

**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

_____)	
2024–2026 TRIENNIAL ENERGY)	
EFFICIENCY PLAN)	Docket DE 23-068
_____)	

**Direct Testimony of
Tim Woolf and Danielle Goldberg**

**On Behalf of
The Office of the Consumer Advocate**

September 12, 2023

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Schedule TWDG-1: Resume of Tim Woolf

Schedule TWDG-2: Resume of Danielle Goldberg

1 **I. INTRODUCTION AND QUALIFICATIONS**

2 **Q Please state your name, title, and employer.**

3 **A Mr. Woolf:** My name is Tim Woolf. I am a Senior Vice President at Synapse Energy
4 Economics (“Synapse”), located at 485 Massachusetts Avenue #3, Cambridge, MA
5 02139.

6 **A Ms. Goldberg:** My name is Danielle Goldberg. I am a Senior Associate at Synapse
7 Energy Economics, located at 485 Massachusetts Avenue #3, Cambridge, MA 02139.

8 **Q Please describe Synapse Energy Economics.**

9 **A** Synapse is a research and consulting firm specializing in electricity and gas industry
10 regulation, planning, and analysis. Our work covers a range of issues, including economic
11 and technical assessments of demand-side and supply-side energy resources, energy
12 efficiency policies and programs, integrated resource planning, electricity market
13 modeling and assessment, renewable resource technologies and policies, and climate
14 change strategies. Synapse works for a wide range of clients, including attorneys general,
15 offices of consumer advocates, public utility commissions, environmental advocates, the
16 U.S. Environmental Protection Agency, the U.S. Department of Energy, the U.S.
17 Department of Justice, the Federal Trade Commission, and the National Association of
18 Regulatory Utility Commissioners. Synapse has over 35 professional staff with extensive
19 experience in the electricity industry.

1 **Q Please summarize your professional and educational experience.**

2 **A Mr. Woolf:** I have over 40 years of experience analyzing technical, economic, and policy
3 aspects of electric utility planning and regulation. In recent years, I have focused on many
4 topics related to power sector transformation, including energy efficiency, distributed
5 energy resources, performance-based regulation, new utility business models, grid
6 modernization, and distribution system planning. I also address a variety of related
7 ratemaking issues, such as rate design, net metering rates, decoupling, and dynamic
8 pricing.

9 Before joining Synapse Energy Economics, I was a commissioner at the Massachusetts
10 Department of Public Utilities (DPU) from 2007 through 2011. In that capacity, I was
11 responsible for overseeing a substantial expansion of clean energy policies, including
12 significantly increased ratepayer-funded energy efficiency programs, an update of the
13 DPU energy efficiency guidelines, the implementation of decoupled rates for electric and
14 gas companies, the promulgation of net metering regulations, review and approval of
15 smart grid pilot programs, and review and approval of long-term contracts for renewable
16 power. I was also responsible for overseeing a variety of other dockets before the DPU,
17 including several electric and gas utility rate cases.

18 I have testified as an expert witness in more than 45 state regulatory proceedings and
19 have authored more than 60 reports on electricity industry regulation and restructuring. I
20 represent clients in collaboratives, task forces, and settlement negotiations, and I have
21 published articles on electric utility regulation in *Energy Policy*, *Public Utilities*

1 *Fortnightly, The Electricity Journal, Local Environment, Utilities Policy, Energy and*
2 *Environment, and The Review of European Community and Environmental Law.*

3 I hold a Master's in Business Administration from Boston University, a Diploma in
4 Economics from the London School of Economics, as well as a BS in Mechanical
5 Engineering and a BA in English from Tufts University. My resume, attached as
6 Schedule TWDG-1, presents additional details of my professional and educational
7 experience.

8 **A Ms. Goldberg:** I have over six years of experience in research and consulting at Synapse.
9 While at Synapse, my work has focused on energy efficiency topics, including cost-
10 effectiveness analysis, best practices for energy efficiency program design, electrification
11 strategies, and equitable distribution of benefits. Most of my energy efficiency experience
12 is in Massachusetts. However, I have also reviewed energy efficiency policies across all
13 50 states; supported energy efficiency modeling in Vermont, New Hampshire, and
14 Connecticut; and critiqued energy efficiency plans or policy in Kansas, New Jersey, Nova
15 Scotia, Minnesota, Wisconsin, Missouri, Illinois, Iowa, Ohio, Indiana, and Puerto Rico. I
16 hold a Bachelor of Science in Mechanical Engineering from Northeastern University. My
17 resume, attached as Schedule TWDG-2, presents additional details of my professional
18 and educational experience.

1 **Q Have you previously testified before the New Hampshire Public Utilities**
2 **Commission?**

3 **A Mr. Woolf:** Yes. I sponsored written testimony before the New Hampshire Public
4 Utilities Commission (the Commission) in Docket DE 99-099 Phase II on January 14,
5 2000, and in Docket DE 20-161 on August 19, 2022.

6 **A Ms. Goldberg:** Yes, I sponsored written testimony before the New Hampshire Public
7 Utilities Commission in Docket DE 20-092 on April 19, 2022.

8 **Q On whose behalf are you testifying in this case?**

9 **A** We are testifying on behalf of the Office of the Consumer Advocate (OCA).

10 **Q What is the purpose of your testimony?**

11 **A** The purpose of our testimony is to explain why the OCA generally supports the NHSaves
12 2024–2026 Plan proposal (the Triennial Plan) submitted jointly by Liberty Utilities
13 (Granite State Electric) Corp. d/b/a Liberty, New Hampshire Electric Cooperative
14 (NHEC), Public Service Company of New Hampshire d/b/a Eversource Energy, Unitil
15 Energy Systems, Inc., Liberty Utilities (EnergyNorth Natural Gas) Corp d/b/a Liberty,
16 and Northern Utilities, Inc. (Northern) (collectively, the “Utilities”). Specifically, we
17 address the Triennial Plan’s compliance with House Bill 549 (“HB 549”) (codified in
18 relevant part as RSA 374-F:3, VI-a(d)), offer some recommended improvements to the
19 Triennial Plan, explain our support for the Granite State Test for cost-effectiveness, and
20 reinforce the longstanding view of the OCA that ratepayer-funded energy efficiency
21 programs are critically important for the state’s residential utility customers. We also

1 address some critical aspects of energy efficiency resource planning, including the market
2 barriers to energy efficiency measures and the appropriate discount rate to use in benefit-
3 cost analysis of energy efficiency resources.

4 **Q What materials did you rely on to develop your testimony?**

5 **A** The sources for our testimony and exhibits are relevant New Hampshire legislation,
6 previous Commission orders, the Triennial Plan, responses to discovery requests, public
7 documents, and our professional knowledge and experience.

8 **Q Was your testimony prepared by you or under your direction?**

9 **A** Yes. Our testimony was prepared by us or under our direct supervision and control.

10 **II. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

11 **Q Please summarize your primary conclusions.**

12 **A** Our primary conclusions are as follows:

- 13 1. The Triennial Plan meets the requirements of HB 549.
- 14 2. The energy efficiency programs in the Triennial Plan are cost-effective under the
15 Granite State Test, which is the primary test to use for this purpose according to HB
16 549. For every dollar spent on energy efficiency programs there will be \$2.3 in
17 benefits experienced by utility customers. In aggregate, all the utility programs
18 combined are expected to result in \$283 million in net benefits to utility customers.
- 19 3. There is room for improvement in the Triennial Plan, specifically additional
20 opportunities for more proactive efforts to integrate federal funding from the *Inflation*

1 *Reduction Act* (“IRA”) and recognition of additional barriers that may exist for
2 vulnerable or other underserved customers.

3 4. The Triennial Plan will help overcome the market barriers that inhibit customers from
4 adopting energy efficiency measures on their own.

5 5. The Triennial Plan uses the appropriate discount rate because it is consistent with the
6 discount rate used in New Hampshire since 1999; is consistent with the Benefit-Cost
7 Working Group recommendations from Docket DE 17-136, which were approved by
8 the Commission in December 2019; and is consistent with the principles and
9 guidance provided by the *National Standard Practice Manual for Assessing Cost-*
10 *Effectiveness of Energy Efficiency Resources* .

11 **Q Please summarize your primary recommendations.**

12 **A** Our primary recommendations are as follows:

13 1. We recommend that the Commission approve the Triennial Plan.

14 2. We recommend that, as part of the approval of the Triennial Plan, the Commission
15 direct the Utilities to adopt the further improvements to the Triennial Plan described
16 in our testimony.

17 3. We recommend that the Commission explicitly acknowledge the findings of the
18 DVM Market Barriers Study and find that the programs in Triennial Plan are
19 reasonably designed to overcome the market barriers facing customers in New
20 Hampshire.

1 4. We recommend that the Commission reaffirm that the discount rate used in the
2 Triennial Plan is appropriate, and that the Utilities should continue to use the same
3 method for determining the discount rate for future energy efficiency plans.

4 **III. THE 2024–2026 STATEWIDE ENERGY EFFICIENCY PLAN COMPLIES WITH**
5 **HOUSE BILL 549**

6 **Q Please summarize HB 549 with respect to the Triennial Plan filing.**

7 **A** HB 549, as signed into law by Governor Sununu on February 24, 2022, amended RSA
8 374-F:3, VI to include the following key provisions for the Triennial Plan:

- 9 • The energy efficiency portions of the electric utilities’ System Benefits Charge
10 (“SBC”) and the natural gas utilities’ Local Distribution Adjustment Charge
11 (“LDAC”) are set at 2020 levels and then increased every year, starting on
12 January 1, 2023, using the 3-year average of the Consumer Price Index.¹
- 13 • The Utilities are required to direct up to \$400,000 of annual SBC revenues to
14 New Hampshire’s Department of Energy to promulgate the benefits of energy
15 efficiency.
- 16 • A maximum of five percent of the overall program budget may be allocated to
17 Evaluation, Measurement, and Verification (“EM&V”) studies.

