

**STATE OF NEW HAMPSHIRE**

**BEFORE THE**

**PUBLIC UTILITIES COMMISSION**

**Docket No. DE 20-092**

**2021-2023 Triennial Energy Efficiency Plan**

**TESTIMONY OF**

**DAVID G. HILL, PH.D.**

**On behalf of Clean Energy NH**

**October 29, 2020**

**STATE OF NEW HAMPSHIRE**  
**BEFORE THE NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION**  
**DIRECT TESTIMONY OF DAVID G. HILL, PH. D.**

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I. Introduction and Qualifications

1

2 **Q: Please state your name and professional title.**

3 **A:** My name is David Hill and I am a Managing Consultant with Energy Futures Group, Inc.

4 in Hinesburg, Vermont.

5 **Q: On whose behalf are you testifying?**

6 **A:** I am testifying on behalf of Clean Energy New Hampshire (“CENH”).

7 **Q: Please describe your current role and relevant work experience.**

8 **A:** I joined Energy Futures Group (“EFG”) in January of 2020. My work since then has

9 included expert testimony on the Dominion Energy South Carolina’s 2020 Integrated Resource

10 Plan; a critical analysis for the need of a proposed natural gas pipeline expansion in New York

11 City; support for testimony on the partial transfer of ownership of a coal fired power plant in

12 Montana; analysis of the customer economics for strategic electrification in Illinois; scenario

13 modeling for statewide greenhouse gas reduction strategies in Massachusetts; and analysis of

14 cost recovery for utility efficiency and demand response initiatives in Maryland.

15 EFG is a clean-energy consulting firm headquartered in Hinesburg, Vermont, with offices

16 in Boston and New York. EFG designs, implements, and evaluates programs and policies to

1 promote investments in efficiency, renewable energy, other distributed resources, and strategic  
2 electrification. EFG staff have delivered projects on behalf of energy regulators, government  
3 agencies, utilities, and advocacy organizations in forty states, eight Canadian provinces, and  
4 several countries in Europe.

5 EFG brings to its work a unique combination of technical, economic, program, and policy  
6 expertise. EFG staff have critically evaluated hundreds of efficiency and renewable energy  
7 programs, playing key roles in developing many that have subsequently won awards for  
8 excellence. Recent work involves efficiency program portfolios and policies in each of the  
9 fifteen highest-ranking states on the ACEEE State Energy Efficiency Scorecard, as well as in  
10 Ontario, Manitoba, and British Columbia. We have also provided expert witness testimony on  
11 efficiency programs, integrated resource planning, and related policy issues in regulatory  
12 proceedings in twenty states and five Canadian provinces.

13 Prior to joining EFG, I worked for the Vermont Energy Investment Corporation  
14 (“VEIC”) for twenty-two years, starting in 1998 as an analyst, subsequently holding several  
15 positions over the decades, and serving my last five years as Director of Distributed Resources  
16 and Policy Fellow.

17 As the Director of Distributed Resources and a Policy Fellow at VEIC, I was responsible  
18 for advancing sustainable energy program design and evaluation. For two decades, I regularly  
19 led major consulting assignments at VEIC, being best known for my work in distributed energy  
20 resources, particularly solar energy. I provided expert testimony and regulatory support on  
21 renewable energy and energy efficiency in six jurisdictions in Canada and the United States. I  
22 was regularly engaged as an expert on renewable energy market design; and regulatory issues at  
23 international, national and regional conferences and workshops. I served on national, state, and

1 local level boards. I also led policy committees and conferences, and comprehensive studies of  
2 the economic, technical, and achievable potentials for sustainable energy programming. My  
3 work also supported detailed level program budget planning and implementation.

4 Over the years, I have led or significantly contributed to the design and development of  
5 more than six large programs, with annual budgets of \$100+ million, for initiatives in New  
6 Jersey, New York, Vermont, Arizona, and Maryland. My clients are in more than a dozen states  
7 and provinces, and six countries outside North America. I have conducted work for several  
8 international organizations, including the World Bank. I have also created and led the launch of  
9 Sun Shares, a subsidiary of VEIC that develops and provides community solar services to  
10 employers and their employees.

11 I have provided testimony in regulatory hearings on more than a dozen occasions and  
12 have participated in scores of technical workshops and working groups on behalf of many  
13 clients. I recently submitted and defended expert testimony on the characterization and analysis  
14 of energy efficiency and demand response in Dominion Energy South Carolina's 2020 Integrated  
15 Resource Plan on behalf of the Southern Environmental Law Center and the Coastal  
16 Conservation League. In 2019, I presented at a technical workshop on efficiency portfolio  
17 diversification and submitted supporting testimony in Nova Scotia on behalf of EfficiencyOne.  
18 In 2018, I provided testimony on behalf of the Ecology Action Centre to the Nova Scotia Utility  
19 and Review Board regarding NS Power's Advanced Metering Infrastructure project.<sup>1</sup> For the  
20 last decade, I have provided ongoing expert review and testimony on EmPOWER Maryland's  
21 energy efficiency portfolio on behalf of that state's Office of People's Counsel. I also led VEIC's

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<sup>1</sup> Nova Scotia Utility and Review Board, Matter M08349, Direct Testimony of David G. Hill on Behalf of Ecology Action Centre, January 18, 2018.

1 team in a review of utility efficiency programs for the Pennsylvania Office of Consumer  
2 Advocate on that state’s legislatively authorized efficiency initiatives (Act 129), providing  
3 testimony in 2013 and 2009. I have also provided expert review and testimony on proposed  
4 efficiency programs of Brampton and Hydro One in Ontario, on behalf of the Green Energy  
5 Coalition in 2005.

