



January 13, 2023

REPORT ON ENERGY EFFICIENCY PLANNING, PROGRAMMING, & EVALUATION

State of New Hampshire
Public Utilities Commission



Introduction

The New Hampshire 10-Year State Energy Strategy and RSA 374-F:3, VI-a make clear that cost-effective energy policies are a key priority for the State, including cost-effective energy savings from investments in Energy Efficiency (EE). As the regulator responsible for oversight of the Granite State's ratepayer-funded EE planning, programming, and evaluation, the Public Utilities Commission (Commission) is responsible for ensuring that EE investments return the maximum benefits for all classes of ratepayers. The goal of this study was to provide the Commission and the participants, including state policymakers, with increased clarity of key EE topics and the impact on Granite Staters. The utilities, Office of Consumer Advocate, and Department of Energy were active participants in this investigation and provided thoughtful responses and insights pertaining to the Commission's inquiries.

Report Highlights

- *Of the \$61.6 million spent on contractors in Program Year 2021, approximately 48% or \$29.6 million was spent on contractors with a New Hampshire business address. The portion of this total in the form of customer rebates could not be determined.*
- *Subsidies provided to program participants typically pay over half of an EE project's costs. Some projects receive a 100% cost subsidy.*
- *The utility program administrators are paid a performance incentive (PI) beginning at a 65% threshold of planned metrics to a maximum 125% of planned metrics.*
- *Annual expenditures on statewide EE planning, programming, and evaluation have grown from \$32 million in 2016 to \$78.2 million in 2021, a 144% increase.*
- *The discount rate, which is used to evaluate the present value of planned capital investments and benefits, was negative when calculated in November 2022.*
- *The statutory tests used to determine cost-effectiveness of New Hampshire's EE programming are unique to the State, do not appear to align with industry norms regarding symmetrical balancing of costs and benefits, and are primarily based on predictions, not observational data.*
- *The Home Energy Assistance (HEA) program for income-eligible customers constitutes nearly 20% of program expenditures while generating 2.5% of the electric benefits. Some HEA measures are not cost-effective under applicable benefit-to-cost tests. No analysis has been done to determine the impact of HEA program on the energy expenditures of individual participants.*
- *Identifying how market barriers are and will be addressed through cost-effective EE opportunities remains a topic of further inquiry.*

Executive Summary

New Hampshire's EE program was established as a part of the restructuring of the New Hampshire electric energy market in the 1990s. The General Court authorized revenue raised by the System Benefits Charge (SBC) to be utilized to fund the removal of barriers to investments in EE assets, with the goal of reducing energy demand and the price of electricity. The EE Program has undergone changes since its inception over 20 years ago, but the same objective remains. Ratepayer-funded EE in New Hampshire is administered by the State's rate regulated electric¹ and natural gas² distribution utilities and the New Hampshire Electric Cooperative Inc. (NHEC Electric), (together, the "Utilities"). For more information on the history of the EE Program, see Annex A.

As markets transform, opportunities arise to shift resources to areas where market barriers continue to exist. This shift is critical to ensure that ratepayer-funded EE investments generate the greatest possible return by lowering the energy expenditures of individual ratepayers. Such repositioning of resources requires an understanding of the current offerings of the EE plan, how investments are analyzed, and the impacts on energy bills. This is particularly true when considering the impact that investments have on the energy expenditures of low-income households. Ensuring that all Granite Staters benefit from EE investments funded by all ratepayers is central to the success of this analysis.

The Commission shares the General Court's and New Hampshire 10-Year State Energy Strategy's perspective that cost-effective ratepayer-funded EE investments have a critical role to play in the State's efforts to reduce the energy expenditures of Granite Staters. As the regulator responsible for overseeing and guiding the EE programs, the Commission is tasked with ensuring that the programs produce the General Court's desired policy impact. As part of its ongoing oversight, the Commission investigated eight topics of EE planning, programming, and evaluation to facilitate a public, transparent and open examination of New Hampshire's existing EE planning, programming, and evaluation. This process fostered a more comprehensive understanding of how the EE investments and benefits are determined. The investigative process launched by the Commission was designed to be educational and informative and to engage stakeholders in an open, overarching, and collaborative approach. This report contains no binding directives nor indicates how the Commission might rule in any future adjudicative proceeding.

The following report provides an overview of the results of the Commission's independent investigation into these eight key EE topics. A summary of each topic is provided below:

¹ Public Service Company of New Hampshire d/b/a Eversource Energy (Eversource Electric), Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty (Liberty Electric), Unitil Energy Systems, Inc. (Unitil Electric), together the Electric Utilities

² Northern Utilities Inc. (Unitil Gas) and Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty (Liberty Gas), together the Gas Utilities

Topic 1 – The Granite State Test, the Total Resource Cost Test, and Discount Rates

Granite State Test (GST) and New Hampshire Total Resource Cost Test (NHTRCT)

The GST and the NHTRCT are benefit-to-cost tests used to evaluate the cost-effectiveness of EE programs. Both tests rely on assumptions for projected costs avoided by EE improvements from the *Avoided Energy Supply Cost Study for New England* (AESC Study) developed by Synapse Energy Economics, Inc. The AESC Study primarily uses predictive analyses to estimate EE savings. State-specific data measuring the impacts of NH's EE programs does not appear to have been collected in a manner for use in determining avoided costs since the inception of the programs.

Today, the GST is the primary test used to determine the cost-effectiveness of EE programs pursuant to RSA 374-F:3, VI-a(d)(4). The GST differs from the NHTRCT in that non-energy impacts of programs are no longer considered in the evaluation, except for programs offered to income-eligible customers. The NHTRCT includes an additional "add-on" to account for non-energy-related economic benefits.

Discount Rates

The discount rate is the rate of return used to discount future cash flows and net benefits back to their net present value to determine if an investment generates a positive return over its lifespan. Since today's dollars are generally more valuable than future dollars, discount rates are expected to be positive.

The discount rate used for EE programs today is the federal prime interest rate, adjusted for inflation. The 2021-2023 EE Plan utilized a 1.41% discount rate. Because the prime rate had fallen below the rate of inflation, when this formula was applied by the Utilities on November 30, 2022, the discount rate was calculated to be a negative figure. This formula was adopted in 1999 and has not been evaluated or updated since.

The GST and NHTRCT use a single discount rate to measure both benefits and the value of capital assets each year over the triennial planning period. The participants to this investigation disagreed as to whether or not the discount rate is a social discount rate or a capital discount rate.

Topic 2 – Performance Incentives

The Utilities earn a performance incentive (PI) annually for investments that achieve a minimum of between 65% and 75% and up to a maximum of 125% of planned metrics, such as lifetime energy savings and value. The PI in 2021 was \$4.3 million in total for all the Utilities, of which approximately \$1.4 million was based on performance below planned metrics, and approximately \$2.9 million for performance exceeding planned metrics.

Topic 3 – Impact on New Hampshire Economy

The Commission requested a breakdown of the Utilities' expenditures for contractor and consultant services between in State and out-of-state providers and a breakdown between separated expenditures for services from rebates. Of the \$61.6 million spent on contractors in Program Year 2021, approximately 48% or \$29.6 million was spent on contractors with a New Hampshire business address. The Utilities were unable to provide the information in a manner that separated rebate funding (which is a passthrough) from expenditures for services. Therefore, the Commission was unable to assess how expenditures for contractor services impact the NH economy versus other states and countries. The Utilities have retained a consultant to analyze the economic impacts of the EE program on the state with findings expected in early 2023.

Topic 4 – Subsidized Services and Equipment

In Program Year 2021, EE programming provided \$60.1 million in subsidized services and equipment, covering 56.9% of total project costs. The Utilities view the use of subsidies as a way to incentivize participants to invest in the most efficient EE investments; however, it remains unclear how to determine whether the level of subsidy was optimized to induce participants to increase their private expenditures on the most energy efficient investments.