¹ This language reflects the revision from Senate Bill 113 to modify the originally adopted automatic inflation adjustment within the SBC and LDAC calculations.

- 1 • At least 20 percent of the annual SBC funds must be used for funding low-income
2 energy efficiency programs.
- 3 • The Utilities are also required to continue to seek alternative sources of funding to
4 supplement these charges.
- 5 • For electric utilities, 65 percent of overall planned annual energy savings are
6 required to come from electric system savings.²
- 7 • The Granite State Test (“GST”) is defined as the primary cost-effectiveness test
8 and the Total Resource Cost (“TRC”) test is defined as the secondary test. The
9 primary inputs to these tests are the *Avoided Energy Supply Components for New*
10 *England* (“AESC”) study, any EM&V studies commissioned by the state’s
11 Department of Energy or joint utilities, and savings that incorporate free-ridership
12 where impacts are material.

13 **Q Does the Triennial Plan comply with HB 549?**

14 **A** Yes. In the testimony that follows we will describe how the Triennial Plan meets the
15 requirements of HB 549.

² This language reflects the revision from Senate Bill 113 to clarify that 65 percent of overall planned *annual* energy savings funded by the SBC must come from electric system savings.

1 **Funding Requirements**

2 **Q What are the funding requirements for HB 549?**

3 **A** There are five primary funding requirements for HB 549:

- 4 1. The energy efficiency portions of the SBC and LDAC are set at 2020 levels and
5 then increased every year, starting on January 1, 2023, using the 3-year average of
6 the Consumer Price Index;
- 7 2. Up to \$400,000 shall be allocated for the New Hampshire Department of Energy
8 to promulgate the benefits of energy efficiency;
- 9 3. No more than five percent of program budget shall be spent on EM&V;
- 10 4. At least 20 percent of the funds collected shall be spent on low-income energy
11 efficiency; and
- 12 5. The Utilities should investigate additional funding sources for energy efficiency.

13 **Q Do the energy efficiency portions of the SBC and LDAC rates in the Triennial Plan**
14 **comply with HB 549?**

15 **A** Yes. HB 549 sets the energy efficiency portions of the SBC and LDAC at the same rate
16 as approved in 2020 and adjusted by the consumer price index. Table 1 displays the SBC
17 for 2023, 2024, 2025, and 2026. The SBC rate is set consistent with the directives in HB
18 549.

19 **Table 1. SBC charges for 2023, 2024, 2025, and 2026—all utilities**

Year	SBC Rate (EE Portion) (\$/kWh)
2023	\$0.00550

2024	\$0.00577
2025	\$0.00603
2026	\$0.00619

1 *Sources: Triennial Plan Attachment E3, Attachment F3, Attachment, G3, Attachment H3.*

2 Table 2 displays the energy efficiency portion of the LDAC for 2023, 2024, 2025, and
3 2026, broken out by customer segment. The LDAC rates for Northern and EnergyNorth
4 are calculated consisted with the directives in HB 549.

5 **Table 2. LDAC charges for 2023, 2024, 2025 and 2026, by utility and customer segment**

Year	LDAC (EE Portion) (\$/therm)	
	Northern	EnergyNorth
2023	Res: 0.0520 C&I: 0.0257	Res: 0.0667 C&I: 0.0444
2024	Res: 0.0545 C&I: 0.0269	Res: 0.0699 C&I: 0.0466
2025	Res: 0.0570 C&I: 0.0282	Res: 0.0731 C&I: 0.0487
2026	Res: 0.0585 C&I: 0.0289	Res: 0.0750 C&I: 0.0500

6 *Sources: Triennial Plan Attachment J3, Direct Testimony of Tyler Culbertson page 5.*

7 **Q Did the Utilities set aside up to \$400,000 of SBC funds for the New Hampshire**
8 **Department of Energy?**

9 **A** Yes. As indicated in Section 1.3.1 of the Triennial Plan, the electric utilities account for
10 their share of the \$400,000 of SBC charges by reducing the amount of funding available
11 for their total program budgets.

12 **Q Do EM&V costs comprise of 5 percent or less of the total energy efficiency budget?**

13 **A** Yes. Table 3 below displays the combined electric and gas energy efficiency budgets, by
14 sector, for Program Years 2024, 2025, and 2026. The EM&V costs as a percent of the
15 total budget range from 4.5 to 5.0 percent, complying with HB 549.

1 **Table 3. EM&V costs as a percent of total**

Sector by Year	Total Program Costs	EM&V Costs	EM&V Costs as a % of Total
2024	\$79,113,966	\$3,873,388	4.9%
A - Residential	\$27,576,397	\$1,358,590	4.9%
B - Income Eligible	\$15,759,417	\$730,185	4.6%
C - Commercial & Industrial	\$35,778,152	\$1,784,614	5.0%
2025	\$81,856,554	\$3,795,871	4.6%
A - Residential	\$29,007,359	\$1,341,033	4.6%
B - Income Eligible	\$16,679,590	\$750,834	4.5%
C - Commercial & Industrial	\$36,169,605	\$1,704,005	4.7%
2026	\$84,494,366	\$3,919,303	4.6%
A - Residential	\$30,568,656	\$1,428,492	4.7%
B - Income Eligible	\$17,314,417	\$785,471	4.5%
C - Commercial & Industrial	\$36,611,293	\$1,705,340	4.7%
Total (2024–2026)	\$245,464,886	\$11,588,563	4.7%

2 *Source: Utilities Benefit-Cost Models. Primary Data Tab.³*

3 **Q Is at least 20 percent of the total energy efficiency budget allocated for low-income**
4 **programs?**

5 **A** Yes. Table 4 displays the combined electric and gas energy efficiency budget for each
6 customer sector and as a percent of the total energy efficiency budget. For 2024, 2025,
7 and 2026, the low-income budget comprises 20 percent of the total budget.

8 **Table 4. Low-income budget as a percent of total**

Sector	2024		2025		2026	
	Total Program Budgets	Percent of Total Budget	Total Program Budgets	Percent of Total Budget	Total Program Budgets	Percent of Total Budget
A - Residential	\$27,576,397	35%	\$29,007,359	35%	\$30,568,656	36%
B - Low-Income	\$15,759,417	20%	\$16,679,590	20%	\$17,314,417	20%
C - Commercial & Industrial	\$35,778,152	45%	\$36,169,605	44%	\$36,611,293	43%
Total	\$79,113,966	100%	\$81,856,554	100%	\$84,494,366	100%

9 *Source: Utilities Benefit-Cost Models. Primary Data Tab.⁴*

³ Utilities live Excel Benefit-Cost Models as filed in conjunction with the Plan filing (Plan Narrative and Attachments) filed on June 30, 2023. Data obtained from Primary Data Tab.

⁴ *Ibid.*

1 **Q Did the Utilities investigate alternative sources of funding and financing for energy**
2 **efficiency?**

3 **A** Yes. Before the 2022–2023 Energy Efficiency Plan, the Utilities commissioned a report
4 in January 2020 to investigate external funding and partnership opportunities.⁵ The report
5 did not uncover meaningful opportunities for external funding.

6 The Utilities continue to offer all customer segments a variety of financing options to
7 support investments in energy efficiency. These include partnering with local lenders to
8 provide low-interest loans for residential customers, buying down interest rates to zero
9 percent for moderate-income customers, and connecting customers to private financing
10 options.

11 Lastly, in Section 1.3.3 of the Triennial Plan the Utilities state that they are engaged with
12 community partners and the New Hampshire Department of Energy to identify
13 opportunities to leverage funds from the federal *Infrastructure Investment and Jobs Act*
14 and the IRA.

15 Please see Section IV of this testimony for recommendations regarding federal funding.

16 **Savings Requirements**

17 **Q What are the savings requirements for HB 549?**

18 **A** HB 549 requires that, for electric utility energy efficiency programs, at least 65 percent of
19 annual energy savings come from electric energy savings.

⁵ NHSaves 2022-2023 Plan, March 1, 2022. Attachment O.

1 **Q Do the electric utilities comply with these savings requirements?**

2 **A** Yes. Table 5 below summarizes annual electric savings as a percent of total annual
 3 savings for each utility in the Utilities’ Triennial Plan. For all three years, annual electric
 4 savings as a percent of total annual energy savings exceed 65 percent. Percentages range
 5 from 71 percent to 86 percent.

6 **Table 5. Electric savings as a percent of total energy savings**

Utility	Net annual electric savings (MWh)	Net annual non-electric savings (MWh)	Electric savings as a percent of total energy savings (%)
2024	101,025	16,979	86%
Eversource	75,002	12,000	86%
Liberty	7,254	1,671	81%
NH Elec Coop	7,335	2,886	72%
Unitil	11,434	422	96%
2025	100,393	18,550	84%
Eversource	74,305	13,428	85%
Liberty	6,790	1,645	80%
NH Elec Coop	7,855	3,054	72%
Unitil	11,443	422	96%
2026	99,543	19,474	84%
Eversource	74,091	14,310	84%
Liberty	6,306	1,604	80%
NH Elec Coop	7,700	3,138	71%
Unitil	11,447	422	96%
Total (2024–2026)	101,025	16,979	86%

7

8 **Cost-Effectiveness**

9 **Q What does HB 549 require for Commission review of cost-effectiveness?**

10 **A** HB 549 requires the Commission to use the GST as the primary cost-effectiveness test in
 11 its review of the NHSaves programs. It also allows the Commission to use the TRC test
 12 as a secondary test. The legislation further directs the Commission to base its review
 13 upon the latest AESC study for New England, as well as EM&V results, including for
 14 free-ridership.

