy usage (kWh)
- b) Fossil fuel savings (MMBtu)
- c) Connected load reductions (kW)
- d) Demand savings coincident with ISO summer and winter peak periods

The primary goal of the process evaluation is to assess the effectiveness of program design and delivery, identify opportunity for further engagement of contractors and effectively integrate emerging technologies (smart lighting, appliances, etc.) during the three-year term. Given increased funding and goals for the program, the process evaluation should identify opportunities to expand the reach of the program and achieve additional electric and gas savings. The evaluation should also assess awareness of and decision making regarding on-bill and 3<sup>rd</sup> party financing offerings, and assess rebate design and incentive levels.

The Cadmus Group completed an impact and process evaluation in 2011. A further review of the opportunities for ancillary summer and winter peak demand savings due to weatherization and installation of new heating systems was completed in 2013.

**High-Level Description of Approach/Methodology:**

The proposed approach and methodology should strive to be consistent with the [Department of Energy's Uniform Methods Project](#), with exceptions discussed and approved by the EM&V Working Group. Impact methodologies may include equipment metering, billing analysis, building simulation, engineering algorithms, or a combination of methods. Samples should be designed to meet ISO-NE requirements for statistical significance of demand savings estimates. Assessing savings for delivered fuels has been a challenge in prior evaluations due to limitations in available data and customer survey responses. Proposals should include methods for addressing these challenges. The process evaluation may include interviews with utility and vendor implementation staff, reviews of similar programs in other jurisdictions, and interviews or surveys of participating and non-participating customers.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Work Plan
<b>Timeline:</b>	Q2 2018 – Q1 2019
<b>Application of Results:</b>	Changes to savings calculations: 2020 Plan Update Process changes: Upon approval of the EM&V working group



## V. Planned Commercial and Industrial Studies

<b>Study Name:</b>	<b>Non-Lighting Impact and Process Evaluation for Multiple C&amp;I Programs (Small Business Energy Solutions, Municipal Program, and RGGI Retail and Large Business)</b>
<b>Study Manager/PA:</b>	Mary Downes, Unitil
<b>Evaluation Vendor:</b>	Cadmus
<b>Primary Contact @ Vendor:</b>	Ryan Hughes
<b>Type of Study:</b>	Impact and Process
<b>Applicable Fuel(s):</b>	Electric and Gas

### Overall Study Goal:

The primary goal of the impact evaluation for the Small Business Energy Solutions and Municipal Programs is to assess the accuracy of claimed energy savings during the 2016 and 2017 program years. The evaluation will compare actual savings against claimed savings, and make recommendations to improve on a prospective basis the accuracy of claimed savings through appropriate changes to savings calculations, equipment baselines, assumed hours of use (on and off peak), or applying realization rate(s). The evaluation will address:

- electric energy usage of non-lighting electric measures in the Municipal and Small Business Energy Solutions program (kWh),
- associated reductions in connected load (kW) and coincident with ISO summer and winter peak periods
- fossil fuel savings (natural gas, propane and fuel oil) in the Small Business and RGGI Retail and Large Business program

The primary goal of the process evaluation will be to evaluate the effectiveness of program design and delivery for non-lighting measures in the affected programs, with a particular emphasis on how to further penetrate the small business and municipal customer market with highly efficient, non-lighting equipment.

The Municipal Program offered by the NH electric utilities and funded by proceeds from the Regional Greenhouse Gas Initiative (RGGI) has not been evaluated since it was established as a program distinct from the Large and Small Business programs; however the measures offered (refrigeration, kitchen equipment, hot water conservation measures, motors and drives, EMS and other controls, etc.) and savings assumptions are based on the same algorithms used in the Large and Small Business programs. The exception to this is the Municipal program's allowance of measures and services that result in fossil fuel savings—including insulation, air sealing, and high efficiency heating and hot water equipment and controls—which are not currently offered by the Large and Small Business Energy Solutions electric programs. Similarly, the RGGI-funded grant has allowed the electric utilities to promote high efficiency fuel-neutral measures, similar to those in the Municipal program, to eligible retail and large business customers. The Small Business Energy Solutions program was last evaluated in 2012. However, a small business and municipal lighting impact study was undertaken in 2017 with an expected completion date of 2018 in conjunction with a similar evaluation in Massachusetts.

