

STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET DE 20-092

IN THE MATTER OF: Electric and Gas Utilities

 2021 – 2023 Triennial Energy Efficiency Plan

DIRECT TESTIMONY

OF

Stephen R. Eckberg
Utility Analyst

October 29, 2020

1 **Introduction**

2 **Q. Please state your full name?**

3 A. My name is Stephen R. Eckberg

4 **Q. By whom are you employed and what is your business address?**

5 A. I'm employed as a Utility Analyst with the Electric Division of the New Hampshire Public
6 Utilities Commission (PUC). My business address is 21 South Fruit Street, Suite 10,
7 Concord, NH.

8 **Q. Please summarize your education and professional work experience.**

9 A. I was employed as a Utility Analyst with the New Hampshire Office of Consumer Advocate
10 for seven years prior to joining the PUC's Sustainable Energy Division. In 2019, I joined the
11 PUC's Electric Division. A more complete listing of my education and professional work
12 experience is included as Attachment SRE-1 to my testimony.

13 **Q. What is the purpose of your testimony in this proceeding?**

14 A. The purpose of my testimony is to provide Staff's comments and recommendations on
15 several issues in the 2021 -2023 Triennial Energy Efficiency Plan filed by the Electric and
16 Natural Gas utilities on September 1, 2020 including:

- 17 1. The proposed behavioral energy efficiency programs including Home Energy Reports
18 and the new Aerial Infrared Mapping program.
19 2. The Home Energy Assistance program.
20 3. Workforce Development and Education.

21 **Q. Which utilities are planning to offer a Home Energy Reports (HER) program in the**
22 **2021-2023 triennium?**

1 A. Liberty (Electric and Natural Gas) and Unitil (Electric and Natural Gas) plan to continue to
2 implement the HERs that they have delivered to their customers for the last several years.

3 Details of the Liberty implementation can be found at Section 6.1.1. of the Plan at Bates 157.

4 Details of the Unitil implementation for its electric and natural gas customers (Northern
5 Utilities) is found at Section 6.1.2. of the Plan beginning at Bates 162.

6 **Q. Are there any significant changes in the HER program delivery, savings estimation**
7 **methodology, or other aspects of the program?**

8 A. Both Liberty and Unitil plan to continue to offer the HER programs through their contractor

9 Oracle¹ delivering a mix of paper and email-based reports to a “treatment group” of

10 customers who receive data about their residential energy use in comparison to an

11 appropriate peer group. The frequency of customer contacts occurs regularly throughout the

12 year with increased frequency for gas heating customers during the heating season months.

13 This is generally consistent with program delivery in prior years. A change in savings

14 methodology is being proposed in that both utilities have decided to change the accounting

15 methodology for computing energy savings for the HER program. Currently, they use a

16 three-year measure life and account for energy savings, which persist from year to year. The

17 three-year measure life means that the energy consumption reduction behaviors which occur

18 as a result of the customer contacts and information provided in a given program year

19 actually persist beyond the initial year – in fact, for nearly three years. Indeed, research has

20 shown that even if the participating treatment group receives the program information for one

21 year, there is savings persistence for several years following the cessation of outreach. This

22 reflects the fact that the learned “energy efficiency behaviors” take time to “wear off.”

¹ <https://www.oracle.com/industries/utilities/products/what-is-opower.html>

1 Liberty Electric and Gas intend to transition to a one year measure life (which includes an
2 amount to account for persistence savings in subsequent years) to simplify the savings
3 accounting, improve forecasting, and remove the savings variability that occurs with the use
4 of the multi-year measure life approach.² In response to discovery, Unitil confirmed that it
5 too, was transitioning to the one-year measure life for savings in its HER program.³ In fact,
6 both Liberty and Unitil have confirmed that their transition to use of the one-year measure
7 life will occur in 2020 so that the annual savings estimates in each year of the 2021-2023
8 Plan will not include any persistence savings from prior years.

9 **Q. Is Staff comfortable with this transition from a multi-year savings approach to a one-**
10 **year savings approach?**

11 A. Yes. Over the course of the numerous planning sessions and discussions with the Evaluation,
12 Measurement, and Verification (EM&V) group, Staff's EM&V consultant, SERA, had
13 expressed its strong preference for use of the one year measure life approach rather than the
14 multi-year approach. SERA has significant experience in the review of implementations of
15 HER programs in other jurisdictions and has expressed its preference for the simplicity of the
16 one-year measure life approach.

17 Staff has discussed the matter extensively with SERA, has reviewed the material that Liberty
18 and Unitil have provided in response to discovery⁴ and agrees that the transition to using the
19 one-year measure life savings approach is appropriate, reasonable, and will result in easier to
20 understand annual savings estimates from the program.

² 2021-2023 Triennial Energy Efficiency Plan at Bates 155.

³ Attachment SRE-2 Response to Staff 2-046.

⁴ Attachment SRE-2 Response to Staff 2-046 and Attachment SRE-7 Unitil Response to Staff 4-001.

1 **Q. Does Staff have any further recommendations regarding the HER program of Liberty**
2 **and Unital?**

3 A. Yes. Currently, the energy savings estimates which are reported and used in the calculations
4 of LBR and PI are produced by the program delivery contractor – Oracle. Staff recommends
5 that an external evaluation of the HER program be included in the EM&V plan in 2021 so
6 that savings estimates produced for the HER program can be independently validated. In
7 particular, Staff’s recommendation, based on input from SERA, is that first year savings for a
8 HER program implementation similar to this one, where the treatment group remains
9 basically unchanged over time, should be based on observed savings between the treatment
10 group (those who receive the HER program information outreach) and the control group (a
11 similar group of customers who do not receive the program outreach).

12 **Q. Are there any other changes of note in the 2021-2023 Plan regarding behavioral energy**
13 **efficiency programs?**

14 A. Yes. Liberty Gas is proposing a new program for its residential customers in New
15 Hampshire – the Aerial Infrared Mapping (AIM) program.