6 In addition, I have written, presented, and/or defended written analyses and/or testimony  
7 for regulatory workshops, commission staff, and legislative hearings on efficiency, alternative  
8 rate design, net metering and interconnection of distributed energy systems, and strategies for  
9 sustainable development of solar markets. This has included my work in New York,  
10 Pennsylvania, Vermont, Arizona, Michigan, and New Jersey. Further details on my work  
11 experience and education are provided in my professional resume included as **Exhibit 1**.

12 **Q. Have you previously testified before the New Hampshire Public Utilities**  
13 **Commission?**

14 **A.** No, this is my first time testifying before the New Hampshire Public Utilities  
15 Commission.

16 II. Summary

17 **Q: What is the purpose of your testimony in this hearing?**

18 **A:** The purpose of my testimony is to provide a critical review and analysis of the 2021-  
19 2023 Triennial Energy Efficiency Plan filed by the Electric and Gas utilities with the New  
20 Hampshire Public Utilities Commission on September 1, 2020 in Docket DE 20-092 (“the Plan,”  
21 “Triennial Plan,” or “NHSaves Plan”). Energy efficiency is a key resource for utility planning,  
22 and the utilities filing of a joint-three year plan provides an important opportunity for CENH and

1 other intervenors to provide review and constructive comments on how the plan as a document,  
2 and in implementation, might be improved.

3 **Q: Please summarize your key findings.**

4 **A:** While I offer several suggestions on how the Plan might be improved, my overall  
5 assessment is positive, and I recommend the Commission approve the savings targets and  
6 budgets as proposed. The second jointly filed Triennial Plan under New Hampshire's Energy  
7 Efficiency Resource Standard ("EERS") reflects continuing progress and it is a significant step  
8 forward in maximizing the economic benefits to New Hampshire's economy from energy  
9 efficiency. The efforts by the utilities and stakeholders to work collaboratively on the  
10 development and revisions to the Plan through the Energy Efficiency and Sustainable Energy  
11 ("EESA") Board and the EERS committee of that Board are commendable. These efforts result  
12 in a plan that has been well vetted, and clearly while not every party agrees to every point, the  
13 proposed plan has a significant level of "buy-in" as submitted. There are many historic and  
14 current planning and regulatory proceedings from around the country that could learn from this  
15 example.

16 **Q: What are the economic benefits that can be expected from implementation of the**  
17 **plan?**

18 **A:** They are significant. Implementation of the proposed plan results in \$912 million of total  
19 resource benefits, and net benefits using the Granite State Test ("GST") over more than \$619  
20 million. Over their lifetime, the installed measures are expected to provide customers with more  
21 than \$1.3 billion in savings on their bills for electricity, natural gas, and other fuels. This money  
22 can be saved and/or recirculated within the State's economy as residential consumers, public  
23 entities, and private businesses spend less on energy, leaving more for spending and investment

1 on other needs and priorities. The anticipated economic benefits extend to workforce  
2 development and deployment with local jobs that will be required to implement the plan. Energy  
3 efficiency employment in the state continues to experience steady growth, increasing 11.5  
4 percent from 2017 to 2019<sup>2</sup>, with only 16 percent of firms reporting no difficulties in hiring.

5 The Plan's projected net benefits are to be expected as energy efficiency is typically a  
6 least-cost resource for meeting energy needs. The Plan's projected net benefits are also  
7 consistent with the New Hampshire Office of Strategic Initiatives' 10-year strategy and the  
8 directive to pursue cost effective savings as an economic growth opportunity.<sup>3</sup>

9 Implementing the proposed plan will also provide significant environmental benefits,  
10 including avoiding an estimated 4.4 million tons of carbon dioxide equivalent greenhouse gases.  
11 To comply with the Legislative directive<sup>4</sup> the plan also includes more than \$77 million of  
12 program spending and initiatives benefiting income eligible populations.<sup>5</sup> Further comments on  
13 the economic, environmental, and social equity impacts of the plan follow in the body of my  
14 Testimony.

15 **Q: Are there areas where the Plan could be further clarified or improved in the**  
16 **Commission's Order?**

17 **A:** Yes, there are several topics I recommend be specifically addressed in the Order to help  
18 improve the plan. These are:

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<sup>2</sup> Clean Energy New Hampshire, 2019 New Hampshire Clean Energy and Employment Report, Figure 15, p.17. and Figure 16, p. 18.

<sup>3</sup> New Hampshire Office of Strategic Initiatives. *New Hampshire 10-Year State Energy Strategy*. Apr. 2018. Available at: <https://www.nh.gov/osi/energy/programs/documents/2018-10-year-state-energy-strategy.pdf>.

<sup>4</sup> House Bill 4, 2019 Session, page 25, lines 25-36.

<sup>5</sup> Triennial Plan, Table 4-4, Bates p. 135.

- 1           i. Clarification on whether the trigger for mid-term modification related to  
2                 avoided cost updates and evaluation results are a **combined** 10% change  
3                 in anticipated budget and savings or **separable** (each can be up to 10%  
4                 before trigger).
- 5           ii. Encourage formal ongoing participation by stakeholders and the EERS  
6                 Committee, as opposed to waiting for October 2022 and the start of  
7                 planning for the next Triennial cycle.
- 8           iii. Expand the Home Energy Assistance Program budget and target for cold  
9                 climate heat pumps targeting electric resistance heat replacements.
- 10          iv. As participation and market acceptance rates permit, encourage the  
11                 utilities to consider adjusting the maximum share of total project costs for  
12                 Home Performance with Energy Star downwards from the proposed 90%  
13                 level.
- 14          v. Formally recognize the value of active demand response as a strategic  
15                 asset to help with future time and location specific investments to avoid  
16                 T&D costs. Highlight the complementary abilities for ADR and  
17                 efficiency programs to be combined to maximize customer benefits.
- 18          vi. Demonstrate and characterize the potential emissions and economic  
19                 benefits from allowing the cross-fuel optimization framework.
- 20          vii. Recognize the long-term net rate impacts and the projected benefits  
21                 accruing to customers from the near-term rate increases. If near-term rate  
22                 impacts are deemed unacceptable adopt strategies for ameliorating rate  
23                 impacts instead of reducing program budgets and savings targets.