1 **Q What is the difference between a primary and a secondary cost-effectiveness test?**

2 **A** The purpose of a primary test is to inform whether the Utilities' proposed investments in
3 energy efficiency create more benefits than costs and therefore merit approval by the
4 Commission. The primary test is the main determinant of whether an energy efficiency
5 program should be included in the Triennial Plan.

6 A secondary test is meant to support the primary test by helping to enhance the overall
7 understanding of the energy efficiency impacts. The additional information from a
8 secondary test can help to prioritize energy efficiency programs and to inform decisions
9 regarding marginally cost-effective programs and allocation of resources. The secondary
10 test is not intended to undermine the purpose or the application of the primary test.⁶

11 **Q Please describe the Granite State Test.**

12 **A** The GST is a jurisdiction-specific cost-effectiveness test that compares the present value
13 of the future stream of benefits to the present value of the future stream of costs for
14 energy efficiency programs over their useful lives. If the present value of benefits is
15 greater than the present value of costs to deliver those programs, then it is determined to
16 be cost-effective (i.e., it has a benefit-cost ratio of 1.0 or above).

17 The GST includes all utility system impacts. For electric utilities, utility system impacts
18 include those associated with the generation, transmission, and distribution of electricity

⁶ National Energy Screening Project (NESP), *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources* (NSPM for DERs), August 2020, page. 3-16. Available at: <https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/>.

1 services. For gas utilities, utility system impacts include those related to the
2 transportation, storage, and distribution of gas services. The GST also includes non-utility
3 system impacts related to other fuels (i.e., oil and propane), water, low-income
4 participants, and the environmental fossil fuel savings impact based on the Regional
5 Greenhouse Gas Initiative.⁷

6 Table 6 shows the GST impacts currently quantified within the Utilities' benefit-cost
7 assessment models and their source.

8 There are additional benefits within the GST that are currently described in a qualitative
9 manner and not currently included in the Utilities' benefit-cost assessment models. These
10 benefits include avoided credit and collection costs, increased reliability, and market
11 transformation.

⁷ Synapse Energy Economics, *New Hampshire Cost-Effectiveness Review: Application of the National Standard Practice Manual to New Hampshire*, prepared for the New Hampshire Evaluation, Measurement, and Verification Working Group, October 2019, Chapter 5.

1

Table 6. Quantified Granite State Test impacts within the Triennial Plan

Category	Impact	Source
Utility System Costs	Measure costs (utility portion)	Triennial Plan Budget
	Other financial or technical support costs	Triennial Plan Budget
	Other program and administrative costs	Triennial Plan Budget
	EM&V costs	Triennial Plan Budget
	Performance incentives	Triennial Plan Budget
Utility System Benefits	Avoided energy costs	2021 AESC ⁸
	Avoided generating capacity costs	2021 AESC
	Avoided reserves	2021 AESC
	Avoided transmission costs	2021 AESC
	Avoided distribution costs	Utility-specific calculations
	Avoided transmission and distribution line losses	2021 AESC
	Avoided ancillary services	2021 AESC
	Intrastate price suppression effects (DRIPE)	2021 AESC
	Avoided compliance with RPS requirements	2021 AESC
	Avoided environmental compliance costs (embedded)	2021 AESC
Reduced Risk	2021 AESC	
Non-Utility System Impacts	Other fuel	2021 AESC
	Water resource	Average of Manchester, NH and Concord, NH water and sewer costs per gallon from July 2016. ⁹
	Income eligible (participant)	Home Energy Assistance Program Evaluation Report ¹⁰
	New Hampshire Environmental fossil fuel proxy	Regional Greenhouse Gas Initiative's dollar per ton carbon dioxide

2

3 **Q How is the GST applied?**

4 **A** The GST is applied to each program in the Triennial Plan that is designed to save energy.

5 The GST requires that each program be cost-effective. While there is no requirement for

⁸ Synapse Energy Economics. *Avoided Energy Supply Components in New England: 2021 Report*, amended May 14, 2021. Available at https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf.

⁹ Utilities live Excel Benefit-Cost Models as filed in conjunction with the Plan filing (Plan Narrative and Attachments) filed on March 1, 2022.

¹⁰ Opinion Dynamics. Home Energy Assistance Program Evaluation Report 2016-2017, Final, July 29, 2020. <https://puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/20200729-NHSaves-HEA-Evaluation-Report-FINAL.pdf>.

1 individual measures and projects to be cost-effective, on average, they must be cost-
2 effective to allow for the overall program to be cost-effective. The GST is used both
3 prospectively to assess cost-effectiveness of the Triennial Plan, and retrospectively as
4 part of annual and term reporting. Certain programs and initiatives are exempt from cost-
5 effectiveness, including evaluation or other research, education, pilots, programs in early
6 stages, and investments in income-eligible programs and customers.¹¹

7 **Q Does the Triennial Plan comply with HB 549, and the GST?**

8 **A** Yes. As shown in Triennial Plan Attachments E1, F1, G1, H1, I1, and J1, each electric
9 and natural gas program for each utility is cost-effective under the GST.¹² We also
10 reviewed the Utilities' live Excel benefit-cost models as filed in conjunction with the
11 Triennial Plan filing (Plan Narrative and Attachments) and found that the relevant
12 impacts of the GST were applied accurately.

13 **IV. RECOMMENDED IMPROVEMENTS TO THE TRIENNIAL PLAN**

14 **Q Do you have any recommended enhancements to improve the Triennial Plan?**

15 **A** Yes. We recommend the following enhancements:

- 16 1. A more proactive plan to integrate federal funding from the IRA into the
17 NHSaves program during the period of 2024 to 2026.

¹¹ NHSaves. Cost Effectiveness Testing 2021-2023. Presented to the New Hampshire Public Utilities Commission on March 16, 2020. Available at: <https://www.puc.nh.gov/EESE%20Board/Meetings/2020/20200316Mtg/20200316-EERS-NHSaves-Cost-Effectiveness-2021-2023.pdf>.

¹² Proposed Plan Attachments. Attachment E1, Bates 51-53; Attachment F1, Bates 103-106; Attachment G1, Bates 142-144; Attachment H1, Bates 268-270; Attachment I1, Bates 167-169; Attachment J1, Bates 187-189.

1 2. Recognition of additional barriers that may exist that inhibit vulnerable or
2 underserved customers from participating in the NHSaves programs.

3 **Q How have the Utilities characterized their access to IRA funds?**

4 **A** The Utilities state that they have not identified federal funding opportunities that they can
5 obtain directly, but rather the vast majority of funds need to be accessed and distributed
6 through the New Hampshire New Hampshire Department of Energy.¹³

7 **Q Have the Utilities identified what areas would benefit from IRA funds?**

8 **A** The Utilities have not identified specific areas where federal funding could be
9 particularly advantageous to NHSaves.¹⁴

10 **Q Do you think federal funding opportunities should be incorporated into the**
11 **Triennial Plan?**

12 **A** Yes. The Utilities should be prepared to use federal funding as soon as they have access.
13 Accordingly, we suggest including priority investments in the Triennial Plan to avoid an
14 additional delay in benefits to ratepayers. While there is uncertainty on timing when the
15 state's Department of Energy will make federal funding available to the Utilities, the
16 Utilities should be prepared to incorporate federal funding between 2024 and 2026. The
17 IRA incentives are available for a ten-year period from January 2023 through December
18 2032.¹⁵

¹³ Utilities Response to OCA 1-021.

¹⁴ Utilities Response to OCA 1-021.

¹⁵ H.R.5376 -117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16).
<http://www.congress.gov/>.

1 We recommend that the Commission encourage, and coordinate with, the Department of
2 Energy to take all reasonable steps to pursue and acquire federal funds to support energy
3 efficiency as quickly as possible. A failure to access these funds during the Triennial Plan
4 period would result in New Hampshire customers paying higher electricity and gas bills
5 than necessary.

6 Similarly, we recommend the Utilities draft a plan for how to incorporate those federal
7 funds into the NHSaves programs when the funds become available. This plan should be
8 drafted with input from the intervenors in this docket and should be filed with the
9 Commission in this docket no later than January 1, 2024.

10 **Q In addition to reducing electric and gas costs, are there other reasons why the**
11 **Utilities should access the federal funds to support the energy efficiency programs?**

12 **A** The Utilities are limited in their ability to implement all cost-effective energy efficiency.
13 HB 549 specifies that electric savings must constitute 65 percent of total savings. Federal
14 funds would provide the Utilities with flexibility to implement the strongest possible
15 programs for New Hampshire ratepayers because they would not be subject to the
16 restrictions that pertain to existing funding sources.¹⁶ The federal funds could be used to
17 pay the costs of non-electric savings for the electric utilities and non-gas savings for the
18 gas utilities.

¹⁶ Utilities Response to OCA 1-021.

1 **Q Do you have suggestions the Utilities could incorporate into their Triennial Plan?**

2 **A** Yes. We see several key areas of the Triennial Plan where federal funding can have a
3 meaningful and positive impact on ratepayers. The key areas include:

4 1. Incentives for programs that encourage cost-effective fuel-switching.

5 2. Expansion of access to weatherization.