16 **Q. What are the program objectives and how will it work?**

17 A. The AIM program’s objective are to efficiently capture large volumes of detailed information
18 about the general weatherization condition of Liberty’s residential customers and to share
19 useful visual information with a group of those customers to: improve literacy on
20 opportunities for improving building efficiency; motivate customers to participate in the
21 Home Energy Assistance (HEA) and Home Performance with EnergyStar (HPwES)
22 programs; and enable the Company to better qualify and prioritize weatherization projects.

1 Liberty and its implementation partner, MyHEAT, Inc.⁵, plan to gather aerial thermal images
2 to produce unique building HEAT maps. The detail provided to each customer is a
3 personalized resource to enable a visual comparison of heat loss from the customer's home
4 with others in their vicinity. The AIM program using MyHEAT's technology and
5 implementation has been deployed in utility service areas in both the US and Canada and is
6 based on peer reviewed research in Urban Thermal Remote Sensing from the University of
7 Calgary.

8 **Q. What is the proposed timeline for the implementation of the AIM program?**

9 A. Liberty's plan for the program is that the MyHEAT contractor will perform two flyovers of
10 the Liberty Gas service territory from Nashua up through Manchester and Concord in Spring
11 2021 and again in Spring 2023. These flyovers will collect the aerial thermal imaging data
12 needed to generate HEAT maps and HEAT ratings for individualized customer marketing
13 material. Liberty states that "a unique customer-facing platform will be designed."⁶

14 **Q. Are there any concerns about issues such as data privacy or customer interest with such**
15 **a new program effort?**

16 A. Yes, both of these issues are of concern to the Company and Staff. Staff believes that the
17 Company has adequately addressed privacy concerns through the program design elements
18 where customers can choose to "opt-out" of participation so that no heat mapping data would
19 be available for their location. Further, the web-based information platform that will be
20 available will be private so that even participating customers cannot "browse" the thermal
21 imaging data of all homes in their neighborhood or city. This is distinctly different than the

⁵ MyHeat, Inc. website: <http://myheat.ca>.

⁶ 2021-2023 Triennial Plan at Bates 160.

1 implementation in certain Canadian cities where thermal imaging data appears available to
2 the public.⁷ Finally, Liberty conducted a customer survey earlier this year to gauge interest
3 and inform program design. The survey provided sufficient positive response and interest
4 from customers that the Company has chosen to pursue the program and has used
5 information gained from the survey to inform a NH specific program design.

6 **Q. Does Staff believe that Liberty's proposal sufficiently addresses potential privacy**
7 **concerns?**

8 A. Staff is aware generally that there is a broad range in the level of concern among households
9 regarding privacy issues. Some households are interested in adopting new technologies such
10 as Amazon's "Alexa"-enabled speakers and wifi-connected thermostats which provide the
11 ability to control a home's heating system via an "app" on the users phone. Other
12 households choose to avoid such technology advancements. Therefore, Staff recommends
13 that the Company ensure that the AIM program implementation provides ample opportunity
14 for customers to learn about the program and opt-out if so desired.

15 **Q. Does the AIM program pass the benefit-cost test (the Granite State Test or GST) as**
16 **proposed?**

17 A. No and yes. The plan presents the GST results for each year individually and overall for the
18 full three year term. The GST values are as follows: for 2021 GST = 0.12, for 2022 GST =
19 1.10, for 2023 GST = 1.16, and overall for the three year term the GST = 0.66.⁸ This
20 demonstrates that the proposed AIM program is cost effective in its second and third year,
21 but not in its first year or when considered over the three year course of the plan. Though not

⁷ Attachment SRE-3 Liberty response to Staff 2-039 (c) "Liberty will not be providing this type of platform for public access viewing."

⁸ 2021-2023 Triennial Plan at Bates 831, 834, 837, 840, respectively.

1 addressed specifically in the filing, it is likely that the initial startup costs, combined with the
2 lead time needed from approval to initial implementation late in 2021 result in very low cost-
3 effectiveness in the first year. This, in turn, has a significant downward impact on the overall
4 GST for the three-year term.

5 **Q. Are you aware of any way in which the GST results could be improved to demonstrate**
6 **cost-effectiveness?**

7 A. Yes. Initially, Staff was concerned that the AIM program proposal might be considered as an
8 intake or marketing component of the HPwES program because it seemed that a likely result
9 of the thermal imaging information being provided to customers would be that the customers
10 would participate in the HPwES program to make cost-effective energy efficiency
11 improvements to their homes. In response to discovery, the Company demonstrated that if
12 the costs of the AIM program are included within the overall costs of the HPwES program
13 the HPwES program remains cost effective. On its own, the HPwES program has a Granite
14 State Benefit-Cost Test (GST) value of 1.82 for the term. Including the AIM program costs
15 into the HPwES program, reduces the GST value to 1.58 for the term. This demonstrates that
16 the AIM program *could* be considered as cost effective if its costs were included within the
17 HPwES program.⁹

18 **Q. Will the AIM program use a one-year measure life savings approach as you discussed**
19 **for the Company's other behavioral energy efficiency program – the HER program –**
20 **above?**

⁹ Attachment SRE-4 Liberty response to Staff 2-047. The table provided shows the HPwES program is cost effective (GST = 1.82) over the term standing alone or with the costs of the AIM program included in HPwES (GST = 1.58).

1 A. The Company's plan did not make it clear if the AIM program proposal will also use a one-
2 year measure life savings approach as it has proposed for the HER program. The Company
3 has said that in many respects the AIM program is "just like" the HER program, but will
4 differ mainly in the type of information it will provide to a different, non-overlapping group
5 of participating customers. Staff recommends that for consistency and simplicity in the
6 behavioral energy efficiency programs, that the AIM program also use a one-year measure
7 life savings approach.

