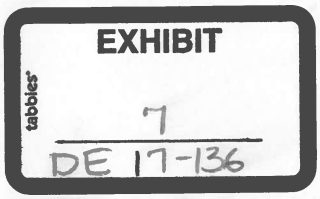

STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET DE 17-136

IN THE MATTER OF: 2018-2020 New Hampshire Statewide Energy Efficiency Plan.

DIRECT TESTIMONY

OF

Elizabeth R. Nixon
Utility Analyst,
NHPUC Electric Division

November 01, 2017

Introduction

Q. Please state your full name?

A. My name is Elizabeth R. Nixon.

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

A. I am employed by the New Hampshire Public Utilities Commission as a Utility Analyst. My business address is 21 S. Fruit Street, Suite 10, Concord, NH 03301.

Q. Please summarize your education and professional work experience.

A. My educational and professional background is summarized in Attachment A.

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

A. My testimony provides comments and recommendations regarding the benefit/cost test and associated assumptions used to evaluate the cost-effectiveness of the energy efficiency measures in the 2018-2020 New Hampshire Statewide Energy Efficiency Plan ("Plan") dated September 1, 2017 filed jointly by the New Hampshire electric and gas utilities ("Utilities"). The Utilities are Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities ("Liberty Utilities Electric"), New Hampshire Electric Cooperative, Inc. ("NHEC"), Public Service Company of New Hampshire d/b/a Eversource Energy ("Eversource"), and Utility Energy Systems, Inc. ("UES"), and EnergyNorth Natural Gas, Inc. d/b/a Liberty Utilities ("Liberty Utilities Gas"), and Northern Utilities, Inc. ("Northern Utilities").

Q. Please provide a summary of your testimony.

A. My testimony addresses the benefit/cost test used to screen the proposed energy efficiency programs and the associated assumptions, including Non-Energy Impacts ("NEIs") and Demand Reduction Induced Price Effect ("DRIPE"). NEIs are other benefits or costs to program participants (such as comfort, productivity, and operation and maintenance savings)

and to the utilities (such as reduced payments in arrears and fewer debt write-offs). DRIPE is the reduction in the wholesale market prices of energy expected from the reduction in energy required in those markets as a result of the energy efficiency programs. Intrastate DRIPE is a benefit specific to the New Hampshire energy efficiency programs. Rest-of-pool DRIPE is a benefit of the New Hampshire energy efficiency programs, but it is a benefit to society (the rest-of-pool), not to New Hampshire, specifically. My testimony indicates that the benefit/cost test should include all benefits and costs to the utilities and participants; therefore, NEIs and intrastate DRIPE should be included in the benefit/cost test. My testimony explains that a 10% adder is reasonable at this time for 2018 and 2019 until evidence-based, New Hampshire-specific NEIs can be developed and used for the 2020 plan year. Since the Utilities use the Total Resource Cost (TRC) test as the cost-effectiveness test, rest-of-pool DRIPE should not be included since it is a benefit to society, not the utilities or participants.

Background on the Cost-Effectiveness Test

Q. What cost-effectiveness test is used by the Utilities?

A. Per Order No. 22,875 in Docket No. DR 96-150, a working group was established to determine the appropriate cost-effectiveness test to use to determine the benefit/cost ratio of programs. The working group report, dated July 6, 1999, recommended the use of the TRC test. As noted by the Utilities in their 2018-2020 plan (p. 139) and consistent with the working group report and Order No. 22,875, the Utilities use the TRC test. A few modifications to the actual costs and benefits included in the TRC test have been adopted over time, but the test itself has not changed.

Q. How is the cost-effectiveness test used?

A. Per the working group report discussed above, a proposed program must have a benefit/cost ratio of greater than 1.0 to be deemed cost-effective. The working group agreed that low income programs and educational programs could still be approved even if they do not exceed the 1.0 benefit/cost threshold, because the benefits are harder to quantify.[1]

Non-Energy Impacts

Q. What are NEIs?

A. NEIs are the benefits or costs that are in addition to the energy benefits or costs. Participants of the energy efficiency programs may experience NEIs such as increased comfort, greater productivity, and operation and maintenance cost impacts. NEIs for the utilities may include reduced payments in arrears and fewer debt write-offs. Societal NEIs may include the impacts on public health and welfare, air quality impacts, and energy security, but note that New Hampshire uses the TRC test to determine cost-effectiveness which considers the utility and participant costs and benefits, but does not include societal costs and benefits. Consequently, only the utility and participant NEIs should be considered.