6 **Q Why do you identify fuel-switching as an area that would benefit from federal**
7 **funds?**

8 **A** In accordance with HB 549, the Utilities are required to plan for 65 percent of total annual
9 savings funded by the SBC to be from avoided electricity consumption. This provision
10 restricts the Utilities' ability to offer fuel-switching measures. Fuel-switching measures
11 increase electricity consumption but decrease usage of other fuels, resulting in net energy
12 reduction and improved efficiency. The most popular high-efficiency fuel-switching
13 measures are heat pumps.

14 The Utilities currently offer all residential customers high-efficiency heat pump
15 incentives.¹⁷ However, the incentives are designed only to promote high-efficiency models
16 over less efficient heat pumps. The Utilities claim savings from heat pump measures based
17 only on the delta between a high-efficiency heat pump and a low-efficiency heat pump,
18 rather than the delta between a high-efficiency heat pump and a non-electric heating system
19 replacement. The small savings delta corresponds with a small incentive which is likely
20 insufficient to encourage fuel-switching.¹⁸

21 Heat pumps are a key focus area within the IRA.¹⁹ See Table 7 for a list of incentives
22 available through the IRA's High-Efficiency Energy Home Rebate Act (HEEHRA). The

¹⁷ Utilities Response to OCA 1-011.

¹⁸ Utilities Response to OCA 1-012.

¹⁹ H.R.5376 -117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16).

1 incentives include rebate amounts that scale based on income (left side of the table) and
2 tax credits that can benefit customers with sufficient tax burden (right side of the table). If
3 the Utilities can leverage funds through the New Hampshire Department of Energy and/or
4 provide supplemental educational material to consumers regarding tax benefits, New
5 Hampshire residents could see notable benefits. As the main point of contact with
6 customers installing energy efficiency measures, the Utilities are in the optimal position to
7 help customers access these benefits.

8 **Table 7. Tax credit and High-Efficiency Electric Home Rebate Act (HEEHRA) rebate amount²⁰**

High-efficiency electric home rebate			25C tax credit	
	Requirement	Rebate caps	Requirement	Credit caps
Overall	Household <150% AMI	\$14,000	Pay taxes (not refundable)	\$1,200 per year (except per below)
Overall % of measure cost		50% except 100% for households <80% AMI		30% (includes labor to install equipment but not for components)
Equipment				
Heat pumps	ENERGY STAR electric	\$8,000	Highest CEE Tier	\$2,000 ³
Heat pump water heaters	ENERGY STAR electric	\$1,750	Highest CEE Tier	\$2,000
Central air conditioner, water heater, furnace, or boiler			Highest CEE Tier	\$600
Stove, cooktop, range, or oven		\$840		
Heat pump clothes dryer	ENERGY STAR electric	\$840		
Biomass (wood) stove or boiler			>75% HHV efficiency	\$2,000
Components				
Insulation and air sealing	ENERGY STAR	\$1,600 ⁴	IECC (of two years before)	\$1,200
Windows and skylights			ENERGY STAR Most Efficient	\$600 (total)
Doors			ENERGY STAR	\$500 (\$250 per door)
Electric panels/load service centers		\$4,000	Enables qualifying equipment	\$600 ⁵
Electric wiring		\$2,500		
Measures				
Energy audit			IRS to specify	\$150

HHV = higher heating value. Highest Consortium for Energy Efficiency (CEE) Tier does not include an "advanced tier." For multifamily buildings, half of households must meet Area Median Income (AMI) requirements. States may be able to set lower caps or more stringent requirements for the Electric Home Rebate.

9
10

²⁰ Ungar, L., Nadel, S. 2022. *Home Energy Upgrade Incentives: Programs in the Inflation Reduction Act and Other Recent Federal Laws*. American Council for an Energy-Efficient Economy. Available at: <https://www.aceee.org/policy-brief/2022/09/home-energy-upgrade-incentives-programs-inflation-reduction-act-and-other>

1 **Q Why are fuel-switching incentives beneficial to New Hampshire residents?**

2 **A** Fuel-switching to efficient technologies, such as high-efficiency heat pumps, is expected
3 to reduce costs for customers long term, reduce customer reliance on volatile and high-
4 cost fossil fuel use, and decrease greenhouse gas emissions.²¹ Increased incentives for
5 fuel-switching technologies would expand customers' options without compromising the
6 savings requirements of HB 549. The incentives currently offered in the Triennial Plan
7 are unlikely to be sufficient to support customers who are interested in fuel-switching to
8 electric end uses.²² Federal funding can bridge the gap for customers who want to pursue
9 cost-effective fuel-switching.

10 **Q How can the IRA expand access to weatherization measures?**

11 **A** Table 7 displays the rebate and tax incentives for weatherization measures (including
12 insulation, window and skylights, and doors) in addition to the heat pump incentives. The
13 Utilities are limited both by the SBC and LDAC caps and the 65 percent provisions in
14 HB 549, and therefore lack sufficient funds to weatherize all New Hampshire homes that
15 currently have insufficient weatherization. The IRA incentives can help support this
16 effort and expand the number of households that can take advantage of weatherization
17 measures.

²¹ Navigant Consulting. 2019. *Energy Optimization through Fuel Switching Study. Prepare for the New Hampshire EM&V Working Group*. Pages 30-31 (Bates 42-43). Available at: https://www.puc.nh.gov/%5C/Regulatory/Docketbk/2017/17-136/LETTERS-MEMOS-TARIFFS/17-136_2019-10-31_STAFF_NH_ENERGY_OPTIMIZATION_STUDY.PDF

²² Utilities Response to OCA 1-012.

1 **Q Why are weatherization measures beneficial to households and ratepayers?**

2 **A** Weatherization measures are critical to successful efficiency programs because they not
3 only contribute to direct energy savings, but they also increase the efficiency of other
4 space heating, water heating, or cooling equipment. These measures are the foundation of
5 high-performing buildings and deliver long-term savings. Efficiency funds for
6 weatherization are used most effectively when measures are delivered in a fuel-blind
7 approach, which is the approach implemented by leading energy efficiency states
8 including Maine, Vermont, and Massachusetts.²³ Energy auditors can recommend
9 weatherization measures for all under-weatherized homes, rather than exclusively homes
10 with electric heating systems. Delivering weatherization measures to all under-
11 weatherized homes would help maximize program savings per home energy audit and
12 reduce the likelihood of lost opportunities. While it is important to protect electric
13 ratepayers from shouldering disproportionate costs of efficiency, it is also important that
14 all electric ratepayers have access to the efficiency programs they help fund—regardless
15 of whether they reap the benefits through their electric bill savings or their other fuel bill
16 savings. Further, weatherization of existing buildings is one of the critical options for
17 reducing greenhouse gases now and in the future.

²³ See weatherization offerings from Efficiency Maine, available at: <https://www.energymaine.com/at-home/weatherization/>., Efficiency Vermont, available at: <https://www.energivermont.com/rebates/list/home-performance-with-energy-star.>, and Mass Save, available at: <https://www.masssave.com/saving/residential-rebates/home-insulation>.

1 **Q What is your second recommendation for improvements to the Triennial Plan?**

2 **A** We recommend the Utilities investigate whether there are vulnerable or underserved
3 populations within New Hampshire beyond the existing income criteria.

4 **Q Have the Utilities identified vulnerable or underserved communities?**

5 **A** Somewhat. The Utilities identify and serve low- and moderate-income households
6 through their programs and partnerships with community organizations, the New
7 Hampshire Department of Energy, and other nonprofit organizations.²⁴ The Utilities have
8 commissioned the “NH Electric Efficiency Opportunities for Low- and Moderate-Income
9 Customers” study to find additional opportunities to support income-eligible customers.
10 The study is scheduled to be completed by the end of 2023.²⁵

11 The Utilities have not identified vulnerable or underserved populations on any basis other
12 than income with respect to the Triennial Plan.²⁶

13 **Q What are some examples of vulnerable or underserved communities that may exist**
14 **in New Hampshire?**

15 **A** In some cases, factors other than income can impact whether a customer is more or less
16 likely to be served by a utility program.²⁷ Factors such as ownership status (e.g., renters),
17 race, English language proficiency, or location (e.g., rural) are examples of customer

²⁴ Utilities Response to OCA 1-005.

²⁵ Utilities Response to OCA 1-006.

²⁶ Utilities Response to OCA 1-006, LISTEN 1-001, and CLF 1-007.

²⁷ Amann, J., C. Tolentino, D. York. ACEEE. *Toward More Equitable Energy Efficiency Programs for Underserved Households* (May 2023). Available at: <https://www.aceee.org/sites/default/files/pdfs/B2301.pdf>

1 characteristics that can be considered when assessing whether program benefits are
2 equitably distributed throughout New Hampshire.²⁸

3 **Q Why is it important to consider vulnerable or underserved populations beyond the**
4 **existing income criteria?**

5 **A** It would be valuable to understand whether the efforts the Utilities have made to target
6 low- and moderate-income customers are reaching customers within each of the groups
7 described above, or whether certain groups remain underserved by the NHSaves
8 programs.

9 **Q What recommendations do you have for the Utilities with respect to vulnerable or**
10 **underserved communities?**

11 **A** We recommend the Utilities use the available participation and household data from the
12 NHSaves program as well as any publicly available datasets from the Census Bureau to
13 identify whether certain groups have been historically excluded from participating in
14 NHSaves. We recommend the results of the analysis be made public so stakeholders can
15 recommend strategies for improving engagement with vulnerable or underserved
16 communities going forward.

²⁸ *Id.* Page 4.

1 **V. THE BENEFITS OF ENERGY EFFICIENCY**

2 **Q Please provide an overview of the benefits of energy efficiency to New Hampshire.**

3 **A** Energy efficiency can provide substantial benefits to New Hampshire electric and natural
4 gas customers, the economy, and the environment.