8 **Q. What is Staff's recommendation regarding the AIM program?**

9 A. Though the AIM program does not, by itself, demonstrate that it is cost effective over the
10 first three-year term, the program *could* be considered cost effective if it was included within
11 the HPwES program and therefore *could* be offered as part of the Triennial Plan. It is Staff's
12 understanding that the Company prefers to offer the program separately, as doing so may
13 help demonstrate the stand-alone cost-effectiveness of this entirely new program effort. Staff
14 recommends that the Commission allow Liberty Gas to offer the AIM program conditioned
15 on the Company conducting an impact evaluation of the program within one year of the end
16 of the first three-year term demonstrating that the program's cost effectiveness, for use in
17 evaluating the program for inclusion in the next three-year plan. Further, Staff recommends
18 that the impact evaluation of the program be done by an independent evaluator (not
19 associated with MyHeat), and that the evaluation control for likely increased participation in
20 the HPwES program by the AIM treatment group as not doing so would likely result in
21 double-counting of energy savings by AIM participants who also participate in HPwES.

22 **Q. Please discuss the Home Energy Assistance (HEA) program and any proposed changes**
23 **in the 2021-2023 plan.**

1 A. The HEA program provides energy efficiency improvements – products and services – to
2 income-eligible households at no cost to program participants. The program works to reduce
3 customer energy costs, reduce energy burdens and address weatherization services waiting
4 lists at New Hampshire’s Community Action Agencies (CAAs). The CAAs are the major
5 program delivery avenue for the HEA program as their service connection to low income
6 households through other income-eligible programs such as LIHEAP (Fuel Assistance) and
7 EAP (SBC-funded electric bill discount program) provides an efficient method for
8 determining program eligibility.

9 **Q. Are there any specific changes proposed for the program that you wish to bring to the**
10 **Commission’s attention?**

11 A. The plan includes several proposed changes including:

- 12 1. Introducing new “on ramps” to program participation which may include visual
13 audits, standalone appliance vouchers, and distribution of energy efficiency kits;¹⁰
- 14 2. New EE measures in the program including: clothes washers and dryers,
15 dehumidifiers, heat pump water heaters (HPWHs), and air conditioning equipment;¹¹
- 16 3. Increasing the spending limit per HEA household/project from \$8,000 to \$20,000.¹²

17 **Q. Is Staff supportive of the proposed changes?**

18 A. Staff is supportive of the inclusion of new pathways for program participation and additional
19 measures, but not the significant increase in the spending limit per household. The plan
20 states that “[t]he increased incentive cap of \$20,000 will ensure more homes are addressed
21 comprehensively, consequently driving energy savings in HEA.” Based on information

¹⁰ 2021-2023 Triennial Plan at Bates 129.

¹¹ Id.

¹² Id. at Bates 128.

1 provided in discovery¹³, Staff estimates that the *average* actual 2019 HEA project was
2 roughly \$4,400 with the program's current \$8,000 project cap. Increasing the project
3 spending limit from \$8,000 to \$12,000 would provide the opportunity to make all cost
4 effective improvements at over 80% of projects. Staff recommends an increase of \$4,000 in
5 the project spending limit to balance the ability for CAAs to make additional cost effective
6 investments at *most* projects while ensuring sufficient funds are available to provide services
7 at *more* residences.

8 **Q. Does the 2021-2023 Triennial Plan include plans to invest in Workforce Development?**

9 A. Yes. Chapter 9 of the Plan¹⁴ provides information on the general plan to invest in workforce
10 development activities, which will include issuance of an RFP to engage a "lead vendor
11 responsible for designing and implementing a Workforce Development Strategy that supports
12 the NH Utilities workforce development plans."¹⁵

13 **Q. Is it appropriate that the Plan include funding for these Workforce Development**
14 **activities?**

15 A. Yes it is. In 2019, a statutory change added language to RSA 374-F:3, VI stating that
16 "[e]nergy efficiency programs...shall also include funding for workforce development to
17 minimize waiting periods for low-income energy audits and weatherization." So, it is
18 appropriate that the utilities have given consideration to this and are endeavoring to address
19 workforce issues.

20 **Q. Does the Plan include an annual budget for these Workforce Development activities?**

¹³ Attachment SRE-5 Response to Staff 1-021 and Attachment SRE-8 Response to Staff 2-014.

¹⁴ 2021-2023 Triennial Plan, Chapter Nine Workforce Development at Bates 201.

¹⁵ Id.

1 A. In response to discovery, the utilities provided additional detail and stated that the Workforce
2 Development funding will come from the Residential and C&I Education budgets for each
3 utility. This budget category also supports other customer education activities such as Button
4 Up workshops¹⁶, K-12 Education and Building Operator Certification courses¹⁷. The total
5 amount included in the Education Budgets over the term for all utilities is approximately \$5.6
6 million¹⁸. While there is not a specific amount directed to the Workforce Development
7 activities, the plan suggests that the utilities will devote significant resources to help ensure
8 success of the planned EE investments.

9 **Q. Is there a general indication of the tasks that the lead vendor will be responsible for?**

10 A. Yes, the plan includes a framework of goals, which will require more detailed development
11 when this Triennial Plan is approved and the RFP is developed. The framework includes the
12 following workforce development goals:

- 13 1. Identification of Workforce Development Needs.
- 14 2. Coordinate Implementation of New and Existing Training and Workforce
15 Development.
- 16 3. Coordinate Activities to Retain Existing Energy Efficiency Workers.
- 17 4. Coordinate Activities to Recruit Entrants to the Energy Efficiency Workforce.

18 **Q. Does Staff support the Plan's proposed investments in Workforce Development?**

19 A. Generally speaking, yes. Staff understands the need for both an educated and trained
20 workforce and educated and informed consumers of energy efficiency products and services
21 as integral components of the success of the overall Triennial Plan. As discussed above,

¹⁶ <https://nhsaves.com/events/button-up-workshop-february/> for example.

¹⁷ <https://www.lccc.edu/programs-training/trainings-a-z/energy-services-and-technology/building-operator-certification/> for example.