Q. What have the Utilities proposed for NEIs in the Plan, and what is their basis for this adder?

A. The Utilities propose using a 10% adder applied to all of the benefits of the energy efficiency program (excluding water benefits). The Utilities provided several studies assessing NEIs for various programs in other states and also calculated the NEIs for electric and gas programs combined as percentage of total benefits for Massachusetts, Connecticut, Rhode Island, and Vermont. Based on their calculation, the NEIs for non-income based residential

[1] Note, however, that the low income programs have typically exceeded the benefit/cost ratio of 1.0.

programs for electric and gas programs have a combined range from 21.46% in Massachusetts to 60.88% in Vermont. The commercial and industrial ("C&I") NEIs for electric and gas programs range from 0% in Connecticut to 52.93% in Vermont, but the Utilities note that Connecticut has not evaluated state-specific NEIs for C&I. The Utilities state that the Massachusetts' NEIs for C&I for electric and gas programs combined is 16.30%.

Q. What do you recommend regarding NEIs?

A. New Hampshire has for many years already recognized that energy efficiency measures can provide non-energy impacts as shown by the inclusion of water benefits in the benefit/cost test. Most energy efficiency measures do provide other non-energy benefits or costs depending upon the specific measure. Until evidence-based, New Hampshire-specific NEIs can be evaluated, the 10% adder proposed by the Utilities is reasonable at this time for 2018 and 2019. For the 2020 program year, the Utilities should develop evidence-based, New Hampshire-specific NEI values by initially starting with the NEIs with the greatest impact and expanding to a full NEI evaluation. In the annual update for the 2020 program year, Staff recommends that the Utilities propose the results of the evidence-based, New Hampshire-specific evaluation of NEIs.

Q. What is the basis for your recommendation?

A. Without a New Hampshire-specific evaluation, a 10% adder is reasonable at this time since the particular NEIs and the associated values specific to New Hampshire have not been determined. Note that some measures may have NEIs less than 10%, and some may be greater than 10%. Northeast Energy Efficiency Partnerships (NEEP) conducted a review of

NEI approaches and values in other states.[2] The NEEP report provides a summary of NEI adders in various states. NEI adders ranged from 5% in Colorado to 15% in New Mexico and Vermont. Several states use a 10% adder for NEIs, while others have specific monetized values for each measure or program. NEEP indicates that only 14 states include NEIs as part of the cost-effectiveness test. The Utilities justified the 10% adder based on a calculated percentage of NEIs for the combined electric and gas programs in MA, CT, RI, and VT. In response to Data Request No. Staff 1-044, the Utilities calculated NEIs for the electric and gas programs separately in these states. (See Attachment B.) The non-income based NEIs for residential electric range from 14.4% in MA to 60.9% in VT (which includes a 15% adder for hard to quantify benefits plus an environmental adder); for non-income based residential gas, 41.7% in MA to 96.5% in CT (Eversource only); for commercial and industrial electric, 0% in CT to 52.9% in VT (which includes a 15% adder for hard to quantify benefits plus an environmental adder), and for commercial and industrial gas, 0% in CT to 16.7% in MA. As shown, the NEIs vary widely from state to state. Based on this data, applying a 10% adder as NEIs to the total benefits (excluding water benefits) for the 2018 and 2019 program years is reasonable at this time until evidence-based, New Hampshire-specific values can be developed.

