**STATE OF NEW HAMPSHIRE**

**BEFORE THE**

**PUBLIC UTILITIES COMMISSION**

**Docket No. DE 20-161**

**Public Service Company of New Hampshire d/b/a Eversource Energy**
**2020 Least Cost Integrated Resource Plan**

# DIRECT TESTIMONY OF CHRISTOPHER J. SKOGLUND

**On behalf of Clean Energy New Hampshire**

**August 19, 2022**

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## I. INTRODUCTION AND QUALIFICATIONS

**Q. Mr. Skoglund, please state your name, business address and position.**

A. My name is Christopher J. Skoglund. I am employed by Clean Energy New Hampshire (CENH), located at 14 Dixon Ave in Concord, NH, as the Director of Energy Transition. Included in this testimony is Addendum CS-1, a statement of my education and work experience.

**Q. Please briefly describe your experience and specific knowledge or skills that relate to your testimony in this docket.**

A. I am currently employed by CENH as the Director of Energy Transition. In this role, I am the organization's lead at the NH Public Utilities Commission, while also providing coordination and support for legislative, planning, and educational initiatives.

Prior to joining CENH at the beginning of 2022, I worked for the NH Department of Environmental Services (NHDES) from 2008 until the end of 2021. While working at NHDES, I was involved in planning, projects, and programs across the electric power, building, and

transportation sectors. My main roles were in coordination of multi-sector energy planning and policy initiatives including: the 2009 NH Climate Action Plan; the 2012 EESE Board Review on the Independent Study of Energy Policy Issues (SB323 (2010) Study); and the New England Governors/Eastern Canadian Premiers 2017 Regional Climate Action Plan Update. In addition, I also regularly testified before the New Hampshire Legislature, and conducted energy and greenhouse gas (GHG) emissions analysis for NHDES and the State of New Hampshire, inclusive of the electric power, building, and transportation sectors.

**Q. Have you previously testified before the Commission?**

A. Yes. On behalf of CENH, I have submitted testimony in two recent dockets: DE 20-092, New Hampshire's Electric and Natural Gas Utilities 2021-2023; and DE 21-078 Eversource Energy Electric Vehicle Make-Ready and Demand Charge Alternative Proposals. Previously, while on staff at NHDES, I submitted testimony in two other dockets: DE 20-092, New Hampshire's Electric and Natural Gas Utilities 2021-2023 New Hampshire Statewide Energy Efficiency Plan; and DE 19-057, Eversource Rate Case.

In addition, I provided significant input on NHDES' comments for IR 20-004, Investigation into Rate Design Standards for Electric Vehicle Charging Stations and Electric Vehicle Time of Day Rates, as well as NHDES's extensive letter of support for key elements of the DE 19-064, Liberty Utilities Rate Case Settlement Agreement.

I was also an intervenor in DE 21-170, EV Time of Use Rates, and was an active participant in the DE 16-576 Development of New Alternative Net Metering Tariffs pilot studies, the IR 15-

296 Investigation into Grid Modernization proceeding, and the DE 17-136 2018-2020 NH Statewide Energy Efficiency Plan working groups.

## II. OVERVIEW AND SUMMARY

**Q. Please describe the purpose of your testimony, including an overview of your analyses and conclusions.**

A. The focus of my testimony is that the Eversource filing is a traditional Least Cost Integrated Resource Plan (LCIRP) that broadly describes how the utility will meet its obligations through a minimal investment in "used and useful" distribution projects, with costs that are later recovered through rates. Such a plan may provide reliability benefits, but will result in limited suppression of electric rates, inclusive of electric supply, distribution, and transmission costs. Technology and market participants have evolved to the point where it's increasingly possible for a utility to invest a similar level of funding into innovative utility distribution systems, investments that avoid traditional utility upgrades by spurring market innovation that improves system performance, reduces rates and overall costs.