1           viii. Recognizing the uncertainties and headwinds related to COVID-19 and  
2           the scale of expansion in this Triennial Plan support the 65% threshold for  
3           minimum performance. However, make clear the expectation the threshold  
4           will increase to at least 75% for future performance periods.

5           Each of these topics is further discussed in the remainder of my Testimony.

6   **Q: Based on your review and analysis what recommendations do you have for the**  
7   **Commission?**

8   **A:** I recommend the Commission provisionally approve the 2021-2023 New Hampshire  
9   Statewide Energy Efficiency Plan as filed by the Joint Utilities on September 1, 2020. The  
10   modifications I recommend be required in a final approved Plan are:

- 11           1. Increase the total number of heat pump installations to replace existing electric  
12           resistance heat for income qualified customers to a total of 450 participants over  
13           the Triennial Plan.
- 14           2. Establish clear ongoing stakeholder collaboration processes and expectations.

15           The remainder of my testimony is presented in four sections. First, I review and  
16   highlight some of the economic and environmental benefits for New Hampshire arising from the  
17   proposed Triennial Plan. Second, I discuss several process issues where clarifications and/or  
18   improvements to the Plan should be considered in the Commission's deliberations. Next, I  
19   highlight some Plan content and analysis where I recommend modifications or changes be  
20   considered. This includes a recommendation to double the number of cold climate heat pump  
21   replacements in the Home Energy Assistance Program targeting the replacement of existing  
22   electric resistance heat. Finally, I offer a summary with my list of recommendations for the  
23   Commission's consideration.

1 III. Benefits to New Hampshire

2  
3 **Q: Can you please expand on the anticipated benefits to New Hampshire of the**  
4 **Commission approving and the utilities successfully implementing the 2021-2023**  
5 **Triennial Plan?**

6 **A:** Yes, let me start with the economic benefits. Energy efficiency as a resource creates net  
7 benefits when the costs for saving electricity and natural gas are cheaper than the cost of the  
8 displaced supply. Using the GST, as applied to the proposed electric utility portfolios as an  
9 example, Table 1 illustrates anticipated net benefits from the 2021-2023 Triennial Plan to be  
10 \$619 million. The GST benefits of \$965 million include avoided utility costs for energy,  
11 capacity, reserves, transmission and distribution, line losses, ancillary services, renewable  
12 portfolio compliance, credit and collections, and environmental compliance.<sup>6</sup>

13 *Table 1: Electric Portfolio Estimated Granite State Test Costs and Benefits*

Total All Electric Utilities						
Program Year	GST		Utility Costs	Net Benefits	B/C Ratio	
	Benefits					
2021	\$ 260		\$ 95	\$ 165	2.73	
2022	\$ 316		\$ 115	\$ 202	2.76	
2023	\$ 389		\$ 137	\$ 252	2.85	
<b>Total</b>	<b>\$ 965</b>		<b>\$ 347</b>	<b>\$ 619</b>	<b>2.78</b>	

14  
15 The utility costs reflect the full costs for delivering the efficiency programs, including  
16 measure costs, technical support, administration, monitoring and evaluation, and share older  
17 incentives. The estimated net benefits are the result of more than a doubling of the utility

<sup>6</sup> Triennial Plan, Figure 10-1 Granite State Test, Bates page 208.

1 spending on efficiency from \$150 million in the 2018-2020 plan to almost \$350 million in the  
2 2021-2023 proposed Plan.<sup>7</sup>

3           These results indicate that adopting the 2021-2023 Plan will result in a net reduction of  
4 system costs for delivering energy services of more than \$600 million. The total life-time  
5 consumer bill savings estimated from the 2021-2023 portfolio are \$1.3 Billion.<sup>8</sup> These are  
6 impressive impacts from a three-year plan highlighting the scale at which NHSaves is expected  
7 to strengthen New Hampshire's economy.

8           Although not quantified in the GST test, additional positive impacts that can be expected  
9 from adoption of the 2021-2023 Triennial Plan include reduced exposure to fuel price volatility  
10 and the reduction of risk from possible future environmental regulations, such as a cost on  
11 carbon.

12           The proposed NHSaves Plan is also notable for identifying and including direct steps to  
13 address financing for energy efficiency and workforce development. These two barriers can  
14 hinder or prevent states from capturing the economic benefits of enhanced energy efficiency  
15 portfolios, and the inclusion of strategies to support financing and workforce development are an  
16 example of how the Triennial Plan is taking a holistic perspective on how to maximize the  
17 economic benefits for the state.

18 **Q: Does the proposed 2021-2023 Triennial Plan estimate anticipated environmental**  
19 **benefits?**

20 **A:** Yes, the Plan results in a significant reduction in consumption of fossil fuels and their  
21 associated greenhouse gas, and other emissions. The Plan estimates savings of 9.6 trillion

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<sup>7</sup> Triennial Plan, Figure 1-1, Electric Programs Over Time, Bates page 17.

<sup>8</sup> Triennial Plan, Bates p. 8.

1 British Thermal Units (“Tbtu”) of natural gas, and 8.3 Tbtus of fuel oil and propane. This results  
2 in an estimated lifetime reduction of greenhouse gas emissions of 4.4 million tons. While the  
3 most appropriate value for the social cost of carbon continues to be debated, it should be clear  
4 the value is not zero. If, for example, one was to use \$112/metric ton recently approved by the  
5 Vermont Public Utility Commission<sup>9</sup>, the value of the avoided carbon emissions is \$493 million.