### High-Level Description of Approach/Methodology:

The evaluator's approach and methodology should strive to be consistent with the [Department of Energy's Uniform Methods Project](#), with exceptions discussed and approved by the NH EM&V Working Group. It is anticipated that the impact evaluation will require on-site visits and metering of equipment for a randomly selected sample of program participants. Samples should be designed to meet ISO-NE requirements for statistical significance of demand savings estimates. The process evaluation may include review of similar programs in other jurisdictions, interviews with implementation staff from the utilities and their vendors, and interviews with gas and electric customers who have both participated in programs, and those who have not.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Work Plan
<b>Timeline:</b>	Q2 2018 – Q3 2019
<b>Application of Results:</b>	Realization Rate changes: 2020 Plan Update Process and calculation changes: Upon approval of EM&V Working Group

<b>Study Name:</b>	<b>Large Business Energy Solutions Impact and Process Evaluation</b>
<b>Study Manager/PA:</b>	TBD
<b>Evaluation Vendor:</b>	TBD
<b>Primary Contact @ Vendor:</b>	TBD
<b>Type of Study:</b>	Impact and Process
<b>Applicable Fuel(s):</b>	Electric and Gas

**Overall Study Goal:**

The primary goal of the impact evaluation for the Large Business Energy Solutions impact evaluation is to assess the accuracy of claimed energy savings during the 2017 and 2018 program years, for prescriptive and custom retrofit and new equipment and construction measures, including lighting, HVAC, motors, air compressors, and other measures. The evaluation will address:

- a) electric energy usage (kWh),
- b) connected load reductions (kW)
- c) demand savings coincident with ISO summer and winter peak periods
- d) natural gas savings

The impact evaluation will compare actual savings against claimed savings, and make recommendations to improve on a prospective basis the accuracy of claimed savings through appropriate changes to savings calculations, equipment baselines, assumed hours of use (on and off peak), or applying realization rate(s).

The primary goal of the process evaluation will be to evaluate the effectiveness of program design and delivery, with emphasis on how to further penetrate the large business customer market. The evaluation should assess the utilities' delivery mechanisms, incentive levels, and incentive paths (e.g., prescriptive, custom, performance-based); the barriers to adoption of high efficiency solutions faced by customers in key segments such as manufacturing, healthcare, colleges and universities, ski areas, hospitality and large retail facilities; satisfaction and effectiveness of program partners (e.g., HVAC contractors, mid-stream distributors, ESCOs, engineering firms); and the marketing strategies, tactics, and pathways for reaching key customer populations.

A baseline evaluation of the New Equipment & Construction program was completed in March 2014, and an impact evaluation of the large C&I programs was completed in September 2015. The studies' recommended adjustments to baselines and realization rates were incorporated into program savings calculations, and action was taken to improve the accuracy of project tracking supporting documentation.

**High-Level Description of Approach/Methodology:**

The evaluator's approach and methodology should strive to be consistent with the [Department of Energy's Uniform Methods Project](#), with exceptions discussed and approved by the NH EM&V Working Group. It is anticipated that the impact evaluation will require on-site visits and metering of equipment for a randomly selected sample of locations which participated in the program(s). Samples should be designed to meet ISO-NE requirements for statistical significance of demand savings estimates. The process evaluations may undertake a review of similar programs offered in other jurisdictions, interviews with implementation staff from the utilities and their vendors, and interviews with gas and electric customers who have both participated in programs, and those who have not.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Work Plan
<b>Timeline:</b>	Q2 2019 – Q2 2020
<b>Application of Results:</b>	Changes to savings calculations: 2021-2023 Three Year Plan Process changes: Upon approval of the EM&V Working Group