¹⁸ Attachment SRE-6 Response to Staff 1-043 regarding Workforce Development budgets.

1 there are still many details to be worked out but as the overall Education Budget is included
2 in the total plan costs which have been demonstrated to be cost effective using the Granite
3 State Test. Staff supports this aspect of the plan, and recommends approval of the Education
4 and Workforce Development components of the Plan. Staff recommends that non-utility
5 stakeholders be involved in the development of the RFP for, and selection of, the lead vendor
6 responsible for developing the detailed workforce development activities.

7 **Q. Please summarize the observations and recommendations in your testimony.**

8 In my testimony I have supported the change to a one-year measure life savings approach in
9 the HER programs proposed by Liberty Electric and Gas and by Unitil Electric and Gas. I
10 also recommend that these programs be the subject of an external impact evaluation to verify
11 the first-year savings estimates. Currently the programs use savings estimates produced by
12 the program implementation contractor and an external evaluation is critical to support the
13 savings estimates. I recommend approval of Liberty Gas' proposed AIM program because it
14 *could* be shown to be cost-effective if its costs were included as a marketing/intake effort
15 within the Company's HPwES program. The AIM program was not demonstrated to be cost-
16 effective on its own, but it is an innovative new program which has potential to provide
17 useful information to customers and improve customer engagement with the HPwES
18 program. I recommend that the AIM Program also have an impact evaluation as soon as is
19 practical to estimate actual program savings. I recommend that the HEA program per project
20 cap be increased from the currently approved \$8,000 to \$12,000. This is a significant
21 increase and would provide the opportunity to perform all cost effective weatherization at
22 approximately 80% of all projects rather than 65% of all projects covered by the current
23 \$8,000 cap. Finally, I recommend approval of the proposed Workforce Development and

1 Education plans and that non-utility stakeholders be involved in the selection of a vendor for
2 workforce development activities.

3 **Q. Does this conclude your testimony?**

4 A. Yes.

Qualifications of Stephen R. Eckberg

My name is Stephen R. Eckberg. I am employed as a Utility Analyst with the Electric Division of the New Hampshire Public Utilities Commission. My business address is 21 S. Fruit Street, Suite 10, Concord, New Hampshire 03301.

I earned a B.S. in Meteorology from the State University of New York at Oswego and an M.S. in Statistics from the University of Southern Maine.

After receiving my M.S. degree, I was employed as an analyst in the Boston office of Hagler Bailly, Inc, a consulting firm working with regulated utilities to perform evaluations of energy efficiency and demand-side management programs. Subsequently, I was employed as a Statistical Applications Programmer at UMass Lowell supporting epidemiology research projects in the Work Environment Department. From 2000 through 2003, I was employed at the NH Governor's Office of Energy and Community Services (now the Office of Strategic Initiatives) as the Director of the Weatherization Assistance Program. Following that, I was employed at Belknap Merrimack Community Action Agency as the Statewide Program Administrator of the NH Electric Assistance Program (EAP). In that capacity, I presented testimony before the NH Public Utilities Commission in dockets related to the design, implementation and management of the EAP. I have also testified before Committees of the New Hampshire General Court on issues related to energy efficiency and low income electric assistance. From 2007 – 2014 I was employed as a Utility Analyst with the New Hampshire Office of the Consumer Advocate (OCA). During my tenure with the OCA, I attended regulatory training at New Mexico State University's Center for Public Utilities.

In my position with the OCA, I entered pre-filed testimony in the following dockets

- DG 08-048 Unitil Corporation and Northem Utilities, Inc. Joint Petition for Approval of Stock Acquisition (Joint w/ K. Traum)

- DW 08-070 Lakes Region Water Company Financing & Step Increase (Joint w/ K. Traum).
- DW 08-098 Aquarion Water Company of New Hampshire (Joint w/ K. Traum).
- DE 09-035 Public Service of New Hampshire Distribution Service Rate Case (Joint w/K. Traum).
- DT 07-027 Kearsarge Telephone Company, Wilton Telephone Company, Hollis Telephone Company & Merrimack County Telephone Company Petition for Alternative Form of Regulation. Phase II & Phase III.
- DW 08-073 Pennichuck Water Works, Inc. Petition for Rate Increase.
- DW 08-070 Lakes Region Water Company Third Step Increase.
- DW 08-065 Hampstead Area Water Company Petition for Rate Increase.
- DE 09-170 2010 CORE Energy Efficiency Programs.
- DW 10-090 Pittsfield Aqueduct Company Petition for Rate Increase.
- DW 10-091 Pennichuck Water Works Petition for Rate Increase.
- DW 10-141 Lakes Region Water Petition for Rate Increase.
- DE 10-188 2011-2012 CORE and Natural Gas Energy Efficiency Programs.
- DE 11-250 PSNH Installation of a Wet Flue-Gas Desulphurization Scrubber.
- DE 12-262 2013-2014 CORE and Natural Gas Energy Efficiency Programs.
- DE 12-292 PSNH 2013 Energy Service Rate.
- DE 12-262 2014 CORE Energy Efficiency Programs Update Filing.
- DE 13-108 PSNH 2012 Energy Service Reconciliation.
- DG 14-091 Liberty Utilities Special Contract and Lease Agreement with Innovative Natural Gas, LLC dba iNATGAS.

In August 2014, I joined the PUC's Sustainable Energy Division. While employed there, I filed testimony in:

- DE 18-140 Liberty Utilities Petition for Approval of a Renewable Natural Gas Supply and Transportation Contract.

In 2019, I joined the PUC's Electric Division. Since joining the Electric Division I have filed testimony in:

- DE 17-136 2018-2020 New Hampshire Statewide Energy Efficiency Plan - 2020 Third Year Programs.
- DE 19-197 Development of a Statewide, Multi-Use Online Energy Data Platform (Joint Direct and Rebuttal Testimony with Jason Morse).