6 **Q: How does the proposed 2021-2023 Triennial Plan address social equity issues?**

7 **A:** The plan allocates 20 percent of the funding from the system benefits charge (“SBC”) to  
8 limited income programs.<sup>10</sup> As a result, the Home Energy Assistance (“HEA”) program is not  
9 less than 17 percent of each utility’s total portfolio budget exclusive of carryover of unspent  
10 limited income program funds from a prior year. The HEA program is a fuel neutral  
11 weatherization program designed to help income-eligible homeowners and renters reduce their  
12 energy costs and make their homes safer, healthier, and more comfortable.

13 The utilities commitment in the Plan to enhance and expand the HEA program is  
14 commendable. Energy efficiency is an important potential resource for households with limited  
15 incomes, and the HEA program aims to adopt steps to reduce barriers, increase participation, and  
16 increase savings. These include enhanced tracking and referral systems, an increased per  
17 household funding cap to allow implementation of all cost effective measures, new screening  
18 methods using the GST and a portfolio wide approach so necessary and appropriate funds can be  
19 used to address health and safety barriers to cost effective efficiency projects, a new HEA  
20 implementation manual, and new HEA pathways and “on ramps” for customers to participate  
21 and access services. Coordination between utilities and with the Community Action Agencies

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<sup>9</sup> <https://epsb.vermont.gov/?q=downloadfile/417666/138298>

<sup>10</sup> New Hampshire House Bill 4, 2019, page 25 lines 25-31.

1 that provide weatherization services are critical to efficiently providing services to this customer  
2 population.

3 The HEA program offers a comprehensive set of measures to address appliance, HVAC,  
4 and lighting end uses. The Plan estimates that up to 22 percent of New Hampshire's households  
5 meet income eligibility requirements for the program, though noting some of these have been  
6 served by utility and or weatherization programs over the last two decades. The Plan proposes to  
7 serve 7,487 participants through the electric utility programs and 1,483 participants through the  
8 gas utility program in the coming three years.

9 IV. Process

10

11 *Mid-Term Modifications*

12

13 **Q: Do you have any comments on the mid-term modification triggers?**

14 **A:** Yes. First, I strongly support integrated three-year targets and a performance period and  
15 the updating of results and cost effectiveness testing during the performance period based on  
16 evaluation results and avoided cost updates. It is also valuable to have two levels, the first  
17 requiring notification – and not resulting in any change to targets and budgets, and the second  
18 requiring Commission approval for mid-term modifications that are more substantive and would  
19 impact budgets and targets. This encourages flexibility and continuity in program management  
20 and market development. These positive features are discussed in Section 2.1.6 to 2.1.8 of the  
21 Plan.

22 One of the second-tier mid-term modifications requiring Commission approval is a  
23 change to GST portfolio benefits or primary energy savings greater than 10 percent in either

1 direction as a result of an update to avoided costs and/or evaluation findings.<sup>11</sup> My interpretation  
2 is that this means if *the combined* impact of these two factors is greater than 10 percent the  
3 trigger threshold is reached. The alternative would be that *each factor* could have up to a 10  
4 percent change before the threshold is reached. I recommend the combined impact be used for  
5 the threshold, and the Commission Order should clarify this point.

6 *Stakeholder Collaboration*

7

8 **Q: Do you have any comments related to stakeholder collaboration?**

9 **A:** I think the Triennial Plan submitted by the Joint Utilities has benefited greatly from  
10 active, structured opportunities for stakeholder input, review and iterative feedback. My  
11 experience is that plans developed in collaboration with stakeholders can have greater impacts  
12 and, in the best of cases, result in less contentious regulatory review and formal proceedings. It  
13 can be very helpful if clear expectations and guidelines for stakeholder collaboration are  
14 included in plans and regulatory orders. At times, the Commission may want to charter specific  
15 assignments for a working group – say for example to provide a working group report on a given  
16 topic by a specific date. Topics could include for example the development of equity metrics,  
17 impact and response to COVID-19, coordination between gas and electric program services,  
18 coordination of low-income initiatives, and harmonization of multi-year efficiency plans with  
19 utility Integrated Resource Plans and evaluation of non-wire alternatives. When appropriate,  
20 specific deliverable charters and deadlines as directions from the Commission helps to focus  
21 activities and encourages collaborative review and discussion of topics of greatest value for  
22 informing Commission decision making.

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<sup>11</sup> Triennial Plan, Baker page 044.

1           The 2021-2023 Triennial Plan indicates a planning stakeholder process for the 2024-2026  
2 Triennial Plan will commence in October 2022, and the stakeholder process will be conducted  
3 through scheduled meetings of the EERS committee of the EESE Board.<sup>12</sup> The timing for this  
4 activity seems appropriate, but I would also respectfully recommend that the Order approving the  
5 Plan indicate that an ongoing collaborative process be specified, most likely in coordination with  
6 the EERS committee of the EESE Board. I also recommend the Commission identify top  
7 priorities, or ask the collaborative to identify top priorities, and work plans for action on the most  
8 important items.

9 *Municipal and Main Street Initiatives*

10

11 **Q:     Do you have any comments on recruitment and marketing for the Municipal and**  
12 **Main Street Initiatives?**

13 **A:**     Yes, in general, I strongly support the objectives and design of the Municipal Programs  
14 as described in Section 3.3 of the Triennial Plan. As noted in the Plan, there are often unique  
15 barriers facing municipal projects and decision makers, and the benefits of increased efficiency  
16 and building performance accrue to the whole community in the form of lower operating and  
17 maintenance costs and enhanced indoor building environments. I support the objectives of  
18 increasing the comprehensiveness of fuel neutral municipal projects and of looking for multiple  
19 pathways to encourage participation.