5 Cost-effective energy efficiency programs will lower system-wide electricity and natural
6 gas costs, leading to reductions in customers' energy bills. Energy efficiency can avoid
7 investments in transmission and distribution (T&D) infrastructure by creating reductions
8 in peak demand. These demand savings reduce stress on local T&D systems, potentially
9 deferring expensive upgrades or mitigating local transmission congestion problems.

10 These avoided costs are enjoyed by all customers, regardless of whether they participate
11 in energy efficiency programs.

12 Energy efficiency also provides the Commission, the Utilities, and utility customers an
13 opportunity to mitigate the impacts of high and volatile prices of wholesale electricity
14 and gas. In the past several years, the default energy service prices in New Hampshire
15 have been volatile and reached as high as 22.6 cents/kWh in August 2022 for
16 Eversource.²⁹ There are few things that the Commission, the Utilities, or the utility
17 customers can do to protect against high wholesale electricity and gas prices because
18 those prices are driven by trends in national and global energy markets. In contrast,
19 energy efficiency resources provide an opportunity for customers to mitigate the bill

²⁹ Direct Testimony of Tim Woolf and Ben Havumaki, on behalf of the New Hampshire Office of Consumer Advocate, Docket No. DE 20-161, August 2022, page 15.

1 impacts of high and volatile energy prices by directly reducing electricity and gas
2 consumption.

3 New Hampshire's energy efficiency programs also provide significant benefits to the
4 local economy.³⁰ Energy efficiency creates local jobs ranging from electricians, HVAC
5 technicians, and insulation contractors, to engineers and architects. Energy efficiency also
6 promotes local economic development and job creation by increasing the disposable
7 income of citizens and making businesses and industries more competitive. Energy
8 efficiency in public buildings (schools, hospitals, government buildings) can also help
9 reduce the tax burden on all customers by reducing government's annual operating costs.

10 **Q Please provide a summary of the specific benefits of the programs proposed in the**
11 **Triennial Plan.**

12 **A** The energy efficiency programs proposed in the Triennial Plan are all cost-effective
13 according to the GST. For every dollar spent on the programs there will be \$2.3 dollars in
14 benefits experienced by both program participants and other customers.³¹ All the electric
15 and gas programs across all the utilities are expected to generate a total of \$283 million in
16 net benefits from measures installed over the three years of the plan.³²

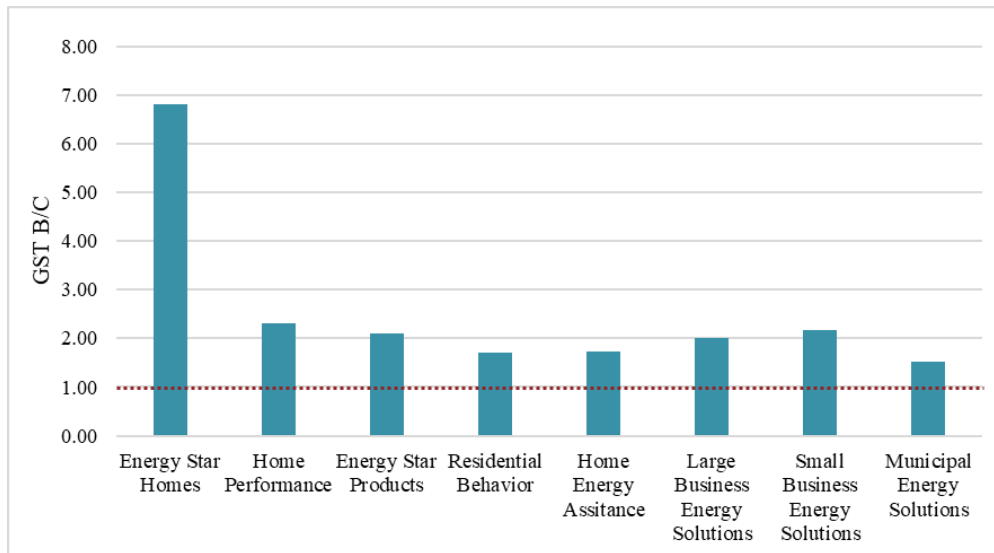
³⁰ Triennial Plan, Attachment N, *Economic Impact of NHSaves Programs*.

³¹ Triennial Plan, page 6.

³² This information was generated by compiling information from all the benefit-cost analysis models of the Utilities' Triennial Plans.

1 Figure 1 presents the benefit-cost ratios for the electricity efficiency programs for all the
2 utilities combined for the three years of the plan. As indicated, each electricity program
3 exceeds the threshold benefit-cost ratio of 1.0 by a significant margin.

4 **Figure 1. Benefit-cost ratios of electricity efficiency programs, 2024–2026³³**



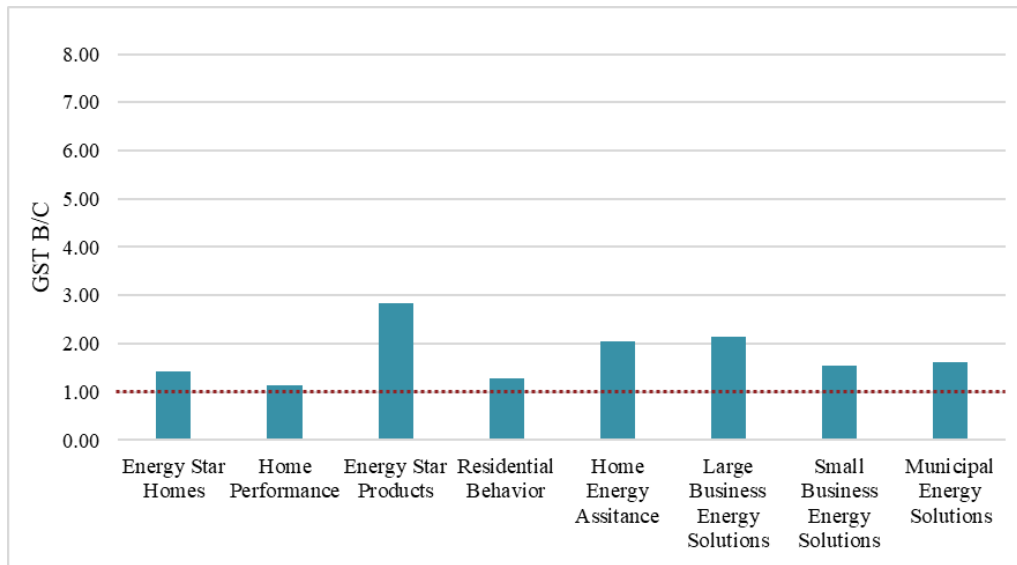
5
6 Figure 2 presents the benefit-cost ratios of the gas efficiency programs for all the utilities
7 combined for the three years of the plan. As indicated, each gas program exceeds the
8 threshold benefit-cost ratio of 1.0 by a significant margin.

9

³³ This information was generated by compiling information from all the benefit-cost analysis models of the Utilities' Triennial Plans.

1

Figure 2. Benefit-cost ratios of gas efficiency programs, 2024–2026³⁴



2

3

Figure 3 presents the benefits, costs, and net benefits of the electricity efficiency

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programs combined for the three years of the plan. In aggregate across all programs, the

5

costs of the program are expected to be \$194 million, the benefits are expected to be \$447

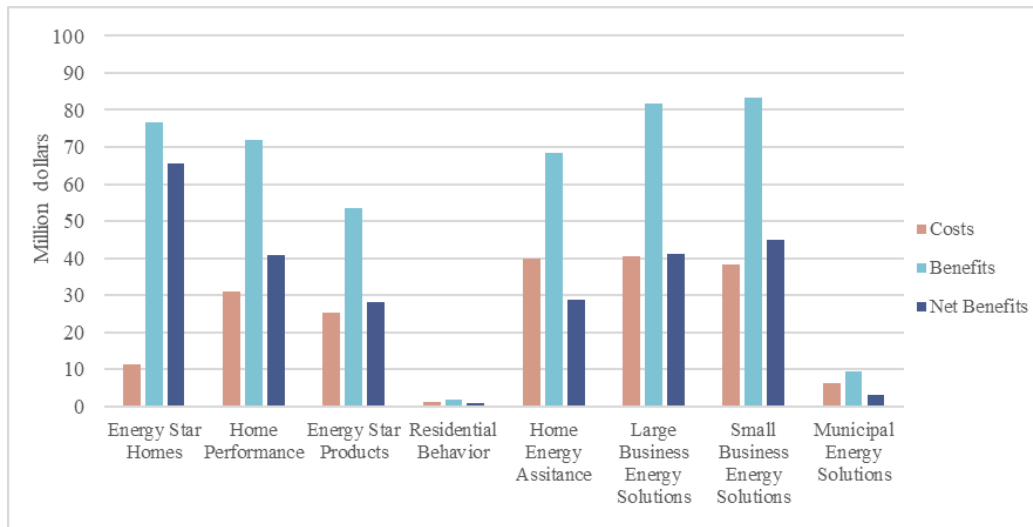
6

million, and the net benefits are expected to be \$253 million.

³⁴ This information was generated by compiling information from all the benefit-cost analysis models of the Utilities' Triennial Plans.