Specifically, the purpose of my testimony is to demonstrate that the Eversource LCIRP:

1. Fails to fully meet the requirements laid out in NH RSA 378:38 and 39;
2. Needs to be updated to reflect PUC Orders issued in other proceedings, specifically:
    - Order in Dockets No. DE 20-092, New Hampshire's Electric and Natural Gas Utilities 2021-2023 New Hampshire Statewide Energy Efficiency Plan (EE Plan); and

- Order No. 26,358 in Docket No. IR 15-296 Investigation into Grid Modernization; and

3. Fails to include their most up-to-date Distribution System Planning Guide (Appendix D) for evaluation, a guide that is already being applied to projects currently under review.

My testimony begins (Section III) with an evaluation of how the company addresses the LCIRP statutory requirements and includes references to relevant PUC dockets. My testimony continues (Section IV) with a discussion of the company's interconnection requirements and goes on (Section V) with an assessment of additional considerations regarding what the plan should contain and concludes (section V) with recommendations for the PUC regarding this LCIRP.

## III. LCIRP EVALUATION

**Q. What New Hampshire law guides the Commission's review of a utility's LCIRP?**

A. New Hampshire's least cost planning law states:

> *The general court declares that it shall be the energy policy of this state to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; to maximize the use of cost-effective energy efficiency and other demand side resources; and to protect the safety and health of the citizens, the physical environment of the state, and the future supplies of resources, with consideration of the financial stability of the state's utilities.*

RSA 378:37.

Regarding integrated resource plans, New Hampshire law states that they must include:

*I. A forecast of future demand for the utility's service area.*

*II. An assessment of demand-side energy management programs, including conservation, efficiency, and load management programs.*

*III. An assessment of supply options including owned capacity, market procurements, renewable energy, and distributed energy resources.*

*IV. An assessment of distribution and transmission requirements, including an assessment of the benefits and costs of 'smart grid' technologies, and the institution or extension of electric utility programs designed to ensure a more reliable and resilient grid to prevent or minimize power outages, including but not limited to, infrastructure automation and technologies.*

*V. An assessment of plan integration and impact on state compliance with the Clean Air Act of 1990, as amended, and other environmental laws that may impact a utility's assets or customers.*

*VI. An assessment of the plan's long- and short-term environmental, economic, and energy price and supply impact on the state.*

*VII. An assessment of plan integration and consistency with the state energy strategy under RSA 12-P.*

RSA 378:38.

In evaluating utility integrated resource plans, New Hampshire law states:

*In deciding whether or not to approve the utility's plan, the commission shall consider potential environmental, economic, and health-related impacts of each*

*proposed option.*

And:

*Where the commission determines the options have equivalent financial costs, equivalent reliability, and equivalent environmental, economic, and health-related impacts, the following order of energy policy priorities shall guide the commission's evaluation:*

*I. Energy efficiency and other demand-side management resources;*

*II. Renewable energy sources;*

*III. All other energy sources.*

RSA 378:39.

**Q. How has PUC historically prioritized the elements within these statutes in LCIRPs?**

A. Over the past decade, significant changes occurred in the New Hampshire energy market as utility deregulation was completed, Eversource fully divested its generation assets, and the Legislature modified the LCIRP statute. However, across this time and those changes, the PUC's Orders consistently reflected the comprehensive, integrated nature of the LCIRP statutory requirements in RSA 378:37-39. In each of the following, Order No. 25,459 in DE 10-261, Order No. 25,625 in DE 12-347, Order No. 26,039 in DE 16-097, Order No. 26,050 in DE 15-248, and Order No. 26,382 in DG 19-126 (collectively these "Orders"), the PUC made no attempt to assert the primacy of one type of benefit--economic, environmental, or public health--over any others.

In these Orders, it was implicit that least-cost energy supply was a necessary, but not sufficient element of the electric and gas utility LCIRP filings. These Orders reflected the fact that NH

statutes required utilities to plan to provide not only the lowest cost energy, but also that utilities must attempt to provision low-cost energy accompanied by the enumerated environmental, social, and health benefits.

**Q. Does the LCIRP filed by Eversource meet those statutory requirements in your opinion?**

A. Not entirely.

Eversource's LCIRP Appendix A describes how each requirement in RSA 378:38 is generally addressed in the filing. However, the LCIRP does not provide sufficient quantitative forecast of electricity consumption and demand, including an evaluation of adoption trends for various disruptive energy technologies. As a result, neither the PUC nor intervenors can adequately evaluate whether the company is in fact preparing for a realistic approximation of the future potential grid conditions.