20           The Plan indicates a steering committee will be established to help strategically focus  
21 municipal and main street efforts.<sup>13</sup> I agree and recommend that, to the degree possible, the  
22 recruitment and marketing efforts maintain an “open-door” stance towards qualification so that

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<sup>12</sup> Triennial Plan, Baker page 222.

<sup>13</sup> Triennial Plan, Bates p. 67.

1 instead of having to compete against other communities, each municipality has the opportunity to  
2 work with the program to identify and implement projects that meet their current situation and  
3 establish the base for future activity.

4 The municipal program budget remains essentially flat over the three-year Plan with \$1.9  
5 million per year and 220 to 227 participants.<sup>14</sup> I recommend monitoring the level of demand,  
6 and, if this level of budget is insufficient to meet demand, that reallocation of budget from other  
7 C/I initiatives may be warranted.

8 *Energy Optimization Pilot*

9

10 **Q: Do you support the Energy Optimization Pilot as proposed?**

11 **A:** Yes, cold climate air source heat pumps provide an important opportunity to reduce fossil  
12 fuel consumption and emissions. Using electricity and compression/expansion heat pumps to  
13 transfer heat, in place of conventional combustion of fuels, results in greatly improved  
14 efficiency. The savings in energy costs can be significant, particularly for customers who rely on  
15 propane or fuel oil which are relatively more expensive fossil fuels. The pilot plans to target  
16 customers that are not already considering a heat pump. Customers who are considering a heat  
17 pump can be directed and encouraged to participate in the ENERGY STAR Products Program.  
18 To best serve all potential customers, who are contemplating or needing emergency heating  
19 system replacements, coordinating the messaging and qualification efforts between the pilot and  
20 other programs will be important.

21 The pilot has a target of 100 participants for the 2021-2023 Plan. This is a rather modest  
22 target given the prevalence of propane and fuel oil heating in much of New Hampshire. The

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<sup>14</sup> Triennial Plan Table 3-2. Bates p. 74.



1 pilot will provide valuable experience and feedback on program design, delivery, and market  
2 demand. If early results are encouraging, and demonstrate success, the utilities should consider  
3 moving from pilot to a full program offering within the 2021-2023 cycle, rather than assuming  
4 that a full program will only be implemented in the next cycle.

5 Home Performance with ENERGY STAR

6

7 **Q: Do you support the Home Performance with ENERGY STAR program as**  
8 **proposed?**

9 **A:** Yes, I appreciate program enhancements that are proposed including the use of virtual  
10 audits, home heating index, and an increase on the maximum cost per project as proposed.  
11 Capturing deep savings levels in the existing home retrofit market is challenging and the  
12 program design thoughtfully provides strategies that should enhance program performance. One  
13 recommendation is that with the higher per project limit of up to \$8,000, the utilities should  
14 carefully consider reducing the maximum incentive share of project costs downward from 90  
15 percent to 75 percent or lower. As program participation grows, it should be possible to maintain  
16 participation and market acceptance, along with larger per project spending, while decreasing the  
17 share of project costs covered by incentives to 75 percent or less.

18 *Performance Incentives*

19

20 **Q: Do you support the proposed structure utility performance incentives?**

21 **A:** Yes, the performance incentive framework as developed by the DE 17-136 working  
22 group results in six weighted performance indicators with minimum and maximum thresholds.<sup>15</sup>  
23 I support this type of structured approach to performance incentives. The Plan notes the working

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<sup>15</sup> Tables 10-1 and 10-2, Triennial Plan, Bates p. 214.

1 group had recommended the minimum threshold for the performance indicators be raised from  
2 65% to 75%. However, due to the significant potential ongoing social and economic impacts of  
3 COVID-19, the Triennial Plan proposes to move the minimum thresholds back to 65%. I  
4 support the 65% minimum threshold for this triennium, assuming the savings targets are  
5 maintained. If savings targets are reduced in the final approved plan, then I would recommend a  
6 75% threshold is appropriate. I also recommend the Commission indicate the 65% threshold is  
7 provisional, based on COVID-19 and the newly expanded NHSaves portfolio and that it is not  
8 intended to be the minimum performance threshold for future performance incentives and plans.

9 *Joint Delivery and Coordination*

10

11 **Q: Do you have additional process related comments?**

12 **A:** Yes, key strengths of the NHSaves Triennial Plan are joint delivery marketing and  
13 coordination. Consumers, trade allies, regulators, advocates, and legislators all benefit from  
14 consolidated initiatives. They provide consistency. They provide clearer paths for navigating  
15 and understanding program opportunities, successes, and challenges. They reduce the time and  
16 efforts required to design, review, modify and approve plans. They increase consumer  
17 familiarity and impact of education and marketing.

18 These advantages are gained through the sustained, and at times difficult, process of  
19 getting the various parties to work together, negotiate and compromise to design and deliver  
20 consistent, consolidated programs. This can be done while maintaining the individual  
21 responsibility and accountability of the parties to manage and deliver on their own initiatives.

22 V. Content and Analysis

23

24 *Home Energy Assistance*

25

1 **Q: Do you have comments related to the content and analysis of specific initiatives in**  
2 **the Triennial Plan?**

3 **A:** I do. While I support approval of the Plan as filed, I have identified several opportunities  
4 for clarification and program enhancements. The first of these is to increase the planned number  
5 of cold climate heat pump installations in the Home Energy Assistance Program, prioritizing  
6 opportunities to replace existing electric resistance heat.