1

Figure 3. Costs, benefits, and net benefits of electricity efficiency programs, 2024–2026³⁵



2

3

Figure 4 presents the benefits, costs, and net benefits of the gas efficiency programs

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combined for the three years of the plan. In aggregate across all programs, the costs of the

5

program are expected to be \$36 million, the benefits are expected to be \$67 million, and

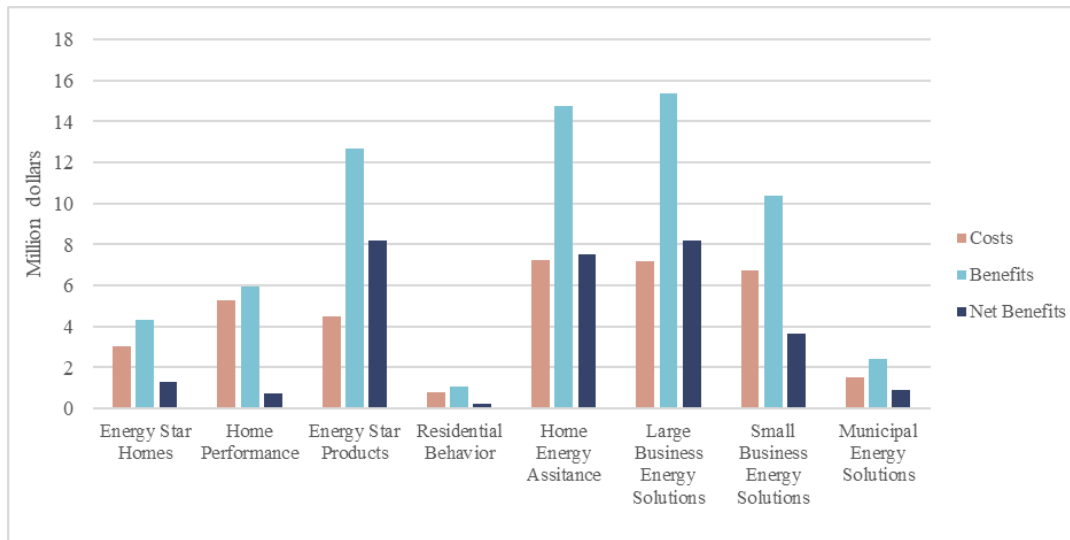
6

the net benefits are expected to be \$31 million.

³⁵ This information was generated by compiling information from all the benefit-cost analysis models of the Utilities' Triennial Plans.

1

Figure 4. Costs, benefits, and net benefits of electric and gas efficiency programs, 2024–2026³⁶



2

3 VI. MARKET BARRIERS

4 **Q Please describe what is meant by market barriers to energy efficiency.**

5 **A** Market barriers refer to real-world obstacles that hinder electricity and natural gas
6 customers from adopting energy efficiency measures on their own. In a perfectly
7 functioning economy, all customers would adopt efficiency measures that result in long-
8 term financial gains and product availability would directly follow product demand. In
9 reality, markets for energy and for energy efficiency goods and services are imperfect and
10 hence fail to produce an efficient outcome.

11 **Q Does the Triennial Plan address market barriers?**

12 **A** Yes. The Triennial Plan explains that the NHSaves programs are designed to overcome
13 the market barriers that inhibit customers from adopting cost-effective energy efficiency

³⁶ This information was generated by compiling information from all the benefit-cost analysis models of the Utilities' Triennial Plans.

1 in their homes and businesses. Some of the key market barriers addressed in the Triennial

2 Plan include:

3 reducing first-cost obstacles by providing customer incentives; increasing
4 stocks of energy efficient equipment at retailers, distributors, and
5 suppliers; training and recruiting installers and other market actors in
6 highly efficient design and installation; and educating customers about the
7 benefits of energy efficiency.³⁷

8 The Triennial Plan also explains that in 2023 the Utilities commissioned an independent
9 analysis of the impact of market barriers on customer adoption of energy efficiency and
10 how energy efficiency programs can intervene, circumvent, and address these barriers.³⁸

11 **Q What were the primary objectives of the DNV Market Barriers Study?**

12 **A** The primary objectives of the DNV Market Barriers Study were to: “(1) identify and
13 detail the market barriers addressed by the NHSaves programs, (2) assess the extent to
14 which selected energy efficiency programs such as those in New Hampshire have
15 overcome such barriers, and (3) identify how New Hampshire’s programs could continue
16 to do so going forward.”³⁹

17 **Q How does the DNV Market Barriers Study describe market barriers?**

18 **A** The DNV Market Barriers Study explains that the market barriers to energy efficiency
19 are multi-faceted, complex, and affect different customers and different technologies

³⁷ Triennial Plan, page 18.

³⁸ Triennial Plan, page 18, and Attachment N: *Market Barriers to Energy Efficiency*, prepared by DNV, submitted to the New Hampshire Evaluation, Measurement, and Verification Working Group, March 27, 2023 (DNV Market Barriers Study).

³⁹ DNV Market Barriers Study, page 5.

1 differently. Consequently, the solutions to address market barriers are manyfold and need
2 to be tailored differently to different technologies and customer types. The study also
3 explains that the energy efficiency market is ever-changing, and so are the barriers to
4 energy efficiency. Consequently, the initiatives to address market barriers need to evolve
5 as well.

6 The DNV Market Barriers Study provides several categories of market barriers, based on
7 the literature for this topic. These categories include:

- 8 • Financial – barriers associated with end users’ financial costs of adopting energy
9 efficiency, including limited access to financing, internal competition for capital
10 resources, and transaction costs such as time and labor for project installation.
- 11 • Informational – barriers associated with obtaining information or lacking sufficient
12 information, such as limited awareness of savings potential or limited access to
13 information to assess and verify vendor claims of performance.
- 14 • Organizational – barriers associated with the structure or practices of end-user
15 organizations, including split incentives whereby owners or landlords decide whether
16 to install efficient equipment, rather than occupants who pay energy bills.
- 17 • Supply and provision – barriers associated with energy efficiency suppliers’ resources
18 and practices, including workforce capacity and training limitations, and limited
19 product availability.

- 1 • Behavioral – barriers associated with the behavioral patterns of end users, which can
2 include factors such as end user habits, skepticism or lack of trust in the benefits of
3 energy efficiency, or social group dynamics limiting adoption.
- 4 • Public policy – barriers associated with public policies (or lack thereof) causing
5 distortion in market prices or behaviors, including externalities or costs that are
6 associated with transactions, but are not reflected in the transaction price (e.g., the
7 potentially harmful consequences of economic activities on the environment).”⁴⁰

8 **Q How did the DNV Market Barrier Study identify and describe the market barriers**
9 **addressed by the NHSaves programs?**

10 **A** The DNV Market Barriers Study provides a summary of the types of energy efficiency
11 program interventions that are typically used by energy efficiency program administrators
12 to overcome market barriers. These include, for example: (a) financial incentives, such as
13 discounts and rebates; (b) information and promotion, such as marketing and educational
14 materials; and (c) technical assistance, such as engineering, design, and other technical
15 support services.⁴¹

16 The DNV Market Barrier Study then conducted several case studies of the NHSaves
17 programs offered in the 2022–2023 EE Plan. It reviews several programs that collectively
18 address all the market barriers expected in that plan, including Residential Retail
19 Lighting, Residential Weatherization, Residential New Construction, C&I Lighting
20 Controls, and Industrial Process programs. For each program, the study characterizes the

⁴⁰ DNV Market Barriers Study, page 2.

⁴¹ DNV Market Barriers Study, page 3, Table 1-1.

1 market barriers and summarizes the remaining savings opportunities available if the
2 market barriers can be addressed.⁴²

3 **Q What were the key findings of the DNV Market Barriers Study?**

4 **A** The DNV Market Barriers Study found that the NHSaves programs “vary in the extent to
5 which they have circumvented or eliminated market barriers.”⁴³ The Residential Retail
6 Lighting program has “helped eliminate market barriers, and program interventions are
7 no longer needed in most cases.”⁴⁴ Accordingly, the Utilities are discontinuing this
8 program in the Triennial Plan.

9 However, the DNV Market Barriers Study finds the efficiency measures offered by all
10 the other NHSaves programs “still face a range of barriers and savings opportunities that
11 justify continued program intervention.”⁴⁵ The study identified the Residential
12 Weatherization and C&I Lighting Controls programs as presenting the greatest
13 opportunities for savings from the NHSaves program.⁴⁶

14 **Q Are the findings of the DNV Market Barrier Study consistent with your**
15 **understanding of the market barriers that inhibit customer adoption of cost-**
16 **effective energy efficiency measures?**

17 **A** Yes. The DNV Market Barriers Study is consistent with many other studies of the market
18 barriers to energy efficiency measures. The existence of market barriers to cost-effective

⁴² DNV Market Barriers Study, page 5, Table 1-2.

⁴³ DNV Market Barriers Study, page 7.

⁴⁴ DNV Market Barriers Study, page 7.

⁴⁵ DNV Market Barriers Study, page 7.

⁴⁶ DNV Market Barriers Study, page 7.

1 energy efficiency savings has been analyzed throughout the industry for over 30 years.
2 As far back as 1988, a study conducted for the National Association of Regulatory Utility
3 Commissioners by the Lawrence Berkeley National Laboratory identified and defined
4 these market barriers and clearly articulated why utility-funded energy efficiency
5 programs are needed to overcome them.⁴⁷

6 These barriers are the reason why utility-funded energy efficiency programs exist in the
7 first place; if customers were able to adopt cost-effective energy efficiency measures on
8 their own, there would not be a need for utility-funded energy efficiency programs in any
9 state. The fact that nearly every state in the United States offers utility-funded energy
10 efficiency programs clearly indicates that legislators, commissions, and other decision-
11 makers around the country recognize that market barriers to energy efficiency still
12 exist.⁴⁸

13 **Q Do restructured electricity markets with competitive wholesale generation help to**
14 **overcome these market barriers to energy efficiency adoption?**

15 **A** No. Since 1998, decades of experience have shown that ratepayer-funded energy
16 efficiency is still critically important in restructured electric markets. Competitive
17 electricity generation markets help to promote more efficient and economic *wholesale*
18 *generation* of electricity but do very little to help with the provision of *energy efficiency*
19 *services at the retail, end-use level*, because they do not address the many market barriers

⁴⁷ National Association of Regulatory Commissioners, *Least-Cost Utility Planning Handbook for Public Utility Commissioners, Volume 2, the Demand Side: Conceptual and Methodological Issues*, prepared by Lawrence Berkeley National Laboratory, December 1988. See especially Chapter II.