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-092

Date Request Received: 10/05/2020

Date of Response: 10/19/2020

Request No. STAFF 2-046

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Mary Downes

Request:

UNITIL: Reference response to Staff 1-027. The response shows that the planned Measure Life (ML) is 2.74 years for both the Electric and Gas HER program. Please explain why Unitil does not also plan to transition to a one year savings approach as does Liberty per the plan at Bates 161-162.

Response:

Unitil intends to report savings using a measure life of 1 year for 2020.

The response to Staff 1-027 shows planned savings as filed in each for 2018, 2019 and 2020. When Unitil files its 2020 annual report, it will report HER savings using a 1 year measure life, in which persistence savings that was originally anticipated to occur in program years 2021 and 2022 is not claimed.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-092

Date Request Received: 10/05/2020

Date of Response: 10/19/2020

Request No. STAFF 2-039

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Eric Stanley

Request:

LIBERTY: At Bates 164, footnote 57 provides a link to <http://myheat.ca> which appears to be the Company that Liberty intends to work with to implement the proposed AIM program. Please respond to the following:

- a) Have any of Liberty's utility affiliates engaged with this company to implement a similar program in the US or Canada? If so, please provide details.
- b) Please provide copies of all EM&V studies performed for utility EE programs (as distinguished from research or marketing material produced by myHeat) that Liberty is aware of that support behavioral savings estimates, program savings attribution, and estimates of savings persistence (savings lifetime).
- c) Is the Company's intent to provide a website and information similar to those available for various cities in Canada that are available at <https://heat.myheat.ca/> ?

Response:

- a) No other Liberty affiliates have engaged with the company yet to implement a similar program in the U.S. or Canada.
- b) Attachment Staff 2-039 A is a comprehensive listing of EM&V studies performed for utility EE programs Liberty is aware of regarding behavioral savings estimates, program savings attribution, and estimates of savings persistence. Attachment Staff 2-039 B is a study Liberty is aware of that specifically incorporates the examination of infrared images on behavioral savings, attribution and persistence.
- c) As described on Bates page 166, Liberty will provide customers a visual HEAT Map depiction and HEAT Rating of their home via a private access code protected web-based platform, where customers can view the heat loss details for only their home. The website and information for various cities in Canada that are available at <https://heat.myheat.ca/>, which allows any viewer to look up detailed profiles for any and all homes within a geography is considered MyHeat's public access platform. Liberty will not be providing this type of platform for public access viewing.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-092

Date Request Received: 10/05/2020

Date of Response: 10/19/2020

Request No. STAFF 2-047

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Eric Stanley

Request:

LIBERTY: Please provide an analysis which includes the costs and energy savings of the AIM program in the Liberty Gas HPwES program. How would doing so change the B/C ratio of the Liberty Gas HPwES program?

Response:

The table below shows the Granite State Test (GST), Utility Cost Test (UCT), and Granite State Test #2 (GST-2) for the Liberty Gas HPwES program with and without the AIM program costs and energy savings included.

Year	HPwES (no AIM)			HPwES + AIM Included		
	GST	UCT	GST-2	GST	UCT	GST-2
2021	1.70	1.47	1.90	1.27	1.10	1.45
2022	1.81	1.56	2.02	1.69	1.46	1.91
2023	1.91	1.63	2.12	1.79	1.54	2.02
Term: 2021-2023	1.82	1.56	2.02	1.58	1.36	1.79

When looking at the Term 2021–2023 period, the GST, UCT, and GST-2 ratios decline by 13%, 12%, and 11% respectively when including the costs and energy savings of the AIM program. However, the GST, UCT, and GST-2 ratios are still well above 1.0 when including the AIM program costs and energy savings. See Excel Attachment Staff 2-047 for the complete backup data.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-092

Date Request Received: 09/17/2020

Date of Response: 10/01/2020

Request No. STAFF 1-021

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Katherine W. Peters, Mary Downes, Eric Stanley, Carol Woods

Request:

Reference Bates 128 regarding the proposed increase in HEA project incentive maximum from \$8,000 to \$20,000. Please provide data and explanation supporting this value as the appropriate project cap. In other words, why this value rather than \$12,000, \$15,000 or some other value?

Response:

The \$20,000 cap was chosen to cover the majority of HEA projects that are projected in 2020. An in-depth analysis of statewide data showed that 95% of the HEA projects could be completed using a cap of \$20,000.

Cap	Count	Percentage
\$8k	882	65%
\$12k	1113	82%
\$15k	1178	86%
\$20k	1297	95%
>\$20k	68	5%

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-092

Date Request Received: 09/17/2020

Date of Response: 10/01/2020

Request No. STAFF 1-043

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Katherine W. Peters, Mary Downes, Eric Stanley, Carol Woods

Request:

Reference Bates pp. 20 and 201-205 regarding workforce. Please provide a summary of the costs associated with the workforce development by year by utility by program

Response:

Workforce development will be an important focus in 2021-2023. The NH Utilities intend to develop a more formal workforce development plan as soon as practicable during the term as described in Chapter 9. Funding for workforce development efforts will come from the Residential and C&I Education budgets from each utility. The education budgets will also support customer education activities such as Button Up workshops, K-12 Education and Resources and Building Operator Certification. Exact allocations between workforce development and these related activities have not been made to date, as workforce development needs and strategies will continue to develop and education and training opportunities may evolve. Eversource and the NH Electric Co-Op did include additional workforce development and training costs as part of the Home Energy Assistance program. Education budgets and HEA allocations are combined in the charts below.