## VI. Planned Cross-cutting Studies and Other Activities

<b>Study Name:</b>	<b>Crosscutting Non-Energy Impacts (NEI) Study</b>
<b>Study Manager/PA:</b>	Miles Ingram, Eversource
<b>Evaluation Vendor:</b>	DNV-GL
<b>Primary Contact @ Vendor:</b>	Jason Symonds
<b>Type of Study:</b>	Other
<b>Applicable Fuel(s):</b>	Electric and Gas

### Overall Study Goal:

This primary goal of this study is to identify and quantify NEIs for inclusion in New Hampshire's benefit cost test, to better reflect the full value of energy efficiency measures and/or programs and ensure symmetrical treatment of costs and benefits, including benefits that factor into participants' decisions to install energy efficiency measures. A secondary goal of the study is to develop empirically-driven quantitative and qualitative information on NEIs that can be used to inform customer outreach and promote benefits beyond energy savings, thereby maximizing the value of our programs to customers, subject to energy savings goals.

The study should examine participant NEIs for residential and C&I new construction, retrofit, and retail products programs. With the exception of low-income NEIs, which will be examined separately as part of the Home Energy Assistance evaluation, the study should be comprehensive in the list of NEIs it examines. However, if necessary, NEIs should be prioritized based on the likely size of their impact within the portfolio. Potential NEIs to examine include O&M and repair/replacement impacts; resident/occupant health, safety, productivity and comfort impacts; property value and home durability impacts; or other NEIs identified in literature and program reviews that are likely to apply in NH.

NEIs resulting from the New Hampshire energy efficiency programs have not been directly quantified to date. For 2018, the New Hampshire TRC test applies a 10 percent adder as a conservative proxy for NEIs, in the absence of New-Hampshire specific, evidence-based values. This study will be the first effort to develop New Hampshire-specific NEI values. A full accounting of NEIs is not only critical to the cost effectiveness test, but can be used to inform customers about monetary savings and other benefits related to O&M, productivity, health and safety, and other impacts.

### High-Level Description of Approach/Methodology:

The study will use a two-phased approach to identify and quantify New Hampshire-specific NEIs. Phase 1 will consist of the following objectives, resulting in an interim report and database of NEI values, by Q3 2018.

- Review the methodologies, assumptions, data, and results from existing literature on NEIs, to identify NEI values that might reasonably be applied in New Hampshire, given New Hampshire's building stock, the programs and measures offered in the state, and other characteristics of the energy efficiency market and customer population. The evaluator shall recommend which NEI values—with or without modification for New Hampshire application—should be included in the NH benefit cost test.
- Identify gaps in NEIs that are applicable in New Hampshire, including NEIs identified in objective 1 that are likely to vary significantly between New Hampshire and other jurisdictions, and recommend which NEIs merit further primary research in New Hampshire.

Phase 2 will consist of the following two objectives, resulting in a final report and presentation by Q2 2019.

- For those NEI values identified as requiring further primary research in New Hampshire, the evaluator shall identify and detail a rigorous approach for quantifying NEI values, and create sampling methodologies and approaches for inclusion in future evaluations of New Hampshire's programs.
- Based on input and feedback from the EM&V Working Group and NH Benefit/Cost Working Group, the evaluator shall conduct primary research using empirical analysis and behavioral survey and/or non-survey approaches to develop estimates for priority NEIs.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Scope of Work
<b>Timeline:</b>	Q2 2018 – Q4 2018 (Phase 1), TBD (Phase 2)
<b>Application of Results:</b>	2020 Plan Update