⁴⁸ American Council for an Energy-Efficient Economy, *2022 State Energy Efficiency Scorecard*, December 2022. See especially Table 7.

1 facing energy efficiency. These barriers exist in restructured and regulated markets alike
2 and require utility-funded energy efficiency programs and supporting regulatory policies
3 to overcome them.

4 A prime example can be found with New York State’s Reforming the Energy Vision
5 (“REV”) initiative. As part of REV, New York transitioned away from utility mandates
6 to a market-based approach for energy efficiency and many other utility services. The
7 initiative sought to enable a competitive market for energy efficiency that would be
8 driven by the value it creates, with the utilities acting as Distribution System Platform
9 Providers.⁴⁹ Despite an aggressive promotion of the efficiency market through the New
10 York REV process, the competitive market for energy efficiency products and services
11 did not materialize. In recognition of the importance of achieving robust energy
12 efficiency savings and the limitations of the competitive energy efficiency markets, in
13 2018 the New York Public Service Commission issued an Accelerated Efficiency Order
14 directing the enhancement and acceleration of energy efficiency by investor-owned
15 utilities. The Order dramatically increased the savings targets and funding for utility-run
16 energy efficiency programs.⁵⁰

17 Additional examples can be seen with the number of restructured states in the Northeast
18 and across the country that still have ratepayer-funded energy efficiency programs
19 implemented by either utilities or third-party program administrators. In fact, many of the

⁴⁹ NYS Department of Public Service Staff Report and Proposal. 2014. Case 14-M-0101.

⁵⁰ Case 18-M-0084. Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios through 2025. January 16, 2020.

1 most successful energy efficiency programs in the country are currently offered by states
2 in regions with wholesale competitive electricity markets. Nine of the top ten states
3 offering energy efficiency programs are in regions with competitive wholesale markets:
4 including California (#1), Massachusetts (#2), New York (#3), Vermont (#4), Maine (#5),
5 Washington DC (#6), Rhode Island (#7), Maryland (#8), and Connecticut (#9).⁵¹ This
6 “top ten” list includes all the states in New England except for New Hampshire.

7 **VII. DISCOUNT RATES**

8 **Q What discount rate do the Utilities use to calculate the present value of the costs and**
9 **benefits of the energy efficiency programs?**

10 **A** The Utilities use a real discount rate of 2.78 percent.⁵²

11 **Q How is this discount rate derived?**

12 **A** The Utilities start with a nominal discount rate based on the nominal U.S. prime rate on
13 or around June 1 of the year preceding the year analyzed in the EE Plan. In June 2023
14 this value was 8.25 percent.⁵³

15 The Utilities then determine a real discount rate by removing the effect of inflation from
16 the nominal rate. The inflation rate for the period between Q1 2022 and Q1 2023 was
17 5.33 percent. When this inflation effect is removed from the nominal discount rate, the

⁵¹ American Council for an Energy-Efficient Economy, *2022 State Energy Efficiency Scorecard*, December 2022. See especially Table 3.

⁵² Triennial Plan, page 87.

⁵³ Triennial Plan, page 87.

1 real discount rate equals 2.78 percent.⁵⁴ The Utilities then apply the real discount rate to
2 the costs and benefits in real dollars, to determine the present values of costs and benefits.

3 **Q Do you agree with the Utilities that this is the most appropriate discount rate to use**
4 **for the Triennial Plan?**

5 **A** Yes. This is consistent with practice used by the Utilities since 1999, based on the Final
6 Energy Efficiency Working Group Report in Docket DR 96-150. It is also consistent with
7 the Benefit-Cost Working Group recommendations from Docket DE 17-136, which were
8 approved by the Commission in December 2019 in that docket. Further, it is consistent
9 with the guidance on discount rates provided in the *National Standard Practice Manual*
10 *for Assessing Cost-Effectiveness of Energy Efficiency Resources* (NSPM for EE)⁵⁵ and
11 the *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy*
12 *Resources* (NSPM for DERs).⁵⁶

13 **Q Please summarize the guidance from the NSPM for EE and the NSPM for DERs on**
14 **discount rates.**

15 **A** The NSPM for EE and the NSPM for DERs do not prescribe a specific discount rate that
16 should be used in each state or jurisdiction. Instead, they offer several principles to use

⁵⁴ Triennial Plan, page 87.

⁵⁵ National Efficiency Screening Project, *The National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*, May 2017, Chapter 9. Mr. Woolf was the lead technical author of this report.

⁵⁶ National Efficiency Screening Project, *The National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, August 2020, Appendix G. Mr. Woolf was the lead technical author of this report. In general, the NSPM for DERs was intended to supplant the NSPM for EE. However, the discussion of discount rates is more expansive in the NSPM for EE, so we refer to that manual frequently here.

1 for determining which discount rate might be appropriate for each jurisdiction. These
2 include:⁵⁷

- 3 • The discount rate represents a time preference for the value of money in the short
4 term versus the value of money in the long term.
- 5 • The choice of discount rate is a policy decision that should be informed by each
6 jurisdiction’s energy policies and goals.
- 7 • Discount rates can reflect a variety of different perspectives, e.g., the utility
8 perspective, the customer perspective, or the societal perspective. The choice of a
9 discount rate for assessing energy efficiency programs should be informed by the
10 “regulatory perspective,” which reflects the perspective of commissions or other
11 agents that oversee the utility energy efficiency programs. The regulatory perspective
12 is guided by the jurisdiction’s energy policies and goals, established in laws,
13 regulations, orders, or other forms. The regulatory perspective should balance the
14 interests of utility investors, utility management, utility customers, and other
15 stakeholders affected by the energy efficiency programs.
- 16 • The choice of a discount rate should be consistent with the goal of the benefit-cost
17 analysis. In general, the goal of benefit-cost analysis for energy efficiency programs
18 is to identify those programs that are most likely to best serve customers over the long
19 term, while also achieving the energy policy goals of the jurisdiction. In other words,

⁵⁷ NSPM for EE, Section 9.1.

1 the goal of the benefit-cost analysis is to identify those energy efficiency programs
2 that will promote low-cost, safe, reliable utility services to customers.

3 **Q Is the utility weighted average cost of capital (WACC) an appropriate discount rate**
4 **to use for assessing the cost-effectiveness of energy efficiency?**

5 **A** No. The utility WACC represents the time preference of utility investors, i.e., its
6 shareholders and bondholders. It is a good way to represent the cost of capital to utility
7 investors, as well as the risk that investors face regarding the value of money today
8 versus in the future. However, the WACC does not reflect the time preference of utility
9 customers, nor does it reflect a reasonable time preference from the regulatory
10 perspective.⁵⁸

11 A discount rate based on the utility WACC is not consistent with the goals of the energy
12 efficiency benefit-cost analysis. Using a discount rate based on the utility WACC will
13 help identify energy efficiency programs that will maximize investor value. But
14 maximizing investor value is not the goal of the energy efficiency programs or of the
15 benefit-cost analysis of them. The goal of the energy efficiency programs is to provide
16 low-cost, safe, reliable utility services to customers. This goal will not be served using
17 the WACC as a discount rate.

18 Further, the Utilities do not use debt or equity to fund their energy efficiency programs.
19 Instead, they use the revenues obtained through the System Benefits Charge and the

⁵⁸ NSPM for EE, Section 9.5.

1 Local Distribution Adjustment Charge, which are simply passed on to customers as an
2 expense. This is a very low-risk source of funding for the utilities.

3 **Q The WACC is the conventional approach that unregulated, for-profit companies use**
4 **to set discount rates for benefit-cost analysis. Why is it not appropriate for**
5 **regulated, investor-owned utilities to use WACC as a discount rate?**

6 **A** This is one of the most important questions regarding the determination of discount rates.
7 It is a common misperception that regulated, investor-owned utilities should follow the
8 conventional practice of unregulated, for-profit companies when setting discount rates.
9 However, the choice of discount rates is one area where regulated utilities should not
10 follow conventional practices of unregulated companies.

11 • For unregulated, for-profit companies, the WACC is a good indication of their time
12 preference because the primary objective of making investments is to maximize
13 shareholder value. In contrast, the primary objectives of regulated utilities are set by
14 legislation and regulators, not utility investors. The primary objectives are to provide
15 safe, reliable, low-cost energy services to all customers over the long term, not to
16 maximize shareholder value.

17 • For unregulated, for-profit companies, the WACC represents the cost of capital for
18 the investment being considered. In contrast, utility energy efficiency programs are
19 not funded by capital or debt.

20 • For unregulated, for-profit companies, the WACC reflects the risks to the company of
21 making the investment, i.e., the risk associated with putting money into one capital

1 investment versus a different one. In contrast, the risk to regulated, investor-owned
2 utilities of energy efficiency investments is very low.