Topic 5 – Market Barriers

The EE program was initiated to implement energy consumption reduction measures post electric utility restructuring as adopted by the General Court via RSA 374-F in 2001. Over 20 years later, analysis identifying what barriers exist and whether these barriers have been reduced or eliminated by EE programming is inconclusive.

While no uniform definition of “market barriers” exists in statute or has been adopted by the Commission, various participants to the investigation suggested definitions, following Commission requests, for consideration.

Topic 6 – Summary of Spending, Including Rebate Spending Recipient Groups/Locations

Actual EE program expenditures grew by 144% between 2016 and 2021. The Commission attempted to differentiate between rebate and service expenditures. The “Rebates and Services” spending category tracked by the Utilities represents the largest spending category in the programs. See aggregated figures as shown in Table 5 on page 17-18.

Topic 7 – Reporting on Income-Eligible Program Offerings

Pursuant to RSA 374-F:3, VI-a(c), a minimum of 20% of the ratepayer funds collected for EE program expenditures must be spent on income-eligible customers. The HEA program is a standalone program designed to meet this requirement.

The HEA program has the lowest cost-effectiveness of all EE programs, with two of the six Utilities' HEA programs costing ratepayers more than the benefits are estimated to return. The HEA program accounts for 2.5% of the total electricity benefits of the EE program while constituting nearly 20% of the costs.

The participants stated that the HEA program is structured to lower the energy bills of income-eligible ratepayers. The Utilities could not conduct an analysis of the energy used by income-eligible households. As such, no bill impact or cost benefit analysis has been provided showing how the HEA program impacts the energy bills of income-eligible ratepayers.

Topic 8 – Reporting to Other Regional or Regulatory Organizations

The Utilities share the goal of improving data access to the public, but caution that the costs must be weighed against the benefits.

Investigation Results

This report is organized into eight sections, each summarizing the results of the Commission's independent investigation into the key topical areas.

Topic 1 – The Granite State Test, the Total Resource Cost Test, and Discount Rates

For EE programs across the country, different benefit-to-cost tests have been developed to assess the cost effectiveness of conservation measures. The methodologies employed for these vary by the type of test and by test inputs based on the local jurisdiction. Some tests use only costs to the utility or participant. Other tests combine benefits and costs for both the utility and customer, as well as impacts to society at large. Different jurisdictions have employed different tests depending on the measure types, policy goals and program outcomes. New Hampshire has developed jurisdiction-specific tests through public stakeholder processes. These tests are required to be used in assessing the cost-effectiveness of EE program plans pursuant to RSA 374-F:3, VI-a(d)(4).

The use of discount rates is another important element in EE programs. Due to the extended cost recovery period needed to implement energy efficiency measures, discounting future net-benefits to a present value provides a means to evaluate projects that have different measure lives on an equal footing. When discount rates decrease, the present value increases. Conversely, when discount rates increase, the present value decreases.

The Granite State Test and the Total Resource Cost Test

The Utilities use benefit-to-cost ratios as a threshold test to determine whether a program can be included in the Statewide EE Plan. Historically, the NHTRCT was used. Starting in Program year 2020, the GST³ replaced the NHTRCT as the primary cost-effectiveness test in New Hampshire. The NHTRCT is now used as a secondary test to inform allocation decisions. The NHTRCT varies from the general, non-jurisdiction specific Total Resource Cost Test⁴ (TRCT) in that the NHTRCT does not include all utility system impacts from EE programs. The utility system benefits not included in the NHTRCT are: (i) avoided ancillary services; (ii) avoided credit and collection costs; (iii) increased reliability; and (iv) market transformation.⁵

³ See [2022–2023 Statewide EE Plan](#) section 5.3.1 (Docket No. DE 20-097 Exh. 47 at Bates pages 82–87).

⁴ See National Standard Practice Manual, Edition 1 (Spring 2017), Appendix A3 (at pages 131–32 of [RR 1-001A](#)).

⁵ In comparing GST with NHTRCT it should be noted no values were assigned to these in the GST metric, so for all practical purposes, these omissions from the NHTRCT have no bearing on how GST differs from NHTRCT.

The following is an algebraic description of the GST and NHRCT benefit calculations:

$$\mathbf{NHRCT\ Benefit} = \text{Total Electric Benefit (\$)} + \text{Total Non-Electric Resource Benefits} + \text{Total Non-Resource Benefits}$$

$$\mathbf{GST\ Benefit} = \text{Total Electric Benefits (\$)} + \text{Total Non-Electric Resource Benefit} + \text{Fossil Emissions Based on RGGI}^6$$

Where,

$$\text{Total Non-Resource Benefit} = \text{Fossil Emissions Based on RGGI} + \text{NEI Adder}^7$$

$$\mathbf{Therefore, GST\ Benefit} = \mathbf{NHRCT\ Benefit} - \mathbf{NEI\ Adder.}^8$$

Simply stated, the GST and the NHRCT benefits differ in only how they consider non-energy benefits estimated to be generated by the investments. For 2021, the Utilities assumed that the non-energy impact (NEI) benefits are 25 percent and 10 percent of total energy benefit (excluding water) for the residential and the Commercial and Industrial (C&I) sectors, respectively, and \$405.71 annually per weatherization project for income-eligible programs. It is unclear how these NEI adder amounts were developed. The GST and the NHRCT metrics do not appear to calculate or estimate the positive non-energy externalities that non-participants may benefit from in addition to what ratepayers receive by directly participating in EE programs. The non-energy benefits attributed to the HEA program do remain in the GST benefits, however.

The GST and NHRCT also differ in how they consider costs. The NHRCT includes the total cost of the investments through utility bills *and* participants' costs paid outside of utility bills. In contrast, the GST includes costs that are only paid for through utility bills *without* considering participant's direct costs.

The following is an algebraic description of the two costs:

$$\mathbf{GST\ Cost} = \text{Utility Cost}$$

$$\mathbf{NHRCT\ Cost} = \text{Utility Cost} + \text{Participants' Cost}$$

In effect,

$$\mathbf{GST\ Cost} = \mathbf{NHRCT\ Cost} - \mathbf{Participants' Cost}$$

⁶ "RGGI" refers to the Regional Greenhouse Gas Initiative program and auction revenues, which are partially directed to the EE programming.

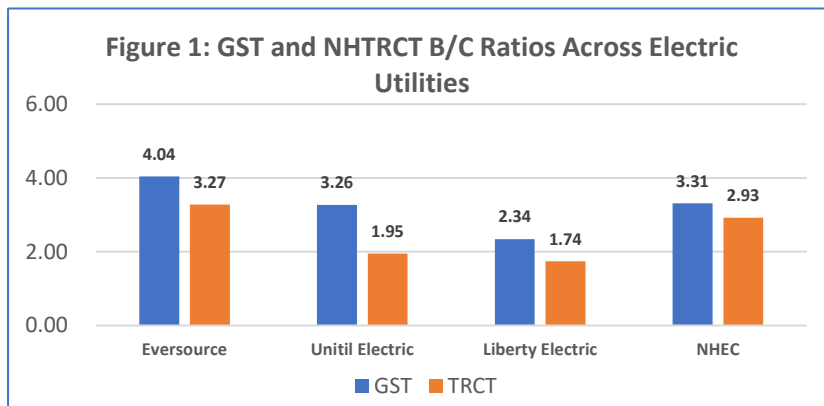
⁷ The "NEI Adder" represents non-energy impacts that participants enjoy owing to property value adjustments, income-related adjustments, health-related adjustments, and utility cost adjustments. For C&I participating customers, NEIs arise out of labor cost adjustments, revenue & productivity adjustments, and utility cost adjustments. See [Final-NH-NEI-Methodology-Memo-20200409.pdf](#), Pages 16-19.

⁸ The NEI Adder represented here excludes the NEI benefits associated with HEA weatherization projects, as benefits are captured in the Utilities' benefit-to-cost models.