<b>Study Name:</b>	<b>Energy Efficiency Market Assessment</b>
<b>Study Manager/PA:</b>	Eric Stanley, Liberty Utilities
<b>Evaluation Vendor:</b>	Navigant
<b>Primary Contact @ Vendor:</b>	Molly Podolefsky
<b>Type of Study:</b>	Market Assessment
<b>Applicable Fuel(s):</b>	Electric and Gas

**Overall Study Goal:**

The primary goal of the market assessment study is to better understand the New Hampshire constituent mindset to help guide the implementation and marketing of the New Hampshire energy efficiency programs. Specific objectives include 1) assessing overall knowledge and awareness of energy efficiency among potential participants, 2) identifying general attitudes, perceptions and behaviors concerning energy efficiency, 3) developing a deeper, evidence-based understanding of the drivers of energy efficiency program participation and the barriers that impede or prevent participation, 4) identifying the means for most effectively communicating with various customer groups, and 5) establishing a baseline against which to benchmark awareness levels of the New Hampshire utilities' energy efficiency programs, the statewide brand, NHSaves, and the ENERGY STAR brand.<sup>2</sup>

The market assessment will evaluate variables across the key customer sectors for the programs: the residential, small business, large business and municipal customer classes. Further, the assessment will investigate whether there are differences amongst customers geographically, by income level or type of business, or other demographic or socioeconomic variables.

Given the need to increase the scale of activity across the NH energy efficiency program portfolio, the study will help identify opportunities to improve how energy efficiency is marketed to customers by each of the key customer classes, what challenges need to be overcome in terms of existing attitudes, beliefs and behaviors currently in the market, what means customers prefer for receiving information on energy efficiency, and specific messaging that may resonate best with different customer classes.

**High-Level Description of Approach/Methodology:**

The methodology will include a survey of randomly selected residential, small business, large business and municipal customers in New Hampshire. The survey may be conducted online, by phone, or other methods allowing for statistically significant sampling results within multiple customer segments and populations. Levels of desired statistical significance will be balanced against the available budget for the study. Survey approaches may be supplemented by other approaches (e.g., interviews) as appropriate to provide greater insight and depth to study findings.

To qualify for the survey, respondents must reside in New Hampshire in one of the NHSaves program sponsors' service areas, be responsible for utility bill payments and decisions about home/facility improvements.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Work Plan
<b>Timeline:</b>	Q2 2018 – Q4 2018
<b>Application of Results:</b>	1) Influence marketing strategies and tactics as part of the statewide energy efficiency marketing campaign and program-specific marketing initiatives, upon study completion 2) Establish benchmarks to measure impact of 2018-2020 program marketing, upon approval of the EM&V Working Group

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<sup>2</sup>Please see Section 1.6 (page 19, 49, 130, ) that shows awareness of utility programs as 49.4% for Residential, 59.6% for Small Business and 85.9% for Large Business customers.

(<http://www.puc.state.nh.us/Electric/GDS%20Report/GDS%20Final%20Report.htm> and <http://www.puc.state.nh.us/Electric/GDS%20Report/GDS%20Final%20Report.htm>)

Study Name:	Study of Energy Efficiency Potential in New Hampshire
Study Manager/PA:	TBD
Evaluation Vendor:	TBD
Primary Contact @ Vendor:	TBD
Type of Study:	Market Analysis
Applicable Fuel(s):	Electric and Gas

#### Overall Study Goal:

The primary goal of the study is to determine the currently remaining technical and achievable electric and natural gas energy efficiency potential in New Hampshire. The results of this study will help to inform cost-effective approaches for capturing the potential through a suite of energy efficiency programs offered under the Energy Efficiency Resource Standard. This public policy standard requires New Hampshire to pursue all cost-effective energy efficiency measures as a means of improving economic efficiency related to energy procurement and consumption in the state. The results of the study will also inform goal-setting for the 2021-2023 Three Year Plan.