3 In sum, unregulated, for-profit companies have very different time preferences than
4 regulated, investor-owned utilities, and these different time preferences dictate different
5 discount rates.⁵⁹

6 **Q Is the utility customer cost of capital an appropriate discount rate to use for**
7 **assessing the cost-effectiveness of energy efficiency?**

8 **A** No. First, the cost of capital is only one factor that will influence a customer's time
9 preference. Customers are interested in several aspects of utility services other than just
10 the costs, such as reliability, resilience, price volatility, and power quality.⁶⁰ The value of
11 these aspects is not reflected in a customer cost of capital.

12 Second, the customer cost of capital can vary widely across customer classes and within
13 customer classes. Some commercial and industrial customers might have relatively low
14 cost of capital, whereas residential customers might have higher cost of capital depending
15 upon their financial circumstances. Low-income customers, who might have to rely upon
16 credit card debt for new capital, might have a much higher cost of capital than an affluent
17 homeowner who can get a second mortgage to get more capital. This higher cost of
18 capital for low-income customers should not result in a higher discount rate for them,

⁵⁹ NSPM for EE, Section 9.5, page 77.

⁶⁰ NSPM for EE, Section 9.7.

1 because this would imply that the future value of low-income efficiency programs is
2 lower than the future value of non-low-income efficiency programs, all else being equal.

3 Third, the regulatory perspective is generally aligned with the time preferences for all
4 utility customers in aggregate. According to the NSPM for EE:

5 In some ways, the time preference from a regulatory perspective is
6 aligned with utility customers' time preference. In both cases, time
7 preference should be consistent with the objective of identifying those
8 resources that will best serve customers. The time preference from the
9 regulatory perspective, however, captures two additional considerations.
10 First, regulators/other decision-makers have a responsibility to ensure that
11 utility resources will meet applicable policy goals. Second, regulators
12 have a responsibility to consider both current and future customer
13 interests. For both of these reasons, the regulatory perspective should
14 place a higher value on long-term costs and benefits than the utility
15 customer perspective.⁶¹

16 **Q Is a social discount rate appropriate for assessing the cost-effectiveness of energy**
17 **efficiency?**

18 **A** A social discount rate might be appropriate for assessing the cost-effectiveness of energy
19 efficiency in some settings. As noted above, the discount rate should reflect the goal of
20 the benefit-cost analysis, and that goal should reflect the energy policies of the state or
21 jurisdiction. If the goals of the energy efficiency program are to achieve social benefits in
22 addition to energy benefits (such as reduced bills for low-income customers, reduced
23 criteria air emissions, reduced greenhouse gas emissions, reduced reliance upon imported

⁶¹ NSPM for EE, Section 9.7, page 79.

1 fuels, or increased jobs in the state), then a social discount rate might be appropriate.

2 Even if a social discount rate is not specifically chosen for the purpose, the discount rate
3 used to assess energy efficiency programs could be chosen to be lower than it would
4 otherwise be to reflect some of these societal goals.⁶²

5 **Q In its procedural order issued in this docket on September 1, 2023, the Commission**
6 **asks the Utilities to conduct several sensitivity analyses using different discount**
7 **rates. One of the questions asked for a sensitivity based on the Discount Rate Policy**
8 **of White House Circular A-94 of the Office of Management and Budget. The**
9 **request asks the Utilities to “[r]e-run all B/C models using the 7 percent real (social)**
10 **discount rate referred to in Section 8.c(3).” Is this an appropriate discount rate to**
11 **use for the benefit-cost analyses of the NHSaves programs?**

12 **A** No, a 7 percent real discount rate is not appropriate for the benefit-cost analyses of the
13 NHSaves program. This question misinterprets the guidance in Circular A-94 and has
14 focused on a discount rate that is not relevant for regulated utility investments in energy
15 efficiency resources.

16 **Q What is the scope and purpose of OMB Circular A-94?**

17 **A** OMB Circular A-94 provides guidance for benefit-cost analysis of federal programs, as
18 indicated in the title of the circular.⁶³ This circular does not explicitly address the
19 question of discount rates for benefit-cost analysis of regulated, investor-owned utilities
20 or unregulated, for-profit companies. OMB Circular A-94 does, nonetheless, provide
21 useful guidance on the choice of discount rates for certain types of benefit-cost analyses.

⁶² NSPM for EE, Section 9.9, page 82.

⁶³ The U.S. Office of Management and Budget, *Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (OMB Circular A-94).

1 But it is critical to be careful in interpreting the guidance because it covers different types
2 of benefit-cost analyses.

3 **Q Which type of benefit-cost analyses does OMB Circular A-94 address?**

4 **A** OMB Circular A-94 provides guidance on benefit-cost analyses for public investments,
5 regulatory analyses, and various types of government spending. Public investments
6 include programs that provide benefits and costs to the general public.⁶⁴ Regulatory
7 analyses assess the costs and benefits imposed on society of government regulations,
8 such as environmental regulations established by the U.S. Environmental Protection
9 Agency.⁶⁵ Various government spending initiatives include internal government
10 investments, asset sale analysis, and lease-purchase analyses.⁶⁶

11 **Q Which type of investment does Section 8(c)3 of OMB Circular A-94 address?**

12 **A** Section 8.c(3) refers specifically to internal government investments, as indicated in the
13 title of the section. This section recommends the use of a 7 percent real discount rate,
14 based on the discussion in Section 8.b of the circular.

15 Section 8.b of the circular refers to public investments and regulatory analyses and
16 explains that these “displace both *private* investment and consumption” (emphasis
17 added). Here, the term “private” refers to non-governmental, non-public investments,
18 which can include investments by for-profit companies or private individuals. For such

⁶⁴ OMB Circular A-94 Section 8(b).

⁶⁵ OMB Circular A-94 Section 8(b).

⁶⁶ OMB Circular A-94 Section 8(b).

1 private investments, a real discount rate of 7 percent might be appropriate if it reflects the
2 time preferences of the investors. But the key issue here is that the perspective of private
3 investors is not consistent with the regulatory perspective, as described above. Therefore,
4 this guidance from OMB Circular A-94 should not be used to set the discount rate for the
5 NHSaves program.

6 **Q Is there other guidance from OMB Circular A-94 that is relevant to this discussion**
7 **of discount rates?**

8 **A** Yes. Sections 8c(1), 8c(2), and 8c(4) provide guidance on cost-effectiveness analyses in
9 general, on lease-purchase analyses, and on asset sale analyses, respectively. Each of
10 these sections recommend using a comparable-maturity US Treasury borrowing rate for a
11 discount rate, which reflects a low-risk cost of capital. In this way, the US Treasury
12 borrowing rate is comparable to the federal prime rate; they both represent low-risk
13 investment options. In fact, the first part of Section 8c(3), the section referred to by the
14 Commission request, also recommends the use of a comparable-maturity US Treasury
15 rate for internal government investments. It is only in the instance of some federal
16 activities that affect private investors where a 7 percent real discount rate is appropriate.

17 In sum, several sections of OMB Circular A-94 recommend using a low-risk discount
18 rate, consistent with the discount rate used for the NHSaves program. Except in the case
19 of government initiatives that affect private investors—a situation that does not apply to
20 benefit-cost analyses of energy efficiency programs funded by customers of regulated
21 utilities.

1 **Q Does a 7 percent real discount rate reflect a “social” discount rate, as indicated in**
2 **the Commission’s request quoted above?**

3 **A** No. Social discount rates tend to be much lower than 7 percent because they generally
4 reflect lower risks, lower costs of capital to society, a greater emphasis on long-term
5 impacts, diverse societal perspectives, and relevant societal goals. Real social discount
6 rates can vary significantly but tend to be in the range of roughly 3 percent to negative
7 percent values.⁶⁷

8 The OMB has another circular that provides guidance on social discount rates. OMB
9 Circular A-4 provides guidance on many aspects of benefit-cost analysis of government
10 regulations.⁶⁸ This circular includes some high-level guidance on setting discount rates
11 for this purpose. This circular states that the real “rate of return on long-term U.S.
12 government debt provides a fair approximation of the social rate of time preference” and
13 that this should be the default approach for setting a social discount rate for government
14 regulatory analysis.

15 Further, OMB Circular A-4 states that “it is advisable to carefully consider the types of
16 effects that need to be discounted. Depending on the effects that you are analyzing, you
17 may be discounting using rates reflecting either society’s perspective or a private entity’s
18 perspective.”⁶⁹ This statement is consistent with our recommendation above that the
19 choice of discount rate should reflect the objective of the benefit-cost analysis being

⁶⁷ NSPM for EE

⁶⁸ The U.S. Office of Management and Budget, *Circular A-4: Regulatory Analysis*, draft for public review, April 6, 2023 (OMB Circular A-4).

⁶⁹ OMB Circular A-4, Section 12.b.

1 conducted and consideration of the parties experiencing the costs and benefits. In this
2 context, the regulatory perspective is most relevant.

3 **Q Given your answers above about the utility WACC, customer cost of capital, and**
4 **the social discount rate, what do you think is the best discount rate to use for**
5 **evaluating the energy efficiency programs in New Hampshire?**

6 **A** A low-risk discount rate is the best option for evaluating the New Hampshire energy
7 efficiency programs. A low-risk discount rate is consistent with the goals of the energy
8 efficiency programs, reflects the interests of all customers in aggregate, and is consistent
9 with the regulatory perspective.

10 A low-risk discount rate can be determined using several indicators of risk. Some of the
11 most common indicators of low risks are the U.S. prime interest rate and the interest rate
12 on long-term US Treasury bonds. The Utilities choice of using the U.S. prime interest
13 rate is a good choice for this purpose.

14 **Q Does this conclude your testimony?**

15 **A** Yes, it does.