In addition, the LCIRP describes Eversource's general expectations for how the distribution system will evolve and the approach that will be taken to address maintenance and growth. However, as was deeply explored in Dockets IR 15-296, Investigation into Grid Modernization, IR 20-004, Investigation in Electric Vehicle Rates, DE 20-170, Electric Vehicle Rates, and *begun* in IR 20-166, Investigation into Compensation of Energy Storage, the entire energy system is in transition. This transition was not adequately reflected in the base forecast. More importantly, there was no assessment of how the Eversource distribution system might support the transition and therefore reduce energy supply, distribution system, and transmission costs for all ratepayers through "non-wires solutions" (NWS), which I will describe later.

The energy transition is projected to reverse historic electric sector trends with electricity

consumption and net demand likely to dramatically increase in the coming decades due to the electrification of building heating and the transportation sector. This trend is likely to accelerate due to the recent passage of the Inflation Reduction Act and the ongoing implementation of the 2021 Infrastructure Investment and Jobs Act. Further, the technologies coming online are a departure from past electric sector entrants. Rather than simply consume electricity, the new technologies have the potential to transform residential, business, and manufacturing customers from consumers into "prosumers" capable of providing flexible load, storage, and clean energy generation.[1]

Further, RSA 378:38 requires utilities to maximize the use of cost-effective energy efficiency and other demand side resources, and RSA 378:39 directs utilities and the PUC to prioritize energy efficiency and other demand-side management resources and renewable energy sources when all other project costs are equal. However, the company only provides a net 50/50 and 90/10 load for the state without more specific scenario analysis. If the company takes seriously the requirements under the statute, they should provide analyses showing:

- Alternative load projections showing anticipated load growth under a variety of scenarios, including the potential impact of federal policies on peak load, load factor, and transmission and distribution rates; and

[1] The term "prosumer" reflects the shift from traditional passive electricity consumers, who were reliant on central, large-scale electricity generation to more active players, who are not only consumers but also producers. The energy transition is allowing the traditional consumers to purchase energy consuming, storage, and generation assets that enable and empower them to participate in energy markets. This portfolio of assets transfers building occupants from customers into potential business partners and active participants in the energy market (Source: Wolfgang, O. et al., (2017). Prosumers' Role In The Future Energy System, Center for Sustainable Strategies, https://www.ntnu.edu/documents/1276062818/1283878281/CenSES%2Bposition%2Bpaper%2Bprosumer%2BFINAL%2B-%2BLanguage%2Bchecked.pdf/6a4406de-53ae-753c-24b2-94579cbfb41e?t=1627384005838).

- Projections of what could result from strategic investments in passive demand-side resources (e.g., energy efficiency improvements) or active demand resources (e.g.., flexible load management), and their potential to increase load factor and lower transmission, distribution, and energy supply costs.

In limiting its planning scenarios, the company provides a limited view of the future, without a means to evaluate whether their plan is in fact going to result in the most advantageous, least cost outcome for ratepayers.

**Q. Can you elaborate?**

A. Yes.

With respect to RSA 378:38, I, in section 5.1 and Appendices B and C of the LCIRP, Eversource provides a load forecast for the entire service territory, as well as subsections and specific communities. However, the load forecasts are only for the coincident 50/50 and 90/10 summer peak. There is no specific quantitative information provided concerning what is driving the changes in load, or the forecast assumptions. Are these simply projections of population growth and concomitant increased economic activity? Are these projections based on some expert evaluation of how the composition of New Hampshire's economy is expected to change? Such information would be invaluable to addressing other LCIRP requirements in RSA 378:38.

Eversource *does* provide the methodology for calculating the load forecast in Appendix D (the Distribution System Planning Guide 2020). That methodology describes how growth in behind-the-meter (BTM) solar photovoltaics (PV), energy efficiency (EE), and electric vehicles (EVs) are incorporated into the load forecast. However, individual forecasts for BTM PV, EE,

and EVs are not included in the Eversource filing. As a result, it is not possible to evaluate the company's forecast[2] and whether the distribution level solutions that are proposed would incur the lowest possible cost.