The study will investigate both energy resources (kWh and natural gas therms) and demand (kW) resources in a) the commercial sector, b) the industrial sector, c) the municipal sector, and d) the residential sector, which will in turn be segmented between customers who can and cannot afford to share in the cost of energy efficiency adoption (i.e., low-income and non-low-income). The study's examination of demand (kW) resources should include an analysis of the potential for demand response programs administered by the efficiency program administrators.

New Hampshire's energy efficiency potential was last studied and reported on in January 2009 by GDS.

#### High-Level Description of Approach/Methodology:

Utilizing customer billing data, energy efficiency program tracking data, existing NH-based surveys and studies, and other primary and secondary research including but not limited to those from the Census Bureau's American Community Survey, the Department of Energy's [Residential Energy Consumption Survey \(RECS\)](#), EnergyStar Unit Shipment Data, the NH Office of Strategic Initiatives, and customer site visits and surveys, the third-party technical potential study evaluator will:

- characterize the existing customer base for each of the utilities as well as for the state as a whole based on types of businesses and residences as well as fuel and equipment types
- identify both general and segment-specific barriers to adoption of energy efficiency measures and practices,
- estimate current saturation and penetration of energy efficient equipment by measure type, customer type and other relevant distinctions

Building upon the current market conditions, the evaluator will develop a New Hampshire-specific model to estimate the remaining technical potential for efficiency measures to reduce electricity and natural gas consumption over the near term. This estimate of *technical potential* will be refined to provide an estimate of potential that can be realized cost effectively, e.g., where the incremental cost of identifying and installing high efficiency equipment and processes is less than the value of the energy that would be supplied over the life of the measure were the high efficiency equipment not installed. This *economic potential* will be further refined to provide an estimate of *achievable potential* that can realistically be captured despite various barriers to adoption experienced by the end user and program administrators. Each of the relevant barriers will be described as will all assumptions used to estimate the impact of each barriers on the *achievable potential*.

Next Steps/Owners:	ID Evaluator to Develop Scope of Work
Timeline:	Q1 2019 – Q1 2020
Application of Results:	2021-2023 Three Year Plan

<b>Study Name:</b>	<b>Technical Reference Manual</b>
<b>Study Manager/PA:</b>	TBD
<b>Evaluation Vendor:</b>	TBD
<b>Primary Contact @ Vendor:</b>	TBD
<b>Type of Study:</b>	Other (non-study)
<b>Applicable Fuel(s):</b>	Electric and Gas

#### **Overall Goal:**

The primary goal of this effort is to develop a New Hampshire-specific Technical Reference Manual (TRM) to be used as a single, consistent source of deemed savings values, algorithms, and related parameters for efficiency measures supported by all NH utilities under the Energy Efficiency Resource Standard. The TRM will be based on the most relevant, methodologically sound, and up-to-date information available. TRM values should be derived from New Hampshire-specific evaluations where possible. For programs or measures that have not been recently evaluated in New Hampshire, the TRM may draw upon studies undertaken in neighboring states for information about prescriptive measure savings assumptions, measure lives, hours of use and other impact factors, as well as savings estimates from the U.S. EPA's online energy saving tools.

The TRM will take the form of a document, to be published on the NHPUC website. It should be organized and formatted for ready application of savings calculations by utility implementation and planning staff, as well as ease of use by regulators, evaluators, stakeholders and other readers. Its sources should be thoroughly documented, and it should be formatted and organized to facilitate annual review and update by program administrators and regulators.

As part of the New Hampshire benefit/cost screening model, the NH utilities currently utilize savings values, algorithms, and related parameters for efficiency measures found in New Hampshire-specific or regional studies where available, supplemented with studies from neighboring jurisdictions and other sources such as EPA's online savings tools where needed. However, these values are not consolidated into a TRM. As committed to in the EERS Settlement and ordered by the Commission, a key priority under the SEP will be to compile a New Hampshire-specific TRM by no later than the end of 2020.