	2021		2022		2023	
	Residential	C&I	Residential	C&I	Residential	C&I
Eversource	\$1,655,573	\$230,107	\$705,547	\$298,389	\$770,806	\$386,906
Liberty Electric	\$39,800	\$32,960	\$45,424	\$44,746	\$54,434	\$58,186
NHEC	\$195,742	\$46,435	\$98,283	\$48,514	\$68,048	\$22,670
Unitil Electric	\$26,950	\$57,500	\$31,574	\$69,056	\$30,721	\$79,733

	2021		2022		2023	
	Residential	C&I	Residential	C&I	Residential	C&I
Liberty Gas	\$60,174	\$60,600	\$65,127	\$65,171	\$71,047	\$70,615
Unitil Gas	\$26,800	\$25,550	\$26,925	\$29,056	\$18,573	\$30,486

Public Service of New Hampshire d/b/a Eversource Energy

Docket No. DE 20-092

Date Request Received: 10/06/2020

Date of Response: 10/20/2020

Request No. STAFF 4-001

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Mary Downes

Request:

Reference Staff 1-027 and Staff 1-028. Please provide the reports and live spreadsheets provided by the consultant that supports the following:

- a. The control and treatment group data and the resulting savings estimates using a 3 year (or greater than 1 year) measure life. Please provide the contractor's full analysis.
- b. The calculations (and the supporting data) that switched from a 3 year measure life to a 1 year measure life. In other words, the basis for the savings estimates in the draft 2021-2023 plan that used a 3 year measure life and also the basis for the savings estimates for the one year measure life.
- c. Historical data used for calculating planned and actual savings in the 2018-2020 plan years, including the primary evaluation data for the treatment and control groups.

Response:

- a. The savings estimates for a three year measure life for the 2018-2020 term is based on the implementation vendor's extensive experience running behavior programs across North America, and is not based on NH specific control and treatment group data. The explanation of how the multi-year measure life savings analysis is derived is attached as Attachment Staff 4-001 A.
- b. Behavior programs that are established with a one year measure life compare billed energy usage between a treatment group and a control group to derive reportable or "measured" annual energy savings. However, Liberty's and Unitil's behavior programs, which were modeled upon the HER program proposed by Eversource and approved by the Commission, were established with a three year measure life, in which measured first year savings were assumed to persist for two additional years (hence a 3 year measure life). In years two and three, the kWh and/or MMBtu "measured" savings is a combination of already claimed persistence savings and newly occurring "annual" savings. The basis for savings estimates for 2021-2023 use a one year measure life, but take into account the persistence already claimed from when savings estimates used a three year measure life in the previous triennium. See Attachment Staff 4-001 B for an explanation from the implementation vendor on how this was accomplished, as well as tables showing savings projections using a 1 year and multi-year measure life for Unitil and for Liberty respectively.
- c. There is no "historical data" used by the implementation vendor for planning for 2018-2020. The actual savings are based on a comparison of billing data between the treatment and control groups using the industry standard randomized control trial method as described in Attachment Staff 4-001 C. The primary evaluation data for the treatment and control groups for calculating actual savings for 2018-2020 for Unitil and Liberty was received from our implementation vendor on October 20th and needs to be converted to a usable format (e.g., MS Excel) before being transferred via a secure file transfer protocol to Staff.

000023

F.1 Measurement and Verification Methodology

Oracle uses the following five steps to implement randomized controlled trials to measure savings:

1. Identify eligible households using data requirements and other characteristics, as specified by the given utility
2. From this pool of eligible households, randomly assign participants to control and treatment groups
3. Verify statistical equivalency between the groups
4. Deploy reports to the treatment group to administer the program
5. Measure the ongoing difference in energy use between the control and treatment groups before and after Program communications begin arriving at customers' homes to calculate the difference usage between the groups, which is the energy savings specifically attributable to Opower's Program.

This approach enables us to provide information on how our program affects customers':

- Electricity usage in kWhs (or other desired unit of measure)
- Natural gas usage in therms (or other desired unit of measure)
- Participation in other energy-efficiency, demand-response, and dynamic-pricing programs

Please refer to Figure F-1 for an overview of our M&V methodology.

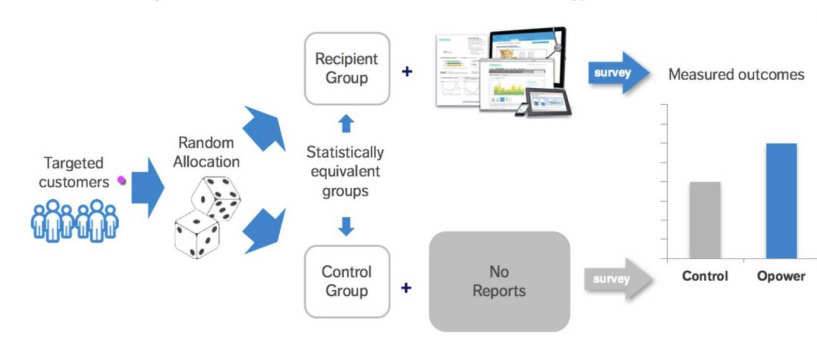


FIGURE F-1: M&V METHODOLOGY

1. Identify Eligible Households: Use data requirements and program design considerations to screen households.
2. Setup Test and Control: Identify and divide eligible households into statistically equivalent groups.
3. Verify Groups: Verify no historical difference in usage between test and control groups.
4. Deploy Communications: Send materials to test group only, observe usage for control group participants.
5. Measure Impact: Compare differences in average energy usage across both groups.

Oracle's approach has been carefully designed to avoid other flawed M&V methodologies that attempt to count savings from behavior-based programs. These flawed methodologies include:

- Pre-post Analysis – Comparing a household to itself over time creates significant likelihood of bias in savings estimates, which reduces their accuracy.
- Self-selection or Opt-in – Opt-in designs are likely to either: 1) introduce bias issues and reduce the likelihood of statistical equivalency between control and treatment groups, or 2) reduce program scale so that statistically significant results cannot be determined through Experimental Design.

- Self-reporting or Surveys – Surveys cannot establish causation—only correlation—and are less accurate due to propensity for survey-response and attribution bias.