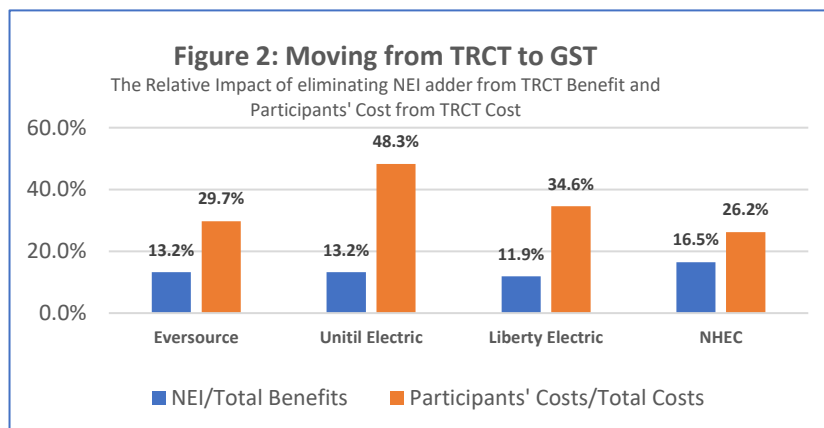
In terms of the GST benefit-to-cost ratio it can be represented as follows:

$$GST \frac{B}{C} \text{ ratio} = \frac{GST \text{ Benefit}}{GST \text{ Cost}} = \frac{NHRCT \text{ Benefits} - NEI}{NHRCT \text{ Cost} - \text{Participants}' \text{ Cost}}$$

In comparing the GST with NHRCT benefit-to-cost ratios⁹, the key figures are the proportion of NEI to NHRCT benefits in the numerator and the proportion of Participants' Costs to the NHRCT costs in the denominator.



Comparing the GST and the NHRCT benefit-to-cost ratios overall using information from 2021 (see Figure 1) for the Electric Utilities, the GST ratio is higher than the NHRCT ratio by 23 percent for Eversource Electric, 67 percent for Liberty Electric, and 34 percent for Until Electric. As explained above, the impact on the benefit-to-cost ratios of the use of either the GST or the NHRCT is entirely dependent on how the ratio of participants' cost to the total resource cost differs from the ratio of the NEI Adder (eliminated from the GST) to the NHRCT benefits (see Figure 2).

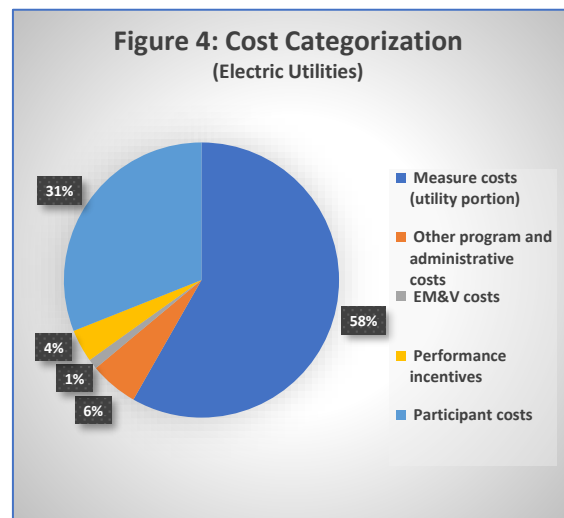
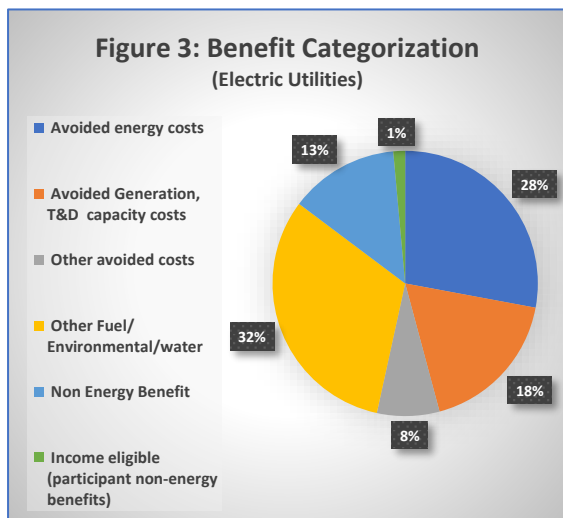


More specifically, using actual data from 2021, Eversource Electric's participants' costs in total accounts for 30 percent and the NEI Adder in total benefits accounts for 13 percent. Liberty Electric's participants' costs in total cost accounts for 48 percent, and the NEI Adder in total benefits accounts for 13 percent. The Electric Utilities' participants' costs in total account for 35 percent and the NEI Adder in total benefits accounts for 12 percent.

⁹ This refers to a straightforward comparison of each numerator and each denominator across both tests.

Benefits:

Based on aggregated actual data for 2021 from the Electric Utilities’ benefit-to-costs models, the total benefits amount to \$273,581,765. The largest share of total benefits consists of other non-energy resources (32%) for fuel, environment, and water, followed by avoided energy costs (28%). Avoided generation, transmission and distribution capacity costs consist of 18% of benefits, while non-energy benefits represent 13%. See Figure 3. In the GST and the NHTRCT metrics used by the Utilities, the benefits in the numerators include utility-focused avoided costs that benefit both participants and non-participants.



Costs:

Based on 2021 reporting (all electric utilities combined), the costs, inclusive of the PI dollars and participant costs, amount to \$97,845,047. As shown in Figure 4, about 58% of costs are driven by the utility portion of a measure’s costs, followed by 31% of participant costs, which are excluded in the GST model. About 6% of costs are driven by program administration, and 4% are driven by PIs. The PI percentage in the figure is based on all-inclusive costs. Actual PIs are calculated based on program cost (excluding participant costs).

In the GST model, while the non-participants’ costs are included fully, a significant part of the participants’ costs are not included. For example, as depicted in Figure 2 for Liberty Electric, over 48 percent of the at-large cost of implementing EE measures are borne by the participants directly outside of utility bills.

The portion of benefits categorized as avoided costs are not tracked to distinguish between benefits to program participants and non-participants; however, the Utilities state that the reduction of energy usage benefits both participants and non-participants.¹⁰ Long-term average bill change analysis performed on the underlying 2022–23 Plan indicates that costs from SBC and natural gas Local Distribution Adjustment Charge (LDAC) assessments exceed the long-term benefits from avoided costs for non-participants.¹¹ Given the importance of societal impacts and the intent of EE programming to benefit both participants and non-participants, it is noteworthy that the National Standard Practice Manual (NSPM) referenced

¹⁰ Response to RR 3-001A filed January 4, 2023.

¹¹ See DE 20-092 Exhibit 47 Bates pages 1165-1176.

in this investigation and the state-level data shared by the Utilities on December 30, 2022, discusses an approach that examines societal impacts comprehensively, known as the Societal Cost Test (SCT). The SCT appears to be more aligned with the NHTRCT than the GST approach.

Furthermore, the NSPM recommends six principles that should govern the analyses informing the primary EE cost-effectiveness test. One of these principles provides that “[e]fficiency assessment practices should be symmetrical, for example, by including both costs and benefits for each relevant type of impact.” See Page 31-32 of the NSPM.¹² Symmetry is cited in the NSPM to explain why the TRC test may be skewed, as “most states do not, in reality, include participant benefits” in the benefits calculation.¹³ The NHTRCT includes some “participant benefits” as defined in the NSPM.¹⁴ The NHTRCT appears to compare benefits and costs more symmetrically than the TRCT as used in other jurisdictions. The GST appears to compare benefits and costs less symmetrically than the NHTRCT.