Q. What approach should be used to develop evidence-based, New Hampshire-specific NEIs?

A. Working within the EM&V Working Group, the Utilities should propose a list of NEIs which they would like to initially evaluate for evidence-based, New Hampshire-specific values. For

[2] National Energy Efficiency Partnership, June 2017. *Non-Energy Impacts Approaches and Values: an Examination of the Northeast, Mid-Atlantic, and Beyond.* http://www.neep.org/sites/default/files/resources/NEI%20Final%20Report%20for%20NH%20updated%2010.4.17.pdf

example, five or six NEIs with the greatest impact could be the first to be evaluated. Since the Utilities use the TRC Test, only NEIs applicable to the Utilities and participants should be considered, not any societal NEIs. Then the Utilities should propose an approach for determining the appropriate value for the evidence-based, New Hampshire-specific NEIs. The Utilities should indicate how they will overcome the challenges faced in other states in quantifying the NEIs. Such challenges include accurately quantifying the values based on self-reporting versus engineering-based studies, avoiding double counting, and accounting for hard to quantify benefits.[3] Since the Utilities will also be working on a Technical Resource Manual (TRM) with specific savings and cost data by measure, the NEIs should be developed on a measure-by-measure basis. As noted in the plan, the Utilities could begin by reviewing the NEI studies and values developed for other states. Then, if necessary, the Utilities could modify them to be New Hampshire-specific. Michael R. Goldman, the Utilities' witness on NEIs, in his response to The Way Home's Data Request No. TWH 1-001, further explained one approach for the methodology and standards for developing evidence-based, New Hampshire-specific NEIs. See Attachment C.

Demand Reduction Induced Price Effect

Q. Please provide a brief explanation of DRIPE?

A. DRIPE is the reduction in wholesale market prices in electricity and gas expected from reductions in the amount of electricity and gas required from those markets as a result of the energy efficiency programs. The *Avoided Energy Supply Costs in New England: 2015*

[3] Abdou, Marie; Stevens, Noel, and Clendenning, Greg, . *EM&V Roadmap to Quantifying Challenging Non-Energy Impacts.* International Energy Policy & Programme Evaluation Conference. http://www.ieppec.org/wp-content/uploads/2016/05/Paper-Abdou.pdf

Report (AESC 2015 study)[4] is used by the Utilities in the benefit/cost test for the proposed 2018-2020 Plan and has been used in analyzing past CORE programs and the 2017 EERS transition plan. As indicted in the AESC 2015 study, DRIPE reflects the effects on electricity prices, gas prices, and the interplay between electric and gas prices, since many of the electric generating units are gas-fired. The AESC study includes DRIPE values for New Hampshire and the rest of New England (rest of pool).

Q. Have other states in New England included DRIPE in their benefit-cost tests for energy efficiency programs?

A. Yes, in New England, DRIPE is reflected in the benefit-cost analyses for energy efficiency programs in Connecticut, Rhode Island, Massachusetts, Maine, and Vermont, although most of these states have adopted different approaches in applying DRIPE in their cost effectiveness testing. According to a presentation sponsored by the Regulatory Assistance Project,[5] Massachusetts and Maryland consider only the state effects (intrastate), Connecticut and Rhode Island consider the effects on the entire regional transmission organization (rest of pool), and Vermont includes 50% of the rest-of-pool DRIPE.

Q. How does DRIPE affect the benefit-cost analysis for the proposed programs included in the 2018-2020 plan?

A. The inclusion of both intrastate and rest-of-pool DRIPE increases the electric benefits by 0.46% in 2018, 0.30% in 2019, and 0.21% in 2020. A majority of the electric DRIPE is intrastate DRIPE with only 0.005% rest-of-pool DRIPE in 2018. The inclusion of intrastate

[4] Tabors Caramanis Rudkevich, March 25, 2016. *Avoided Energy Supply Costs in New England: 2015 Report*. Prepared for the Avoided-Energy-Supply-Component Study Group. http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/AESC_2015_%20w%20App_rev%202016_03_25.pdf

[5] Presented by Paul Chernik, Resource Insight and Chris Neme, Energy Futures Group, March 18, 2015, *The Value of Demand Reduction Induced Price Effects (DRIPE).* *http://www.raponline.org/wp-content/uploads/2016/05/efg-ri-dripewebinarslidedeck-2015-mar-18-revised.pdf*

and rest-of-pool DRIPE increases the gas benefits by 12.51% in 2018, 9.23% in 2019 and 7.39% in 2020. A majority of the gas benefits is rest-of-pool DRIPE. The intrastate DRIPE increases the gas benefits by 1.06% in 2018, 0.75% in 2019, and 0.58% in 2020. (See p. 143 of the Plan).