F.2 Working with Independent Evaluators

Oracle is happy to provide program data to an independent evaluation contractor, as we have done for many of our other utility clients. The standard data that we package for independent evaluators includes:

Customer identification

- Opower customer identifier
- Utility customer identifier

Billing information

- Billing period end date (include billing data 1 year prior to program launch)
- Duration of billing period
- Fuel Type
- Energy usage (kWh or therms) during billing period
- Indicator of estimated read

Subscription information

- Test/control indicator
- Program start date
- Opt-out date
- Move-out date

F.3 Persistence

After years of evaluations designed to understand if Opower HER programs deliver energy savings, the validity of behavioral energy efficiency savings is now widely accepted.

Post-treatment persistence of savings has also been well documented in eleven independent evaluations that cover four separate program deployments, citations for which can be found in the Evaluations section below. These studies indicate that a proportion of HER savings persist for at least two years, provided that reports were consistently delivered for at least two years. This persistence is the result of accumulation of what Allcott and Rogers refer to as “capital stock” of energy-saving habits and hardware investments that continue to deliver savings after program suspension. Across each of the four deployments that ran for at least two years prior to suspension, a portion of savings persists into the second year of suspension.

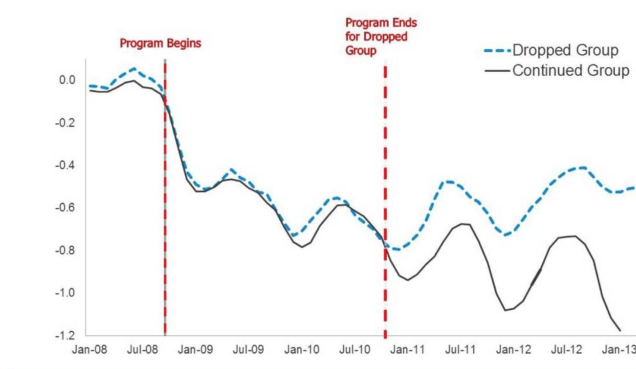


FIGURE F-2: POST-TREATMENT SAVINGS

Figure F-2 is a graphical representation of post-treatment savings. In this program, customers received reports for two years, and then a portion of the recipient customers stopped receiving reports. Once the reports were suspended for the "Dropped Group", savings began to decay gradually, while the "Continued Group" continued to save.

The Cadmus Group published a paper in October 2014, which, among other things, summarizes many of the persistence studies and evaluations of Opower HER programs; Figure F-3 shows the annual decay rates that were observed in these studies.

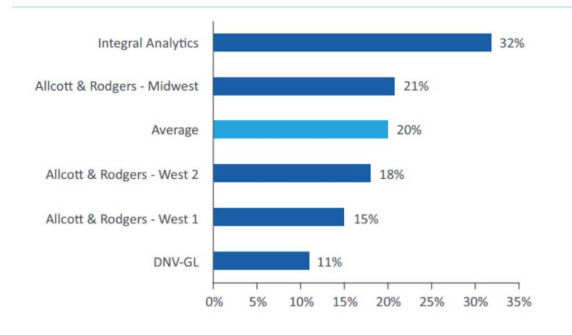


FIGURE F-3: ESTIMATED ANNUAL DECAY RATES (AFTER 2 YEARS OF RECEIVING HERs)

For simplicity, Cadmus recommends assuming a 20% annual decline rate to calculate persistence from future HER programs.

Measure Life & Accounting Implications

The next question that tends to arise is: if savings persist for customers who have stopped receiving reports, then what is the appropriate measure life to assume for an HER program? The measure life for an HER program is a little different than it would be for installed measures because savings decay gradually over time for the HER program, while most installed measures simply assume a single deemed savings value for a certain number of years. Therefore, the measure life of an HER program is actually defined as the lifetime savings divided by the annual savings in a given year (and it will vary over time). There is currently precedence for one-year measure life as well as assuming 2, 3, or 4 years of persistence in different jurisdictions. This is primarily determined by the utility and regulator based on local precedent, availability of persistence data, and policy objectives.

Utilities in NH have included 3 years of persistence at a 20% decay rate. Figure F-4 below depicts the savings accounting breakdown associated with this method. Note that the savings numbers are for illustration purposes only. The first year of savings on a per household basis would look like what is shown in Figure F-4, where "Annual Y1 kWh" refers to the average savings per household that we measure via RCT in the first year of the program, and "Persistence Y1 kWh" refers to the average persistence savings attributable to the first year of the program, assuming 3 years of persistence at a 20% decay rate.

Docket No. DE 20-092
Data Request Staff 4-001
Dated 10/06/2020
Attachment Staff 4-001 A
Page 4 of 5

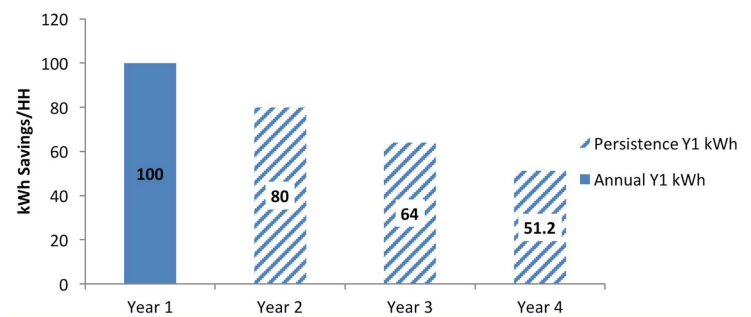


FIGURE F-4: SAVINGS BREAKDOWN

For year one, the savings that would be claimable towards the annual goal would be 100 kWh per household, and the lifetime savings would be 295 kWh per household. This would mean that in year 1, this program would have a measure life of 2.95.