Discount Rate Sensitivity: GST & NHTRCT

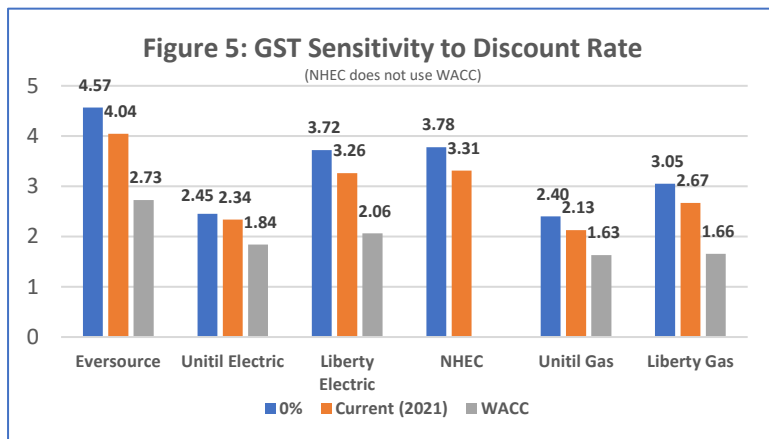


Figure 5 illustrates the changes in GST benefit-to-cost ratios when the discount rate is sequentially increased from zero to the 2021 rate and finally to the weighted average cost of capital (WACC).¹⁵ As we note later, the WACC is the preferred discount rate in most states in the US. As expected, higher discount rates lead to lower benefit-to-cost ratios. The same

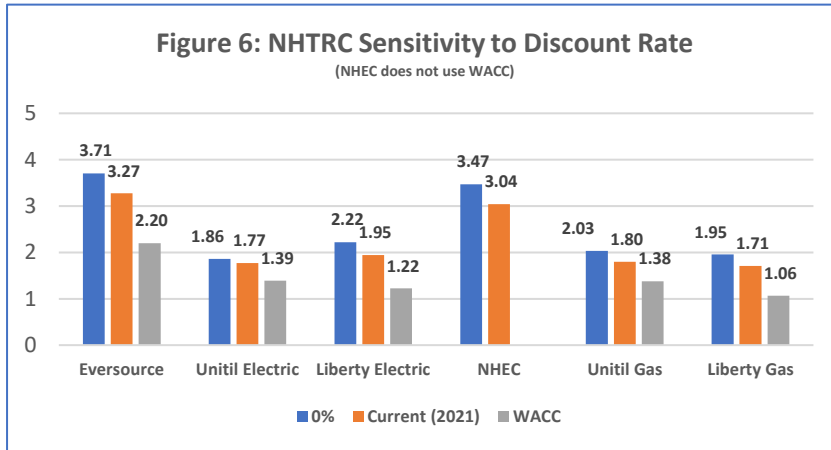
trend is captured when the NHTRCT is subjected to discount rate sensitivity (see Figure 6). Consistent with what is reflected in Figure 1, the NHTRCT ratios are lower than the GST ratios. We observe, all else being equal, that when WACC is used as the discount rate, several existing EE programs, like the Energy Star Products program, Small and Large Business Energy Solutions, etc., may produce benefit-to-cost ratios that are less than 1. For a full list of

¹² The other principles are: 1) efficiency is a resource and should be compared to other energy resources; 2) applicable policy goals should be accounted for; 3) hard-to-quantify impacts should be accounted for; 4) analysis of impacts should be forward looking; and 5) efficiency assessment practices should be transparent.

¹³ Footnote 19 of the NSPM clarifies that “the term ‘participant benefits’ refers to all benefits other than the reduction in the participant’s utility bill.”

¹⁴ For example, in the NHTRCT, for Eversource Electric, the NEI is 16.6 percent of total NHTRCT benefits.

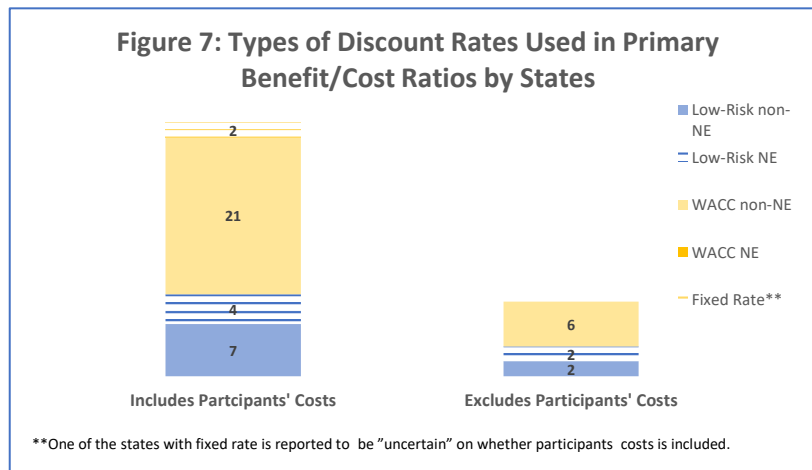
¹⁵ “The discount rate reflects a particular pattern of ‘time preference,’ which is the relative importance of short- versus long-term impacts. A higher discount rate gives more weight to short-term impacts, while a lower discount rate gives more weight to long-term impacts.” See response to RR 1-001A, Page 91 of 146. Also see Table 19, at page 94 of 146, for a description of commonly used discount rates for cost-effectiveness analyses.



programs that produce benefit-to-cost ratios less than 1 under the GST & NHTRCT tests comparing the current approach to discount rates and hypothetical WACC approach, see Annex 3.

Interstate Comparisons – Discount Rates

Key observations from Figure 7 include that most states factor participants’ costs in the primary cost-effectiveness test, most states rely on WACC as the discounting factor when measuring long-term impacts, and even when participants’ costs are excluded, most states rely upon WACC. WACCs typically tend to be significantly higher than low-risk discount rates and result in lower benefit-to-cost ratios.¹⁶



The Office of the Consumer Advocate (OCA) construed the discount rate utilized in New Hampshire as a hybrid discount rate that is closer to a capital discount rate, noting that when using data effective November 30, 2022, that the formula results in a negative discount rate. The OCA stated that the current

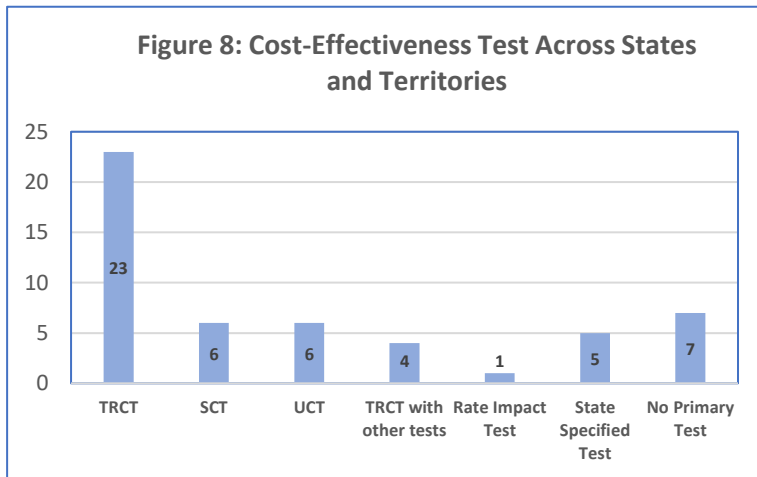
discount rate methodology should be changed and recommended that EE programming in New Hampshire utilize a fixed discount rate of 2%.

Interstate Comparisons – Cost-Effectiveness

Figure 8 compares cost effectiveness tests utilized by US states and territories. The majority of states rely on the TRCT as their primary test. The bulk of the remaining states use either Utility Cost Tests (UCTs) or SCTs.¹⁷ Four of the five states that rely upon state specific tests are in New England.

¹⁶ Figure 7 is based on the record reference to the NSPM, as well as the National Energy Screening Project.

¹⁷ Response to RR 1-001A, See Table at page 129 of 146, which summarizes the traditional cost-effectiveness tests: the UCT, TRCT, SCT, Participant Cost Test, and Rate Impact Measure Test. UCT



The NSPM states that while UCT captures impacts that are solely utility focused, TRCT captures impacts that are both utility and participant focused. Conversely, SCT focuses on all societal impacts. The NSPM cites the U.S. Department of Energy and Environmental Protection Agency’s National Plan of Energy Efficiency (2007, 5-4)¹⁸ to highlight that:

- The societal discount rate should be applied when using the SCT.
- The utility WACC should be applied when using the UCT, the TRC test, or the Rate Impact Measure test.
- A customer discount rate should be used when applying the Participant Cost test.