7 **Q: Please explain your analysis and recommendation adjustment for the Home Energy**  
8 **Assistance Program.**

9 **A:** New Hampshire has approximately 50,000 electrically heated households.<sup>16</sup> The HEA  
10 program description estimates roughly 22 percent of New Hampshire households meet the  
11 program’s income eligibility qualifications. Applying this to the estimated number of  
12 electrically heated households results in a target population of roughly 10,000 income eligible  
13 households with electric resistance heat. The utilities propose a total of 164 heat pump  
14 replacement over three years in the HEA program.<sup>17</sup>

15 *Table 2: Current Plan HEA Heat Pump Replacements*

HEA Heat Pump (heating) Replacements				
Program Year	<u>Eversource</u>	<u>Liberty</u>	<u>NHEC</u>	<u>Unitil</u>
2021	40	-	-	-
2022	50	-	-	2
2023	60	-	8	4
<b>Total</b>	<b>150</b>	<b>-</b>	<b>8</b>	<b>6</b>

16

<sup>16</sup> U.S. Census, American Community Survey, 528,109 households and 9.1% electrically heated = 48,058 households.

<sup>17</sup> Eversource, Bates p.634, Liberty Bates p. 702, NHCop Bates p. 749, Unitil Bates p. 792.

1           The proposed participation in Table 2 represents a very small portion (roughly 1.6%) of  
2 the potential target market of electrically heated households that meet income eligibility  
3 requirements.

4           The plan estimates annual per participant savings of 4.78 MWh. Using the Technical  
5 Reference Manual, measure characterization number “**1.29 HVAC Heat Pump – Ductless**,”<sup>18</sup> I  
6 estimate net annual per participant savings of 5.78 MWh. My calculations include increased  
7 cooling consumption, assuming no pre-existing cooling, a 3-ton system, 2.6 HSPF for the heat  
8 pump, and 18 SEER for heat pump cooling. In either case, and recognizing there may be  
9 differences in assumptions, heat pump replacements for existing electric resistance heating  
10 provide large per participant savings.

11           HEA heat pump replacements for electric resistance heated households are an important  
12 opportunity to increase the electric savings for the HEA program. They will also dramatically  
13 reduce annual heating costs for participating households. In the Final Plan, I recommend the  
14 Commission direct Eversource to at least double its HEA heat pump target and that each of the  
15 other three utilities be directed to target at least 50 heat pump replacements over the three-year  
16 Plan. The statewide total for the three-year plan would thereby be at least 450 replacements.

17 **Q:    What changes to the HEA budget and electric savings changes would you expect if**  
18 **this recommendation is adopted?**

19 **A:**    With an average cost of \$10,000 per participant my proposed new target of 450 is an  
20 increase of 286 heat pump replacements over the currently proposed 164 units, requiring a  
21 budget increase for HEA on the order of \$2.86 million over the current Plan. This would  
22 increase the currently proposed HEA budget of \$69.8 million by about 4 percent.

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<sup>18</sup> Bates p. 331.

1           The increased heat pump installations would increase the anticipated electric savings by  
2 about 10 percent. I recommend the total NHSaves Triennial portfolio budget and targets be  
3 adjusted to reflect this increase in the HEA heat pump replacements. Alternatively, downward  
4 adjustments to other program budgets and targets in the portfolio could be made to support this  
5 increase in the HEA program.

6 *Active Demand Response*

7

8 **Q: Do you have comments on the content and analysis for other program elements?**

9 **A:** Yes, I want to compliment Eversource, Liberty and Unitil for including the Active  
10 Demand Response (“ADR”) in their electric portfolio. Eversource and Unitil plan to offer ADR  
11 for residential and the commercial industrial markets, while Liberty is limiting ADR to  
12 commercial industrial.

13           Eversource and Unitil are building upon the experience and learning from the 2019 ADR  
14 pilots for commercial and industrial customers. The evaluated results indicate load reductions  
15 during peak summer events were successful with 6.9 MW reduction for the annual peak installed  
16 capacity hour (ICAP) with 7.5 MW of enrolled capacity and 47 customers in New Hampshire.<sup>19</sup>  
17 The evaluation contains process recommendations and detailed discussions of baseline and  
18 impact analyses, providing a strong foundation for expanded and more streamlined efforts. The  
19 2021-2023 Triennial Plan anticipates increasing the ADR impact by more than four times from  
20 the pilot initiatives, reaching over 31 MW by 2023 as illustrated in Table 3. More than 90% of  
21 the impact is from the C/I sector, though Eversource and Unitil will both offer residential ADR.  
22

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<sup>19</sup> Energy & Resource Solutions (ERS) Inc., 2019 Cross-State C&I Active Demand Reduction Initiative Summer 2019 Evaluation Report. Prepared for Eversource, National Grid and Unitil. Table 1-6 State Level Summary.

1

*Table 3: 2021 to 2023 ADR Summer Peak Impacts*

	ADR Annual Active Demand kW				
	<u>Eversource</u>	<u>Liberty</u>	<u>NHEC</u>	<u>Unitil</u>	<u>Total</u>
2021	9,312	3,343	NA	2,025	<b>14,680</b>
2022	14,018	5,015	NA	2,488	<b>21,521</b>
2023	20,978	7,522	NA	2,950	<b>31,450</b>

2

3

4

Reducing loads during peak hours benefits participants and non-participants as the system wide costs for generation, transmission, and distribution capacity are reduced.

5

6

Reductions in summer peak also tends to avoid generation with high emissions profiles. The plan indicates the expanded ADR initiatives for C/I segment are highly cost-effective savings

7

8

with estimated 2021-2023 GST benefit-cost ratios ranging from 2.95 to 3.5 as show in Table 4.