Q. Should DRIPE be included in the cost-effectiveness test for the 2018-2020 Plan?

A. The 2017 plan was the first plan to include DRIPE. After further review in this proceeding, Staff recommends that only some of the DRIPE benefits be included. The intrastate DRIPE should be included, but not the rest-of-pool DRIPE. As mentioned previously, the Utilities' cost-effectiveness test is the TRC Test, which takes into account the costs and benefits for the utility and the participants. Intrastate DRIPE is a benefit specific to the New Hampshire energy efficiency programs. Rest-of-pool DRIPE is a benefit of the New Hampshire energy efficiency programs, but it is a benefit to society (the rest of pool), not to New Hampshire specifically.

Q. What effect would excluding rest-of-pool DRIPE have on the cost-effectiveness test for the 2018-2020 plan?

A. Excluding the rest-of-pool gas DRIPE would potentially have a more significant impact, with some programs resulting in a benefit/cost ratio of less than 1. To estimate the benefit/cost ratio without rest-of-pool DRIPE, Staff assumed that benefit/cost ratios for the gas programs would be reduced by about 11.5% in 2018, 8.5% in 2019, and 6.8% in 2020 based on the summary tables in the 2018-2020 plan (p. 143).[6] Only one of Northern Utilities' residential programs in 2018 (Energy Star Products Program) would have a benefit/cost ratio of greater than 1.0. Three of Northern Utilities' residential programs out of

[6] Note that the estimated benefit/cost ratios without the rest-of-pool DRIPE did not account for decreased benefits from NEIs resulting from the reduced benefits that would be used as the basis for the calculating the NEIs. Therefore, the actual benefit/cost ratio may be slightly lower.

five in 2019 and two out of five in 2020 would have benefit/cost ratio greater than 1.0. For Liberty Utilities-Gas, two residential programs out of five in 2018 would have a benefit/cost ratio less than 1.0. The remainder of Liberty Utilities-Gas programs would be cost-effective even without the inclusion of any rest-of-pool DRIPE benefits.

For the electric benefits, excluding the rest-of-pool electric DRIPE will not have a significant impact on the cost-effectiveness results, because the rest-of-pool electric DRIPE only increased the benefits by 0.005% in 2018.

Q. What do you suggest regarding the programs that have a benefit/cost ratio of less than 1.0 as a result of excluding benefits that were included in the proposed plan?

A. A benefit/cost ratio of less than 1.0 is concerning. In general, programs that do not exceed a benefit/cost ratio of 1.0 are not cost-effective, and therefore, should be modified, if possible, to be cost-effective or not implemented unless the program is justified for other reasons (such as the low income exception discussed above). All but one of Northern Utilities' programs would have a benefit/cost ratio of greater than 0.95, the exception being the Home Energy Reports program, and all of Liberty Utilities Gas' programs would have a benefit/cost ratio of greater than 0.95 in 2018. To proceed with the EERS beginning in January of 2018 and to provide for program continuity, Staff recommends that the gas utilities proceed with the proposed programs for 2018, focusing on the more cost-effective programs whenever possible and reducing costs of other programs, if possible, to make them cost-effective. The incentive provided could be reduced or other utility costs could be minimized.

In addition, the Utilities, Staff and Stakeholders could convene a working group to review the benefit/cost test assumptions in early 2018, to examine any concerns with the underlying assumptions, such as the incentive levels, NEIs and DRIPE. Results of the working group

could then be incorporated in the annual updates for 2019 and 2020. In addition, new avoided cost data will be available for the 2019 annual update, so the Utilities should reevaluate the programs with the new avoided cost data and any new assumptions to determine the cost-effective programs for the 2019 program year.

Cost-Effectiveness Test

Q. As proposed in the 2018-2020 plan, were all of the proposed programs cost-effective?

A. No. Two of the proposed programs do not have a benefit-cost ratio of 1.0 or greater, meaning the present value of the benefits is less than the costs. The Home Energy Reports program for Unitil Energy Systems, Inc. in 2018 has a benefit/cost ratio of 0.75, and the Home Energy Reports program for Northern Utilities Inc. in 2020 has a benefit/cost ratio of 0.89.