A comparison across the New England states with respect to the use of participant costs and participant NEIs is provided in Table 1 (See Annex 2 for a comprehensive breakdown of cost and benefits for all New England states).

Cost or Benefit	RI*	VT	MA	NH*	ME*	CT*
Participant costs	✓	✓	✓	X	✓	X
Participant non-energy benefit – Asset Value	✓	X	✓	X	X	X
Participant non-energy benefit – Comfort	✓	✓	✓	X	X	X
Participant non-energy benefit – Economic Well-Being	✓	X	✓	X	X	X
Participant non-energy benefit – Health and Safety	✓	✓	✓	X	X	X
Participant non-energy – Satisfaction	X	✓	X	X	X	X
Participant non-energy – Productivity	✓	✓	✓	X	✓	X

Source: Record under IR 22-042 including the NSPM Database
 * These states use their own jurisdiction-specific test.

The only states in New England that exclude participant costs and non-energy participant benefits in the calculation of the EE benefit-cost ratio are New Hampshire and Connecticut. It also appears that while Vermont uses a SCT as a primary test, Rhode Island’s test, which is

includes the costs and benefits experienced by the utility system, TRCT includes the costs and benefits experienced by the utility system, *plus* costs and benefits to program participants, SCT includes the costs and benefits experienced by society as a whole, Participant Cost Test includes the costs and benefits experienced by the customers who participate in the program, and Rate Impact Test includes the costs and benefits that will affect utility rates, including utility system costs and benefits and lost revenues.

¹⁸ See Response to RR 1-001A, page 95 of 146.

state-specific, includes more non-energy external or societal factors, such as economic well-being and asset value, than Vermont.

Given the elimination of participants’ impacts (costs and benefits) from the GST relative to the NHTRCT, NSPM standards indicate that the GST is more in line with the UCT than SCT, and appears apt for an application of WACC as the discount rate rather than the social discount rate.

Resulting End Use Benefits by Measure

End Use Categories	End Use % of Total Electric Benefits	End Use % of Granite State Test Benefits
Lighting	67.18%	33.52%
HVAC	11.26%	17.96%
Envelope	6.58%	32.49%
Process	3.50%	2.42%
Compressed Air	3.48%	1.94%
Custom Measures	2.67%	6.13%
Refrigeration	2.01%	1.13%
Hot Water	1.39%	2.86%
Motors/Drives	1.36%	0.76%
Food Service	0.29%	0.42%
Behavior	0.29%	0.27%
Non-Energy Saving	0.00%	0.09%
Grand Total	100%	100%

End use categories represent the areas of energy consumption that are reduced by EE investments. Table 2 shows each electric measure’s respective share of the estimated benefits and the total GST estimated benefits. As an illustrative point, lighting is the largest category of benefits, with investments into efficiency lighting contributing to 67.18% of the total electric benefit. However, these lighting investments contribute only 33.52% of the total GST benefits. The fact that lighting has a higher

share of the electric benefits than the total GST benefits is due to the weighting that is given to other system benefits categories in the GST.

Future studies and approaches could assess the cost-effectiveness benefit-to-cost ratios for measures and groups of measures, as well as better identify values for benefits made available to all members of society to assess the value of EE investments.

Topic 2 – Performance Incentives

The Utilities are paid a PI to tie financial rewards to the success of administered EE programming. The Utilities begin to earn a PI for some categories once 65% of certain metrics, such as planned energy savings and value, have been achieved. The PI is not tied to any specific program’s performance, but rather the utility’s overall portfolio.

While numerous responses and material provided by the participants to this investigation attempt to explain how the existing PI structure incentivizes the Utilities to maximize investments and optimize ratepayer savings, some ambiguity remains. Further study would be needed to understand if a PI tied to other methodologies for measuring success could provide a better proxy for excellent utility EE program administration.

Table 3: Comparison of PI Thresholds in 2021

Utility	Actual PI	Hypothetical PI w/ 100% Min Threshold	Delta
Eversource Electric	\$2,749,894	\$1,657,774	\$1,092,120
Liberty Electric	\$335,192	\$204,412	\$130,780
Liberty Gas	\$454,874	\$370,677	\$84,197
NHEC Electric	\$216,766	\$195,026	\$21,740
Unitil Gas	\$128,222	\$50,970	\$77,252
Unitil Electric	\$472,357	\$472,357	\$0
Total	\$4,357,305	\$2,951,216	\$1,406,089

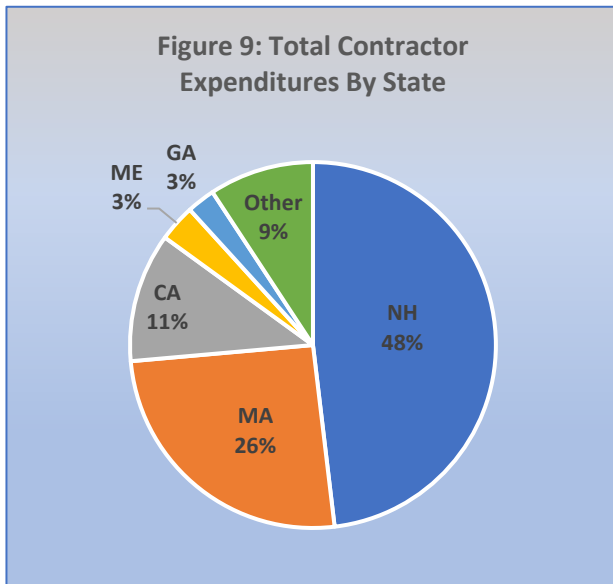
Table 3 shows 2021 actual PIs by utility, hypothetical PIs in 2021 if the minimum success threshold had been 100% of planned metrics (as opposed to the current 65% or 75% thresholds), and the difference between the two figures. These calculations leveraged data from the Utilities’ 2021 Program Reports.

The Utilities were asked to provide calculations for PIs going back to the 2016 program year. The Utilities reported data to the Commission with non-standardized calculations across companies, limiting further investigation of the PI thresholds.

Topic 3 – Impact on New Hampshire Economy

Since the first EE working group report in 1999¹⁹, approaches to best account for the EE programs’ impact on the New Hampshire economy have been of interest. Given that the majority of program funding is derived from revenue raised by the electric SBC and natural gas LDAC, the Commission and the Utilities have been mindful of the need for these assessments to stimulate economic opportunities for Granite Staters. Despite quantification of costs, determination of economic benefits from the program for New Hampshire remains challenging.

The Commission requested a breakdown of payments to contractors to understand what portion of expenditures occur in the form of rebates, the costs passed through to New Hampshire customers and the proportion of expenditures for contractor and consultant services. The Utilities provided rebates and services expenditures combined but were unable to provide these components in discrete categories. Figure 9 shows the breakdown of all expenses paid to contractors and consultants by location of the business address:



About 48% of the total contractor expenditures were made to businesses with a primary billing address in New Hampshire. Without knowing the breakdown of rebates and services, expenditures flowing out of the NH Economy to other states and countries could not be quantified.

In Order No. 26,621 approving the 2022-2023 EE plan, the Commission instructed the Utilities to analyze the program's impact on the NH economy. The Commission further noted that the household and firm-level impacts of

reductions in energy consumption need to be quantified. In compliance with this directive, the Utilities have retained a consultant to conduct the analysis. This report is expected to be issued by March 31, 2023.

¹⁹ Final Energy Efficiency Group Report of DR 96-150, dated July 6, 1999, [https://www.puc.nh.gov/Electric/96-150%20%20NH%20Energy%20Efficiency%20Working%20Group%20Final%20Report%20\(1999\).pdf](https://www.puc.nh.gov/Electric/96-150%20%20NH%20Energy%20Efficiency%20Working%20Group%20Final%20Report%20(1999).pdf)

Topic 4 – Subsidized Services and Equipment

The EE program subsidizes a portion of an eligible project costs, and the participant-customer contributes the difference. EE program subsidies covered 56.9% of all EE investments.²⁰ Table 4 summarizes statistics on project subsidies and shows the distribution of subsidies across ranges.