**Q. Why would it be necessary to see a more detailed and granular analysis of the factors influencing the load forecasts?**

A. One reason is that New England is expected to undergo a significant leap forward in the clean energy transition in the next decade, primarily occurring in the other five New England states because of policies adopted to reduce barriers to market transformation and unlock those states' economies access to lower cost, cleaner energy sources and energy consuming technologies.

Electric vehicles are a particularly important part of that transition. ISO-New England estimates that between 2022 and 2031, New England will see 1.5 million new EVs on the road, a 3000 percent increase from today. The vast majority of those EVs will be in states outside of New Hampshire, as we are a relatively small state and New Hampshire policies will result in EV adoption in New Hampshire lagging the rest of New England by a factor of three (3).[3] What is unclear from the Eversource LCIRP filing is whether their modeled summer load over that similar timeframe accounts for a similar growth in EVs in New Hampshire. It is also unclear whether they accounted for the growth in the potentially very large number of EVs that might visit this state from other states and provinces and contribute to that peak summer load. Tens of

[2] In comparison, ISO-New England provides state level forecasts for BTM PV, EE, and EVs in its annual Capacity Energy Load Transmission (CELT) Report available at: https://www.iso-ne.com/system-planning/system-plans-studies/celt/.

[3] ISO-NE (2022). Capacity Energy Load Transmission Report, ISO-New England, https://www.iso-ne.com/system-planning/system-plans-studies/celt/.

millions of tourists visit New Hampshire annually, and the State reports that "the large majority of tourists drive to the state, as opposed to fly or take trains into the state."[4]

**Q. Why would this more granular forecasting be beneficial?**

A. This type of forecast would enable a more thorough appraisal of demand-side energy management programs, including conservation, efficiency, and load management programs required in RSA 378:38, II. Having this level of detailed analysis available would enable evaluation of general and specific solutions proffered by the company to address electricity demand and consumption growth in the most cost-effective manner.

Specifically, EVs represent a source of consumption and demand growth, but as reflected in Docket No. DE 19-064, IR 20-004, DE 20-170, and DE 21-078, EVs possess a much greater capacity to be flexible load, and if managed properly can avoid significant increases in distribution costs, improve load factor, and reduce rates.[5] As EVs consume more electricity, there are more kWh over which to spread Eversource and the other utilities' fixed costs.[6] This was independently supported by the Eversource analysis provided in its previous filing in DE 19-057.[7] In a separate analysis of two California utilities over an eight-year period, Synapse Energy

[4] NH DOT (2015). State Airport System Plan. NH Department of Transportation, https://www.nh.gov/dot/org/aerorailtransit/aeronautics/sasp/documents/TR3economic.pdf

[5] Farnsworth, D, Shipley, J., Sliger, J., LeBel, M., and O'Reilly, M. (2020). Taking First Steps: Insights for States Preparing for Electric Transportation, Regulatory Assistance Project, https://w, ww.raponline.org/wp-content/uploads/2020/04/rap-farnsworth-et-al-EVs-first-steps-2020-april.pdf.

[6] Joint Comments of Liberty Utilities (Granite State Electric) Corp. D/B/A Liberty Utilities, Public Service Company of New Hampshire D/B/A Eversource Energy, And Unitil Energy Systems, Inc. Re: Order No. 26,254. pg. 13, http://www.puc.state.nh.us/regulatory/docketbk/2015/15-296/letters-memos-tariffs/15-296_2019-09-06_gsec_eversource_unitil_joint_comments.pdf,

[7] Eversource Response to PUC (Staff 13-013a), DE 19-057 Eversource Energy Request for Permanent Rates, October 25, 2019.

Economics found that EV drivers in PG&E's and SCE's service territories have contributed $806 million more in revenues than associated costs, driving rates down for all customers.[8]

BTM PV has its own generation profile and unique modeling as noted in Appendix D, Distribution System Planning Guide. However, BTM PV presents unique challenges and opportunities that are not adequately addressed in the LCIRP. Certain individual distribution circuits may have greater or lesser solar penetration. In circuits where penetration is low, new BTM PV has the potential to reduce the peak demand on that circuit by acting as a load reducer. In New England, solar production is highly correlated with peak demand days, since such demand spikes are driven by hot, sunny weather during summer heat waves.