During year 2 of program treatment, the savings would likely look like the green solid and dashed bars in Figure F-5. Notice in Figure F-5 that the overall savings per household we expect to measure in year 2 are higher overall than in year 1 due to the standard program ramp, but the “Annual Y2 kWh” savings that the utility would be able to count towards the annual target are lower. This is because the persistence savings that have already been claimed towards year 1 lifetime savings are subtracted to ensure clear accounting and no double counting of savings. Therefore, for year 2, the utility would count 75 kWh/hh towards their annual target and 262 kWh/hh towards the lifetime savings. Notice that in year 2 the measure life for the program would increase to 3.50.

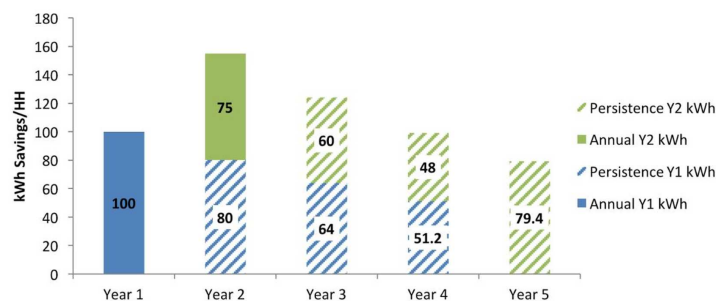


FIGURE F-5

Thus, using a multi-year measure life accounting approach decreases the amount of savings that a utility can claim toward its annual goals, but increases the overall lifetime savings for the program.

Figures F-6 and F-7 show the annual and lifetime allocation of savings for the NH program we've proposed.

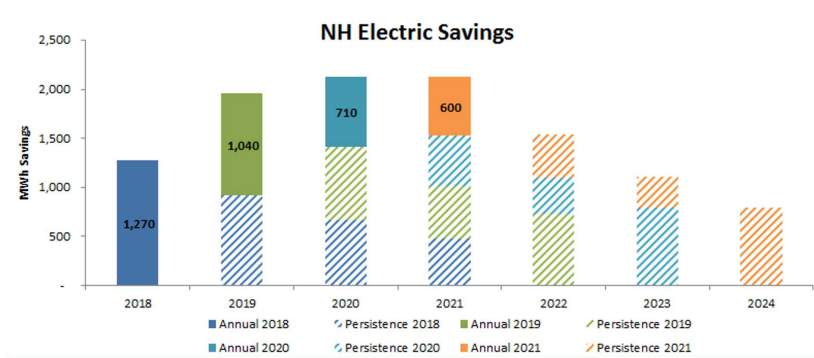


FIGURE F-6: NH ELECTRIC SAVINGS

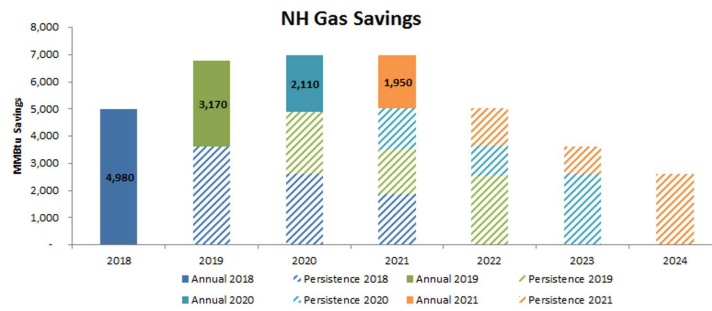


FIGURE F-7: NH GAS SAVINGS

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-092

Date Request Received: 10/05/2020

Date of Response: 10/19/2020

Request No. STAFF 2-014

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Katherine W. Peters, Mary Downes, Eric Stanley, Carol Woods

Request:

Please provide a list of all the contractors that are pre-qualified. For 2019 for each contractor, please provide the total revenues paid to each contractor, the number of projects, and the number of facilities or households served by the contractor.

Response:

In the context of this question, the NH Utilities understand "contractors" to mean companies that install energy efficiency measures at a customer site. The only programs that require customers to utilize pre-qualified contractors are HEA and HPwES.

Excel Attachment Staff 2-014 contains the list of qualified contractors, the amounts paid to each and the number of customers served. The project management system used for these programs does not track the number of projects, facilities or households individually. They are just tracked as number of customers served.

Program	Contractor	Projects	Payments
HEA	Belknap-Merrimack Counties CAP	604	\$1,672,378.57
HEA	CLEARResult	94	\$44,555.70
HEA	Resilient Buildings Group, Inc.	108	\$208,688.00
HEA	Southern NH Services	756	\$3,557,048.06
HEA	Southwestern Community Services Inc	181	\$843,984.94
HEA	Strafford County Community Action Weatherization	279	\$1,837,431.92
HEA	Tri-County Community Action	264	\$1,868,239.70
HPwES	A+ Energy Services	48	\$166,504.92
HPwES	ABC Energy Savings LLC	50	\$165,246.27
HPwES	Build Basic Green	6	\$14,955.20
HPwES	Building Alternatives	16	\$43,930.09
HPwES	CLEARResult	517	\$295,734.12
HPwES	Earthshare Construction LLC	8	\$29,134.24
HPwES	Efficient Home Services, LLC	5	\$23,157.60
HPwES	HomeLock Construction/ Christopher Hayward	3	\$11,910.05
HPwES	Invictus Spray Foam	3	\$6,535.70
HPwES	J MYERS BUILDERS, Inc	37	\$98,308.77
HPwES	Mill City Energy	569	\$278,623.51
HPwES	Newell & Crathern, LLC	292	\$759,105.43
HPwES	P&M Installed Building Solutions	14	\$42,234.41
HPwES	Quality Insulation-Meredith	130	\$377,111.05
HPwES	Quality Insulation-Nashua	119	\$273,342.21
HPwES	Romik Developers, LLC	10	\$31,555.87
HPwES	Shakes to Shingles	56	\$200,839.51
HPwES	Simplified Green Homes	5	\$18,005.65
HPwES	Tri-County Community Action	5	\$11,301.37
HPwES	Turn Cycle Solutions, LLC	160	\$482,755.21
HPwES	Yankee Thermal Imaging	183	\$484,560.46