Subsidy Level (% range of project cost)	Number of Projects	Total Cost	Total Incentive
0-19%	3,597	\$10,495,654	\$965,029
20-39%	106,049	\$27,959,833	\$9,063,326
40-59%	609,905	\$19,196,990	\$9,446,635
60-79%	16,806	\$24,661,054	\$17,773,237
80-99%	4,282	\$5,170,808	\$4,651,136
100%	55,078	\$18,203,092	\$18,203,093
Grand Total	795,717	\$105,687,431	\$60,102,456

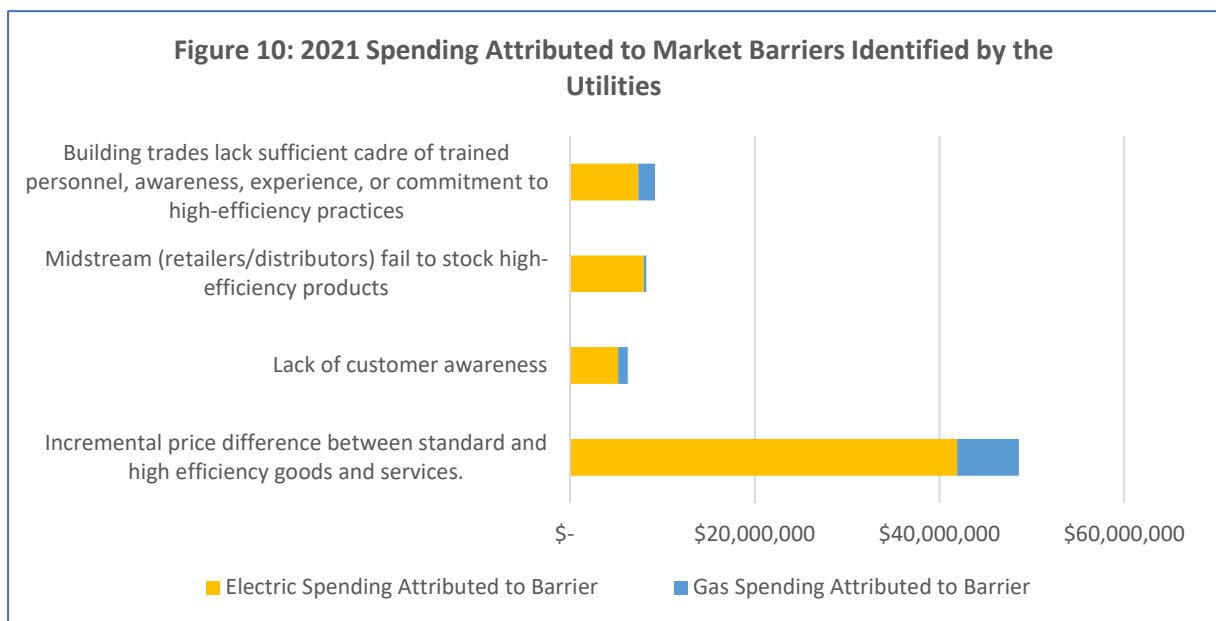
The Utilities stated they view subsidized services as a way to incentivize participants to invest in more efficient EE measures. The Utilities did not present a methodology to determine the level of subsidy a participant receives. Analysis was not available concerning whether the level of subsidies offered are incentivizing more efficient investments or enabling free-ridership.

²⁰ \$60,102,456 / \$105,687,431 = 56.86%

Topic 5 – Market Barriers

The Commission sought to identify market barriers and to quantify the responses implemented to reduce or eliminate such market barriers in terms of their net present value. This aspect of the investigation is based on RSA 374-F:3, X, which states that the restructured market in New Hampshire should “reduce market barriers to investments in energy efficiency and provide incentives for appropriate demand-side management and not reduce cost-effective customer conservation... [u]tility sponsored energy efficiency programs should target cost-effective opportunities that may otherwise be lost due to market barriers.”

In the responses to Reporting Requirement V, filed on August 31, 2022, the Utilities identified four categories of barriers including actual costs associated with market intervention during the 2021 programming year. Figure 10 represents these responses graphically:



No uniform definition of “market barriers” has been adopted by the Utilities. Future study of successful EE programs or measures that have reduced market barriers could provide opportunities to evaluate the prudence of current and future incentives and programs to transform the market and continuously reduce barriers.

The Utilities jointly identified potential definitions for “market barriers” in their response to RR 1-005:

1. “The factors behind the so-called ‘efficiency gap’ – the differential between the level of energy-efficiency actually achieved and the level judged to be cost-effective at prevailing prices,” based on a 1992 Lawrence Berkeley Lab technical report.
2. “Equivalent to conventional market failures from economic theory, or as anything that works against investment in energy efficiency,” based on a 2012 ACEEE Summer Study.

3. “A real or perceived impediment to the adoption of energy efficient technologies or energy efficient behavior by consumers,” based on the Iowa Administrative Code.

The Utilities’ response to RR 1-005 also distinguished programming responses to market barriers as either ‘resource acquisition’ programs or ‘market transformation’ programs, categorizing New Hampshire’s programming as ‘resource acquisition’ programs aimed at reducing customer barriers. According to the Utilities, due to the small scope of New Hampshire’s energy efficiency budgets, programming that might transform the market from the top down or otherwise focus on technology barriers is not feasible.²¹ The Utilities stated that, when taken together, nationwide EE programming and federal interventions have helped transform some markets, such as high-efficiency lighting. While the Utilities provided their respective perspectives on the “markets” targeted by their existing EE programs, the issue of whether the current programs or new initiatives should be targeted remains ripe (e.g. whether energy optimization technologies or distributed energy resources not currently included within the current EE programs should be considered for eligibility). It is not clear whether market barriers cause cost-effective opportunities to be lost or can be reduced by the State’s EE programming.

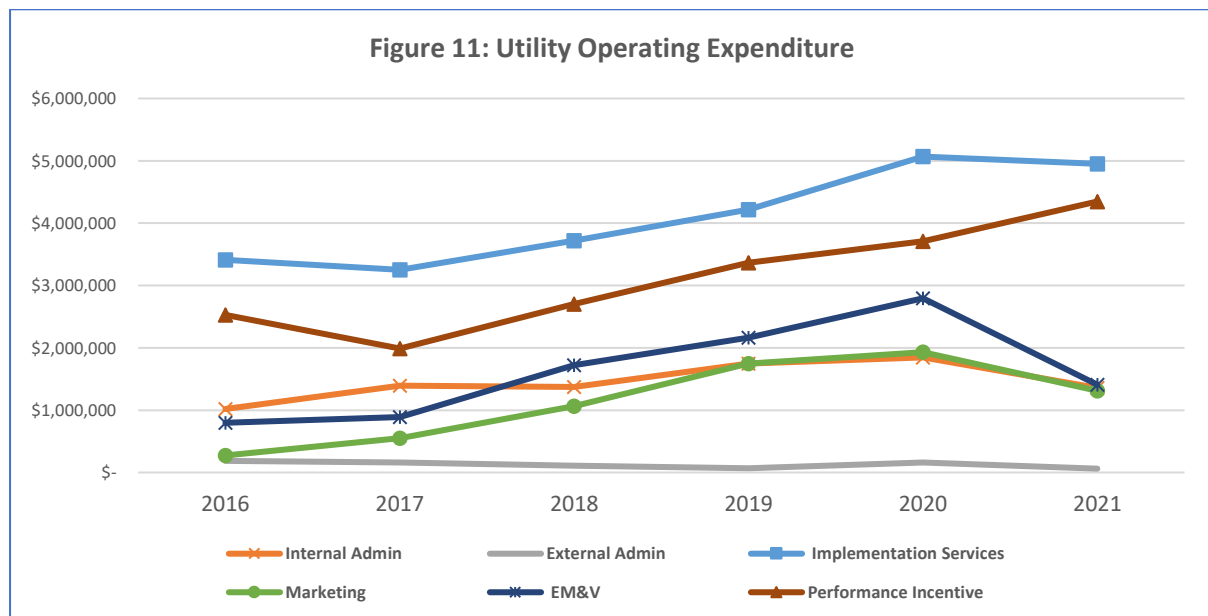
²¹ See Response to [RR 1-005](#) (pages 2 and 3 of 4, PDF pages 522 and 523 of 546).