However, as penetration increases, this capability decreases, since BTM PV tends to be biased towards southern orientation, and therefore produces less in the afternoon peak than it's technically capable. By not including more detailed estimates of circuit level details of impact of future distributed solar installs, it is not possible to assess viability of solutions. Presenting modeling and analysis of growth can allow evaluation of how the company is preparing from growth in this resource.

Without presentation of such disaggregated technology specific analysis, it is also not possible for the company to demonstrate compliance with an assessment of supply options including renewable energy and distributed energy resources (DERs) as required in RSA 378:38, III. Such an assessment impacts overall compliance with RSA 378:38 and 378:39.

[8] Frost, J., Whited, M. and Allison, A. (2020). Electric Vehicles Are Driving Electric Rates Down, Synapse Energy Economics, https://www.synapse-energy.com/sites/default/files/EV_Impacts_June_2020_18-122.pdf.

As the company notes in Section 1 of Appendix A, the company has divested its generation assets and solicits bids for its default energy supply. However, as a distribution utility, the company has considerable influence over how easily renewable energy assets and other DERs can interconnect and therefore provide a range of grid services. Unfortunately, the company's approach to DERs is passive rather than actively planning for how they might serve as NWS, alternately referred to as "non-wires alternatives" (NWA) in the net-metering docket, DE 16-576.[9]

Eversource's passive treatment is reflected in Appendix A, Section 1, Part III:

*Eversource accommodates the development of such projects and installations by customers as part of its distribution system planning process as described in Section 5 of this filing.*

And:

*Eversource expects the development of such facilities to continue and expand in New Hampshire and, consistent with Section 10, will continue to plan for a system that can accommodate such development.*

Such an approach appears to treat energy efficiency, renewable energy, and other DERs reactively. Rather than treating these technologies and grid entrants as assets that could be integrated into the distribution system in a manner that reduces electricity consumption and demand on the distribution and transmission systems, the LCIRP appears to lay out an approach

[9] Navigant Research defines NWA as: "*[A]n electricity grid investment or project that uses non-traditional T&D solutions, such as distributed generation, energy storage, energy efficiency demand response, and grid software and controls, to defer or replace the need for specific equipment upgrades, such as T&D lines or transformers, by reducing load at a substation or circuit level*." Navigant Research (2017). Non-Wires Alternatives: Non-Traditional Transmission and Distribution Solutions - Market Drivers and Barriers, Business Models and Global Market Forecasts. Cited in Feldman, Brett (2017). Non-Wires Alternatives: What's Up Next In Utility Business Model Evolution, Utility Dive, https://www.utilitydive.com/news/non-wires-alternatives-whats-up-next-in-utility-business-model-evolution/446933/.

to managing them as if they would only be a burden on the system. A burden that will need to be addressed through utility side investments.

On the contrary, customer enthusiasm for investing in locally sited DERs represents a substantial opportunity for Eversource to harness customer capital to defer distribution grid upgrades. By creating appropriate, geographically specific price signals that convey the value of peak demand reductions based on specific infrastructure capacity constraints, Eversource could effectively create new market pressures that would push out the date for costly substation and "distribution" system upgrades. This potential was identified in the Grid Modernization docket DE 15-296, which this PUC directed each utility to consider in *"all pending and future LCIRP dockets of the goals and expectations for those dockets"* in Order No. 26,575 (pg. 6).

As noted previously, RSA 378:38 requires utilities to maximize the use of cost-effective energy efficiency and other demand-side resources, and RSA 378:39 directs utilities and the PUC to prioritize energy efficiency and other demand-side management resources, and renewable energy sources when all other project costs are equal. A key feature of an effective LCIRP is that it should evaluate a window of time when specific clean energy technologies will have fallen in price and be more competitively priced, if not outright cheaper, than traditional alternatives and plan accordingly so as provide the least cost service to customers. At present, this LCIRP at best only nods toward the potential of grid modernization to lower cost and does not fulfill this requirement.