9

*Table 4: ADR Granite State Test B/C Ratios 2021-2023*

	ADR Benefit/Cost Ratios			
	<u>Eversource</u>	<u>Liberty</u>	<u>NHEC</u>	<u>Unitil</u>
Residential	2.45	-	-	1.02
Com/Ind	3.18	2.95	-	3.5

10

11

12

Residential ADR has lower benefit cost ratios and represents less than 10% of the

13

anticipated impact and participation. As the number and capabilities of connected devices

14

grows, and electrification of end uses increases, residential ADR will likely grow in future years.

15

The Plan indicates the utilities have undertaken or will undertake cyber-security risk reviews, an

16

important safeguard as ADR activity grows.

1           Looking forward ADR will be an increasingly important asset that can be both  
2 geographically and temporally targeted. Targeted and broader market-based ADR can help  
3 address circuit limitations and other localized transmission and distribution constraints and serve  
4 as the basis for cost effective non-wire alternatives (NWAs). ADR should complement the  
5 energy efficiency initiatives for all the electric utilities, and I would encourage NHEC to learn  
6 from the other utilities, and their own battery pilot initiative, and plan for inclusion of this asset  
7 in their future program design and planning.

8 VI.    Paying for the Plan's Investments  
9

10 **Q:    Do you have observations on the proposed funding and rate impacts of the proposed**  
11 **Triennial Plan?**

12 **A:**    I do. The 2021-2023 Triennial Plan represents a very significant increase in the funding  
13 and investment for the NHSaves Portfolio. Cumulative program funding for the combined  
14 electric and natural gas initiatives more than doubles from the 2018-2020 Plan level of \$185  
15 million to more than \$392 million in the proposed 2021-2023 Plan. As explained in earlier  
16 sections of my Testimony, I support this level of investment and am confident that the Utilities  
17 can deliver the proposed services in a manner that provides significant net benefits to New  
18 Hampshire's economy and ratepayers.

19           The 2021-2023 Plan focuses savings and spending on the Commercial, Industrial and  
20 Municipal sectors, with 85 percent of electric savings and 60 percent of gas savings coming from  
21 these non-residential markets. This sectoral focus helps the full portfolio cost-effectively attain  
22 the proposed savings targets. Since the overall budgets are increasing the level of funding and  
23 services available, the residential sector also continues to increase in comparison to prior cycles.

1           Given the differential levels of program investment by sector, I support differentiated  
2 systems benefits charges. This implies the C/I sector will face larger increases in the system  
3 benefit charge component of their rates than the residential sector, since the C/I sector receives  
4 the largest share of portfolio spending. As an example, Table 5 illustrates that Eversource,  
5 which accounts for 78 percent of the proposed three-year electric program budgets, estimates the  
6 SBC rate for its C&I customers will more than triple, from 7/10ths of a cent to 2.432 cents per  
7 kWh.<sup>20</sup>

8                           *Table 5: Eversource Projected System Benefit Charge Impacts*

Eversource SBC Rate Impacts				
	2020	2021	2022	2023
Total SBC - Res (¢/kWh)	0.743	0.866	0.898	0.941
Total SBC - C&I (¢/kWh)	0.743	1.270	1.807	2.432

9  
10 **Q: Does this level of SBC rate impact, particularly for the C&I segment raise concerns?**

11 **A:** It can, and indeed some have expressed concern with this level of rate impact. However,  
12 it is important to note the SBC impact presented in Table 5 does not account for the reduced cost  
13 benefits that accrue to the system from the energy efficiency investments. Table 5 indicates that  
14 to fund the proposed programs, the systems benefit charge needs to increase, but it does not  
15 account for what the system costs would be if the investments in energy efficiency were not  
16 made. Since, by definition, cost effective energy efficiency is a lower cost resource than the  
17 avoided supplies, the system without the energy efficiency investment will have higher overall  
18 costs and, in the absence of the programs, these costs will also need to be recovered from  
19 ratepayers.

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<sup>20</sup> Triennial Plan, Part 3, Bates p. 672.



1           The Plan provides a net rate and bill impact analysis conducted by Synapse Energy  
2 Economics, as Attachment M and the results help to illustrate this point. The rate and bill impact  
3 analysis estimates that long-term revenue requirements will be reduced by more than \$410  
4 million for the electric utilities and more than \$72 million for the natural gas utilities as a result  
5 of the proposed 2021-2023 Plan programs.<sup>21</sup>

6           Funding the program's investments through the SBC over three years results in a marked  
7 increase in the SBC rate, followed by savings due to lower system costs that are realized over the  
8 following decade. Over the long-run, the estimated average change in bills during the life of the  
9 measures installed by the program are expected to decrease, even for those customers that are not  
10 participants as illustrated in Figure 1.

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<sup>21</sup> Triennial Plan Attachment M, Table 1. Bates p.959.