Q. Please provide a brief description of the Home Energy Reports program.

A. The Home Energy Reports program encourages behavior changes by providing residential customers with a comparison of their energy usage with their efficient neighbor and an average neighbor. Behavior changes promoted include lowering of thermostats in the winter and raising them in the summer, lowering the temperature set point on water heaters, and controlling phantom plug loads. The Utilities also refer the customers to the energy efficiency programs and suggest other ways to reduce energy consumption.

Q. Is there a reason why the benefit/cost ratios for these programs are less than 1.0?

A. The Utilities explain that these programs are just beginning during these plan years, and programs often have initial higher start-up costs. Therefore, they might have a lower benefit

cost ratio initially. Note that when Eversource conducted a pilot for the Home Energy Reports program in 2013, the benefit/cost ratio for this program was less than 1.0.

Q. Do you have suggestions regarding these new Home Energy Reports Programs?

A. Yes, these programs should be monitored to ensure that after the initial start-up period, they are cost-effective. If the programs are not cost-effective, then the Utilities must examine their costs to determine if they can be reduced or if the programs can be modified in any way to make them cost-effective. If the programs cannot be modified to make them cost-effective, then Staff recommends that the programs be discontinued unless the Utilities can justify otherwise.

Q. What were the cost-effectiveness ratios of the other programs?

A. The cost-effectiveness of the other programs ranges from 1.01 for both the Home Energy Reports program for Liberty Utilities Electric in 2018 and the Municipal Energy Solutions program for New Hampshire Electric Cooperative, Inc. in 2018, to the most cost-effective program at 3.19 for the Large Business Energy Solutions program for New Hampshire Electric Cooperative, Inc. in 2019. All of these ratios include a 10% adder for NEIs and both intrastate DRIPE and rest-of-pool DRIPE.

Q. Do you have any recommendations regarding the benefit/cost test?

A. Yes, it is difficult to assess all of the underlying assumptions for each measure as presented in the plan. For more transparency and ease of review, Staff recommends that the Utilities provide an electronic workbook with the filing of each 3-year plan and annual updates, as provided in response to Data Request No. Staff 1-001. (See Attachment D for a sampling of pages from this spreadsheet.) For consistency purposes, one of the spreadsheets should list the measures by program and all the associated assumptions. Then each Utility should use

this spreadsheet as the basis for the benefit/cost calculation. If one of the Utilities assumes a different assumption than the others, then the Utility should provide justification.

Q. Do have any other recommendations regarding the plan?

A. Yes, in response to Data Request No. Staff 1-006, the Utilities developed trend charts for each program by utility showing the actual and planned budgets, the actual and planned savings (in kWh, kW, and MMBtu), and the $/kWh saved, $/kW saved, and the $/MMBtu saved. (See Attachment E for a sampling of these charts.) These charts are helpful to see trends in the programs and to compare the programs from year to year and utility to utility. Staff recommends that the Utilities provide these charts with the annual updates and initial filings.

Recommendation

Q. Please summarize your recommendations.

A. Staff recommends the following regarding the Utilities' 2018-2020 energy efficiency plan:

1. The inclusion of a 10% adder to the total benefits (excluding water benefits) for the NEIs for 2018 and 2019 only is reasonable at this time, and evidence-based, New Hampshire-specific NEIs should be proposed for 2020.
2. The Utilities should develop a list of NEIs to evaluate initially and begin reviewing NEIs from other states to determine if those values can be used in New Hampshire or could be modified. Only NEIs to the utilities and participants should be considered, not the societal NEIs.
3. The benefit/cost test should include intrastate DRIPE only and not rest-of-pool DRIPE since rest-of-pool DRIPE is a societal benefit.

4. The Utilities, Staff, and Stakeholders should convene a working group, to examine any underlying assumptions of the benefit/cost test so that they can be included in the 2019 annual updates.
5. The Utilities should submit the electronic spreadsheets associated with the benefit/cost test as part of the plan. The assumptions for each measure should be clearly listed in a spreadsheet to allow for the ease of use and to ensure consistent use of assumptions among the Utilities.
6. The Utilities should include trend charts showing the actual and planned budgets, the actual and planned savings (in kWh, kW, and MMBtu), and the $/kWh saved, $/kW saved, and the $/MMBtu saved with the annual updates and initial filings.

Q. Does this conclude your testimony?

A. Yes, it does.