**Q. Can you provide some examples?**

A. Yes.

Liberty Utilities has deployed a battery storage pilot, approved in Order No. Order No. 26,209 in Docket DE 17-189, Petition to Approve Battery Storage Pilot Program, which has allowed the utility to invest in residential battery electric storage. These batteries are partly paid for by the homeowners and can be used to provide backup power in the case of power outages. More importantly, Liberty can dispatch those batteries as needed to reduce local demand during peak periods. Such assets can reduce energy supply costs and transmission costs and, when placed in constrained areas, reduce the need for costly distribution upgrades. Such investments are examples of the above-referenced NWS.

Eversource has a similar program, Connected Solutions, in its Massachusetts and Connecticut service territories.[10]

Technological pairings such as solar PV and battery electric storage, either residential, commercial, or utility scale, could have similar benefits with the potential to deliver larger system benefits by reducing stress on distribution and transmission assets and further lowering total rates.

Eversource has already proposed a managed charging program for EVs in New Hampshire in Docket No. DE 20-170. This could be an additional opportunity to create flexible demand and, therefore, reduce energy supply costs and distribution system costs. While the PUC ultimately rejected that proposal and directed the company to file a residential time-of-use (TOU) rate in a new docket, it is important to note that not all EV households may feel comfortable taking a

[10] Eversource MA (2022). Demand Response For Home Battery Storage, Connected Solutions, Eversource Massachusetts, https://www.eversource.com/content/ema-c/residential/save-money-energy/energy-efficiency-programs/demand-response/battery-storage-demand-response, and Eversource CT (2022). Demand Response For Home Battery Storage, ConnectedSolutions, Eversource Connecticut, https://www.eversource.com/content/ct-c/residential/save-money-energy/energy-efficiency-programs/demand-response/battery-storage-demand-response.

TOU rate and may prefer participating in a managed charging program with a simpler guaranteed benefit, and that managed charging could be paired with a TOU rate.

Moreover, up to 80 percent of electric passenger vehicle charging occurs at residences.[11] A study from Norway, which had an EV market penetration of 10 percent as of fall 2018, showed that there is also danger in not planning for EV charging. The study found that controlled EV charging could be met with the existing distribution grid but that uncontrolled EV charging could require grid investments of $100 to $200 million for one city.[12] If directed to occur in the overnight hours, there is enormous potential to not only avoid distribution system upgrades but also for the electrification of transportation to result in improved load factors for existing electricity infrastructure. In a well-designed policy landscape, this could result in substantial rate-depression and resultant savings for all consumers.[13]

Further, EVs and EV supply equipment (EVSE) are being designed and equipped to provide backup power to buildings. There is significant interest in the potential to use EV batteries as demand response resources, capable of providing lower cost and lower emitting power to the grid.[14] In fact, there is a pilot already under development at Plymouth State University, which is located in the NH Electric Cooperative service territory.[15]

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[11] US DOE (2020). Electric Vehicles: Charging at Home, Office Energy Efficiency and Renewable Energy, https://www.energy.gov/eere/electricvehicles/charging-home.

[12] Hildermeier, J., Kolokathis, C., Rosenow, J., Hogan, M., Wiese, C., & Jahn, A. (2019). Start with Smart: Promising Practices For Integrating Electric Vehicles into the Grid, Regulatory Assistance Project, https://www.raponline.org/knowledge-center/start-with-smart-promisingpractices-integrating-electric-vehicles-grid/.

[13] NREL (2021). Incorporating Residential Smart Electric Vehicle Charging in Home Energy Management Systems, https://www.nrel.gov/docs/fy21osti/78540.pdf.

[14] IRENA (2019). Innovation Outlook: Smart Charging For Electric Vehicles, International Renewable Energy Agency, https://www.irena.org/publications/2019/May/Innovation-Outlook-Smart-Charging.

[15] Brooks, D. (2022). Granite Geek: Instead Of Filling My Car, What If My Car Could Fill The Station? Concord Monitor, May 2, 2022, https://www.concordmonitor.com/vehicle-to-grid-NH-46138404.