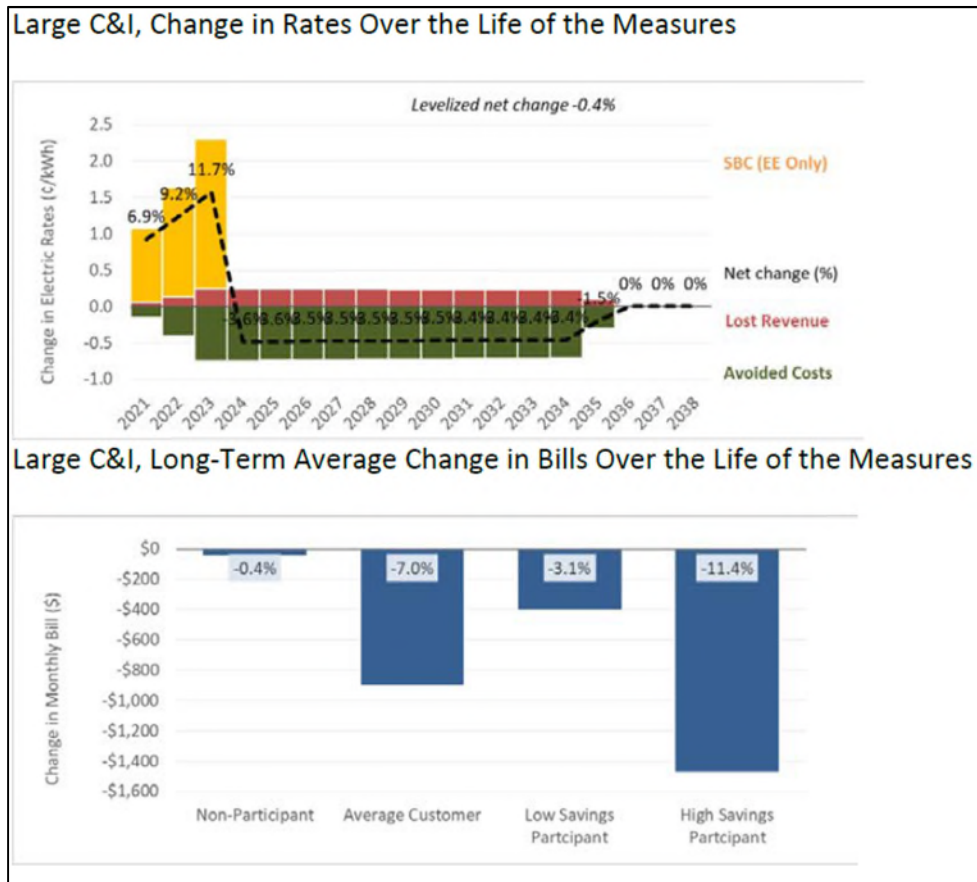


Figure 1: Eversource Rate & Bill Impact Analysis for Large C&I

Gaining the significant benefits of the proposed Triennial Plan portfolio requires investment, and it is important to help consumers and decision makers understand the long-term benefits and savings, rather than having a short-sighted focus on the near-term gross SBC rate impact.

**Q: Despite the long-term benefits if the SBC impacts is found to be unacceptable are there modifications or alternatives you can recommend?**

**A:** Yes, while I think the near-term SBC impact is a very worthwhile investment in New Hampshire’s future economy, there are some options the utilities and Commission can consider that limit the SBC increases. One of these is to spread the SBC payments represented by the yellow bars during the first three years in Figure 1 above over more years. If a social cost of

1 capital can be used to finance this amortization of program costs, then the short-term costs and  
2 long-term benefits can be brought into closer alignment. While there will be some additional  
3 cost associated with such financing, if the near-term SBC rates as proposed are found to be  
4 unacceptable, then this approach to financing the costs over a longer period is preferable to  
5 reducing the program budgets or savings targets.

6 A second option that will have a much smaller impact is to shift some portfolio  
7 investments and savings towards the residential sector. For example, my testimony above  
8 presents a recommendation that the Home Energy Assistance Program three-year budget be  
9 increased in order to support a higher level of heat pumps replacing electric resistance heating.  
10 Such shifts could reduce the near-term C&I SBC rate impact but likely only by small degrees  
11 given the overall portfolio composition and objectives.

12 A third option is to carefully examine opportunities for underspending or carryover funds  
13 from existing initiatives to help reduce the near-term SBC impact.

14 I do not recommend allowing concerns over the near-term SBC impact to outweigh the  
15 long-term benefits provided by the Triennial Plan as proposed. Before reducing the proposed  
16 budgets or savings targets, I support these options for reducing the SBC impact as necessary.

17 VII. Recommendations

18  
19 **Q: Please summarize your recommendations for the Commission based on your review**  
20 **of the 2021-2023 Triennial Plan**

21 **A:** I strongly support the 2021-2023 Triennial Plan as submitted. The proposed plans and  
22 investments will benefit New Hampshire's economy, ratepayers, and environment for years to  
23 come. The work by the utilities and stakeholders to develop and refine the plan is commendable.

- 1 In my testimony I have discussed seven areas where I recommend the Commission direct  
2 modifications or request clarifications as conditions for Plan approval. These are:
- 3 1. Clarify that the combined, as opposed to separable, impacts from evaluation and  
4 updated avoided costs of more than 10 percent constitute a mid-term modification  
5 trigger.
  - 6 2. Require the Plan, or a supplement, to include a stakeholder collaborative  
7 workplan with tasks and working groups and deliverables that include but are not  
8 limited to activities for 2024-2026 Planning.
  - 9 3. Require an increased target for Home Energy Assistance Program Heat Pump  
10 replacements for electric resistance heating of at least 450 households.
  - 11 4. Encourage NHEC to learn from the Active Demand Response activities being  
12 implemented by the other utilities and require all utilities to seek to expand ADR  
13 offerings.
  - 14 5. If the Energy Optimization Pilot has early promising results, encourage it to  
15 expand to program scale within 2021-2023 plan delivery period.
  - 16 6. Indicate that while the minimum 65 percent performance incentive thresholds are  
17 acceptable for this Plan, the Commission anticipates minimum thresholds of 75  
18 percent will apply for future plans.
  - 19 7. If the Commission determines it is necessary to adopt strategies to reduce the  
20 SBC rate impacts, it should consider amortization program costs over a longer  
21 period, shifting funds between programs, and the use of carryforward or unspent  
22 funds, before reducing portfolio savings targets or budgets.

23 **Q: Does this conclude your testimony?**

1 A: Yes, it does.  
2

**Exhibit List**

Exhibit 1

Resume of D.G. Hill