Topic 6 – Summary of spending, including rebate spending recipient groups/locations.

Annual EE program expenditures have grown from \$32 million in 2016 to \$78.2 million in 2021, a 144% increase.²² (See Table 5 and Figure 11). The majority of the increase has been in the rebates and services category, which grew by 172%.²³ As noted in Topic 3, the Utilities do not currently track how these funds were spent between direct rebates to customers and the costs of consultants and contractors.

(In \$000)							
Year	Internal Admin	External Admin	Rebate/ Services	Implementation Services	Marketing	EM&V	Performance Incentive
2016	\$1,019	\$187	\$23,795	\$3,411	\$273	\$798	\$2,527
2017	\$1,395	\$159	\$25,739	\$3,251	\$552	\$890	\$1,989
2018	\$1,371	\$107	\$34,405	\$3,718	\$1,067	\$1,719	\$2,702
2019	\$1,746	\$69	\$46,454	\$4,218	\$1,748	\$2,163	\$3,366
2020	\$1,846	\$163	\$61,498	\$5,068	\$1,930	\$2,795	\$3,711
2021	\$1,358	\$ 62	\$64,807	\$ 4,953	\$1,311	\$1,409	\$4,348

Figure 11 shows the expenditure trends for the Utilities operating expense categories.



²² $(78,246,485 - 32,008,788) / (32,008,788) = 144.45\%$

²³ $(64,806,650 - 23,794,698) / (23,794,698) = 172.36\%$

Topic 7 – Reporting on Program Offerings for Income-Eligible Customers

The New Hampshire General Court mandated that EE programs be established targeting direct utility cost reductions for income-eligible ratepayers. RSA 374-F:3 VI-a(c) requires a minimum of 20% of SBC and LDAC Funds raised for the EE program to be expended on applicable income-eligible programs. To qualify for such income-eligible programming, a customer must meet certain eligibility criteria (such as the household income criteria applicable to the New Hampshire Fuel Assistance Program or the New Hampshire Electric Assistance Program), reside in subsidized housing, or meet other identified municipal or nonprofit organization criteria for serving those in need.

The Utilities have complied with the income-eligible expenditure requirements through the HEA program. The HEA program pays 100% of the costs to update owned or rented properties occupied by income-eligible customers, up to \$15,000 per participant per year.

As with all EE programs, HEA is evaluated based on the benefits-to-cost ratio of the program. To calculate HEA’s benefits, the GST is augmented to include a per-project adder of \$405.71. This added value represents a proxy for the economic benefit of weatherization and is accounted for as a “non-resource benefit” through the GST. The methodology utilized to derive this proxy amount was not provided.

Table 6 shows the breakdown of the major categories of the GST’s benefits calculations:

Utility	Total Electric Benefits	Total Non-Electric Resource Benefits	Total Non-Resource Benefits	Total Granite State Test Benefits
Eversource Electric	\$2,546,048	\$7,269,242	\$3,403,333	\$13,218,622
Liberty Electric	\$358,450	\$602,793	\$44,550	\$1,005,793
Liberty Gas	\$373,928	\$1,003,267	\$152,645	\$1,529,839
NHEC Electric	\$94,604	\$414,582	\$281,880	\$791,067
Unitil Gas	\$26,982	\$212,644	\$243,811	\$483,437
Unitil Electric	\$257,388	\$587,307	\$911,359	\$1,756,054
Total	\$3,657,400	\$10,089,835	\$5,037,577	\$18,784,812

53.7%²⁴ of the income-eligible program’s benefits are non-electric benefits. These benefits are primarily driven by the estimated reductions in fuel heating costs from improved insulation (referred to as “enveloping”). See Table 7.

²⁴ 10,089,835 / 18,784,812 = 53.71%

Table 7: 2021 HEA Granite State Test Calculations by End Use Category

End Use Categories	Total Electric Benefits	Total Non-Electric Resource Benefits	Total Non-Resource Benefits	Total Granite State Test Benefits
Custom Measures	\$0	\$0	\$3,939,108	\$3,939,108
Envelope	\$1,776,976	\$7,845,749	\$723,541	\$10,346,267
Hot Water	\$97,581	\$237,756	\$16,270	\$351,607
HVAC	\$482,993	\$2,160,288	\$150,891	\$2,794,173
Lighting	\$799,684	-\$153,866	-\$10,435	\$635,383
Motors/Drives	\$3,403	\$0	\$0	\$3,403
Non-Energy Saving	\$0	\$474	\$218,223	\$218,697
Refrigeration	\$496,763	-\$567	-\$21	\$496,174
Total	\$3,657,400	\$10,089,835	\$5,037,577	\$18,784,812

EE program income-eligible customers often qualify for the federally-funded Fuel Assistance Program and state-funded Electric Assistance Program. Further analysis on how the HEA program has impacted these other assistance programs may provide insight into how the HEA program impacts overall energy expenditures of income-eligible customers receiving HEA investments.

For renters served through the HEA program, the investments generally benefit the property owner as well, as EE measures typically improve and stay with the dwelling. Similar to the apportionment of benefits between participant and non-participant benefits, further study of shared benefits between renters and property owners may be useful.

Unlike other residential and C&I programs where benefits are optimized at the system level, the HEA program is designed to optimize benefits by reducing energy expenditures of its individual participants. In support of this practice, the Utilities cite to Commission Order No. 23,574 (November 1, 2000). The utilities responded that they are unable to conduct a cost benefit analysis of the HEA programs’ impact on individual participants given data constraints.

Table 8: 2021 HEA Benefit to Cost Ratios

Utility	HEA GST B/C with Adder	HEA GST B/C without Adder
Eversource Electric	1.46	1.15
Liberty Electric	0.89	0.89
Liberty Gas	0.93	0.93
NHEC Electric	1.15	0.78
Unitil Electric	1.01	0.51
Unitil Gas	1.20	0.66

As discussed above, an “adder” for weatherization is included in the benefit calculations for the HEA program. Table 8 shows the sensitivity of the HEA benefit-to-cost ratios to the inclusion of the adder.

Two of the Utilities’ cost-benefit analyses for HEA programs yield benefit-to-cost ratios less than 1.00,

indicating that the programs cost more than the aggregate benefits they are estimated to produce.

Topic 8 – Reporting to Other Regional or Regulatory Organizations

The Utilities share the goal of “providing data in a manner conducive to comparing changes over time or other research purposes the public may have.” The Utilities caution that the cost of any centralized data system would have to be weighed against the benefits.

The Utilities do not believe the existing requirements for reporting on energy efficiency programming to federal, state, and regional entities are burdensome.

ANNEX 1 – BACKGROUND AND FILINGS

Background

EE has represented an integral part of New Hampshire’s energy policy for decades, since at least the 1973 energy crisis which precipitated the Public Utilities Regulatory Policy Act (PURPA) that established polices related to energy conservation and market opportunities for non-utility power producers. Substantial increases in retail electricity prices and the bankruptcy of Public Service Company of New Hampshire in the early 1990s led the General Court to transform the utility business in New Hampshire through the enactment of RSA 374-F, which initiated the restructuring of the State’s electric utilities. New Hampshire became the first state in the nation to pass such a statute, a policy decision that has been echoed by more than a third of the United States. Today, “restructured” electricity markets have separated the business of generating electricity from the business of delivering electricity to consumers.

Since the enactment of RSA 374-F, New Hampshire has taken this goal a step further by incentivizing utilities to *reduce* energy delivered to customers.