#### **High-Level Description of Approach/Methodology:**

The vendor developing the New Hampshire TRM will:

- comprehensively review all existing assumptions, algorithms and methods of modeling savings for each measure offered in each program based on the benefit/cost screening model that is currently utilized by the electric and natural gas utilities;
- identify and document the most relevant, up-to-date evaluations or other sources of information for all existing or recommended measure assumptions. This includes identifying changes in federal equipment standards, referencing neighboring states' TRMs, and updating savings algorithms as necessary.
- compile all savings values and assumptions the EM&V Working Group agrees to in one consolidated document, with supporting spreadsheets as needed.

<b>Next Steps/Owners:</b>	ID Evaluator to Develop Scope of Work
<b>Timeline:</b>	Q1 2019 – Q1 2020
<b>Application of Results:</b>	2021-2023 Three Year Plan



## VII. Reporting Guidelines

Evaluation reports may require different formats, organization, and levels of technical detail depending on their subject matter, intended application, and target audience. However, evaluators should follow the general guidelines below to the extent possible, to ensure reports and other written products provide maximum value to a broad range of audiences—from evaluation professionals, to state policy makers, to program implementation staff and others who may have little prior knowledge of EM&V.

- To the extent possible, evaluators should organize reports to provide key information in an abstract; brief executive summary; a report body that is only as long as necessary to provide key details on the findings, conclusions, and recommendations; and remaining details (e.g., methodology, supporting data, project/site-level results, etc.) in appendixes. For an example of such a reporting model, see <http://stephanieevergreen.com/the-1-3-25-reporting-model/>.
- Reports and other written products should follow a “bottom line up top” deductive style, more akin to newspapers than academic journals. Sections should begin with key findings or conclusions, and paragraphs should begin with topic sentences, followed by supporting facts or examples.
- Acronyms and jargon should be defined when first used, and in a separate glossary or acronym list.
- Key impact evaluation findings such as evaluated kWh, kW, and MMBtu savings, impact factors, installation rates, etc., should be presented in a user-friendly manner (e.g., tables, algebraic formulas, etc.) for easy application to savings calculations and the Technical Reference Manual.
- To the extent possible, reports should include cross-comparisons of results with those from prior New Hampshire studies and studies of similar programs and jurisdictions.
- The methodology employed in the evaluation should be thoroughly documented in the draft and final reports. The impact evaluation findings and recommendations should be thoroughly explained and analyzed in terms of the most significant explanatory factors underlying the results of the study. The final report should describe how the analysis met the standards set forth in the ISO-NE Manual for Measurement and Verification of Demand Reduction Value from Demand Resources (M-MVDR).
- Recommendations should be based on sound evidence from multiple sources of data. Not all findings in the report need to have a recommendation; rather where there are clear and consistent findings that point to an action the utilities could take to address an identified problem, then evaluators should craft a recommendation. Final recommendations should:
  - Be specific and actionable. *Example: The utilities should update the User-Defined Reference Home to align with IECC 2009, and consider increasing the HSPF requirement for homes heated with air source heat pumps to a value above what is required by ENERGY STAR v3.0 and 3.1.*
  - Clearly explain the positive effect of taking the recommended action, or negative effect of not taking it. *Example: Now that REM/Rate can model energy savings due to additional features of domestic hot water systems, program homes have an additional opportunity to outperform and claim savings over non-program homes. To do so, program trainings should promote best practices around these water-related measures.*
  - Consider program costs for implementing the recommendation. *Example: While the program currently uses its entire budget, the program budget may need to be increased to support enhanced marketing efforts with long-term benefits in mind.*

These guidelines are intended to lead to recommendations that utilities can effectively implement to achieve meaningful program improvements. To the extent that potential recommendations do not meet these criteria, evaluators should consider alternative approaches to reporting the information. In addition, evaluators should communicate recommendations to utility staff before the evaluation report is finalized. This allows for feedback on the practicalities of implementing recommendations, and allows utility staff to understand and ask questions about the recommended actions.