NH RSA 374-F:3 X. Energy Efficiency

Restructuring should be designed to reduce market barriers to investments in energy efficiency and provide incentives for appropriate demand-side management and not reduce cost-effective customer conservation. Utility sponsored energy efficiency programs should target cost-effective opportunities that may otherwise be lost due to market barriers.

Thereafter, New Hampshire’s electric and natural gas utilities began implementing integrated statewide EE efforts in 2002, historically referred to as the CORE EE programming. EE offerings have evolved in the two decades since, as have the regulatory scheme and stakeholder processes coordinating planning efforts. In 2008, RSA 125-O:5-a was enacted, creating the Energy Efficiency and Sustainable Energy (EESA) Board to review, promote and explore strategies to expand energy conservation initiatives in New Hampshire. In 2014, the Commission initiated an informal, stakeholder process to develop a new framework within which EE plans would strive to meet energy savings goals.

In 2021, the General Court enacted NH RSA 12-P, creating the State’s Department of Energy to represent State energy policy priorities and administer State energy programs. Roles and responsibilities between the Commission and Department of Energy shifted. Shortly thereafter, the Commission rejected the Utilities’ proposed EE plan for the 2021-2023 triennium presented in Docket No. DE 20-092 based on the plan’s rate impacts, performance incentive structure, and the treatment of year-over-year budgetary carryforwards. That plan was drafted with the guidance and support of the EESA Board and would have increased the budget for Statewide EE programming by \$202,207,000, or 148% for the 2021-2023 period.

In early 2022, HB 549 was enacted. Among other changes, HB 549 amended RSA 374-F:3, VI to set predictable funding levels for EE programming through EE related portions of the electric SBC and natural gas LDAC. HB 549 required the use of the primary GST and the secondary NHTRCT as a part of cost-effectiveness evaluation. In addition, RSA 374-F, as amended, requires that EE programming and incentives be optimized to deliver ratepayer

savings (RSA 374-F:3, VI-a(d)); 20 percent of expenditures shall be made on income-eligible programs (RSA 374-F:3, VI-a(c)); each electric utility's planned electric savings shall not fall below 65 percent of overall planned energy savings (RSA 374-F:3, VI-a(d)(4)); and EM&V expenditures shall not exceed five percent of the budget (RSA 374-F:3, VI-a(d)(5)).

In Order No. 26,621 (April 29, 2022), the Commission approved a Statewide EE Plan for the second and third years of the 2021-2023 triennial planning period. Order No. 26,621 and the reporting requirements contained therein, served as a starting point for this investigation.

List of Filings

On August 1 and 2, 2022 each of the Utilities filed Program Year 2021 reports.

On August 19, 2022, the Commission issued its first supplemental inquiries to the Utilities.

On August 31, 2022, the Utilities each filed responses pertaining to reporting requirement V from Order No. 26,621.

On September 12, 2022, the Commission issued its second supplemental inquiries to the Utilities.

On September 26, 2022, the Utilities filed responses to the Commission's September 12, 2022, supplemental inquiries.

On September 29, 2022, a Commission-attended technical session was held related to the workings of the GST model.

Between September 30 and October 3, 2022, the Utilities, the Department of Energy, the Office of the Consumer Advocate, and LISTEN Community Services filed initial comments on this investigation.

On October 12, 2022, a prehearing conference was convened, and position statements were received from the Utilities and all interested persons, a transcript of this conference is posted to the Docket at Tab 40.

On November 1, 2022, the Commission issued its third supplemental inquiries to the Utilities.

On November 4, 2022, the Commission issued a set of supplemental inquiries that the Utilities were requested to respond to, and any interested person was invited to file responses to.

On November 30, 2022, the Utilities filed responses to the Commission's November 1 and 4, 2022 inquiries.

On December 1, 2022, the Department of Energy filed responses to the Commission's November 4, 2022, inquiries.

On December 8, 2022, the Commission issued its fourth set of supplemental inquiries to the Utilities.

On December 16, 2022, the Utilities filed responses to the Commission's November 1 and 4, 2022 inquiries.

On December 16, 2022, the Office of the Consumer Advocate filed responses to the Commission's November 4, 2022, inquiries.

On December 29, 2022, the Utilities filed responses to the Commission's December 8, 2022, inquiries.

On December 30, 2022, the Commission issued its fifth supplemental inquiry to the Utilities.

On January 4, 2023, the Utilities filed a response to the Commission's December 30, 2022, inquiry.

ANNEX 2 – COMPARISON OF PRIMARY TESTS ACROSS STATES

Cost or Benefit	RI	VT	MA	NH	ME	CT
<i>Utility System Costs</i>						
Measure costs (utility portion)	✓	✓	✓	✓	✓	✓
Other financial or technical support costs	✓	✓	✓	✓	X	✓
Other program and administrative costs	✓	✓	✓	✓	✓	✓
EM&V costs	✓	✓	✓	✓	✓	✓
Performance incentives	✓	X	✓	✓	X	✓
<i>Utility System Benefits</i>						
Avoided generating capacity costs	✓	✓	✓	✓	✓	✓
Avoided Marginal Energy Costs	✓	✓	✓	✓	✓	✓
Avoided T&D	✓	✓	✓	✓	✓	✓
Avoided T&D line losses	✓	✓	✓	✓	✓	✓
Avoided ancillary services	✓	X	X	✓	X	X
Wholesale Price Suppression	✓	X	✓	✓	✓	✓
Avoided compliance with RPS requirements	✓	✓	✓	✓	✓	✓
Avoided environmental compliance costs (embedded)	✓	✓	✓	✓	✓	✓
Avoided credit and collection costs	✓	✓	✓	✓	X	✓
Reduced risk	✓	✓	✓	✓	X	X
Increased reliability	✓	X	✓	✓	X	✓
Increased Resilience	✓	X	X	X	X	X
Market transformation	X	X	X	✓	X	X
<i>Non-Utility System Impacts</i>						
Other fuel	✓	✓	✓	✓	✓	✓
Water resource	✓	✓	✓	✓	✓	X

REPORT ON ENERGY EFFICIENCY PLANNING, PROGRAMMING, & EVALUATION

Cost or Benefit	RI	VT	MA	NH	ME	CT
Low Income Participants	✓	✓	✓	✓	X	✓
Participant costs	✓	✓	✓	X	✓	X
Participant non-energy – Asset Value	✓	X	✓	X	X	X
Participant non-energy – Comfort	✓	✓	✓	X	X	X
Participant non-energy – Economic Well-Being	✓	X	✓	X	X	X
Participant non-energy – Health and Safety	✓	✓	✓	X	X	X
Participant non-energy – Satisfaction	X	✓	X	X	X	X
Participant non-energy – Productivity	✓	✓	✓	X	✓	X
GHG Emissions (fossil fuel proxy for NH)	✓	X	✓	✓	✓	✓
Environmental, other externalities	✓	X	X	X	X	X
Public health	✓	✓	X	X	X	X
Energy security	✓	X	X	X	X	X
Economic Development and Jobs	✓	✓	X	X	X	X

Source: Record under IR 22-042 including the NSPM Database

Annex 3 – 2021 Programs with Benefit-to-Cost Ratios Less Than 1 Under GST, NHTRCT, and Hypothetical WACC Approach

GST		
Company	Current (2021)	WACC
Eversource Electric		Home Energy Assistance
Unitil Electric		Home Energy Assistance
Liberty Electric	Home Energy Assistance	Home Energy Assistance, Energy Star Products
Unitil Gas		Home Energy Assistance
Liberty Gas	Home Energy Assistance	Home Energy Assistance
TRCT		
Company	Current (2021)	WACC
Eversource Electric		Home Energy Assistance
Unitil Electric		Home Energy Assistance, Municipal Energy Solutions
Liberty Electric	Home Energy Assistance	Home Energy Assistance, Large Business Energy Solutions, Small Business Energy Solutions, Municipal Energy Solutions
Unitil Gas		Home Energy Assistance, Energy Star Products
Liberty Gas	Home Energy Assistance	Home Energy Assistance, Energy Star Homes, Small Business Energy Solutions