This potential exists as EVs can spend up to 90 percent of their time parked and peak periods tend to occur between 4:00 pm and 8:00 pm, which is when many vehicles are parked[16] for the remainder of the day. Significant issues still need to be worked out on both the manufacturing side for EVs and EVSEs and on the utility side to realize this potential at scale. However, in the current LCIRP the company does not contemplate the enormous potential of these technological changes in its LCIRP.

**Q. Does the LCIRP include no mention of these sorts of demand management opportunities?**

A. The LCIRP includes a limited description of how they address demand management through energy efficiency and NWS. However, it is limited to energy efficiency and battery electric storage. This can be found in Section 11 of the LCIRP.

A significant portion of what was proposed in Section 11 would have been funded through the 2021-2023 energy efficiency plan that was filed with the PUC in the fall of 2020 in Docket DE 20-092. The unanimous settlement agreement filed by parties in that Docket was ultimately rejected in November 2021. After HB549 (2022) was signed into law in the winter of 2022, a much-revised energy utility energy efficiency plan was filed in the spring of 2022. This plan did not include the storage pilots initially proposed and included in Section 11. Further, the energy efficiency captured by the revised plan was less than half that initially proposed.

[16] IRENA (2019). Innovation Outlook: Smart Charging For Electric Vehicles, International Renewable Energy Agency, https://www.irena.org/publications/2019/May/Innovation-Outlook-Smart-Charging.

Therefore, the demand management programs included in the Eversource LCIRP are out of date and should be updated to reflect that budget caps will result in a failure to capture a large amount of cost-effective energy efficiency and to realize the valuable contribution of active demand response. This update should also include a much deeper evaluation of other potential NWS.

**Q. Are there any additional elements of the LCIRP that are insufficient?**

A. Yes.

A requirement that was considerably overlooked was the section on the "smart grid" and other features that are consistent with "grid modernization" as required in RSA 378:38, IV. Further, this section does not consider the full opportunities that were explored and prioritized in Docket No. IR 15-296, Investigation into Grid Modernization.

Grid modernization investments are needed to spur market adoption of more innovative demand-side management technologies and the clean energy transition in general through price signals or utility side upgrades. The grid mod docket occurred over a period of several years and engaged numerous stakeholders from all sectors of the state, and further benefited from participation of well-respected technical consultants. In order No. 26,575, the PUC directed the utilities to consider the findings of IR 15-296 in their LCRIPs.

However, the company's filing reflects only a broad overview of the benefits that could result from grid modernization. Following such a lengthy investigation, and with the benefit of both the 2017 Report on Grid Mod and the guidance in Order 26,358, the company should have

provided a more exhaustive treatment of what investments they would make and how such investments would result in a lower cost, more reliable energy system.

**Q. Sections V ad VI of RSA 378:38 require an assessment of the LCIRPs integration and impact on state compliance with the Clean Air Act of 1990 and other environmental laws, and as an assessment of the plan's environmental, economic, and energy price and supply impact on the state. Did the LCIRP adequately address these elements?**

A. Not adequately.

As noted previously, Eversource has divested its generation assets following the completion of utility deregulation. The company in its filing claims that because it does not own generation assets, it is not subject to these sections of the law as it is subject to the ISO-NE market for its default supply.

As a distribution energy company, however, the company does have the capacity to examine its policies, plans, and projects to assess how they will support the adoption of clean energy technologies that can reduce energy electricity consumption and demand. It can specifically examine the consumption of fossil fuels and, therefore, reduce energy costs, as well as the public health and environmental impacts associated with fossil fuel energy consumption.

As was noted during the Grid Mod proceeding, the 2017 Grid Mod Working Group Report and the subsequent PUC Orders, the emergence of smart grid technologies as well as DERs presents an opportunity for utilities to serve as distribution platforms that enable integration and interconnection of a variety of service providers that can lower system and consumer costs.

**Q. How are energy costs, energy supply, and environmental outcomes related?**

A. Clean energy measures, including energy efficiency, strategic electrification, storage, and renewable energy technologies, all presents economic, energy, and environmental opportunities for the state as they are increasingly the least cost method to manage overall energy consumption and therefore energy costs, while also reducing fossil fuel consumption. Each of the technologies can be utilized as NWS and impact distribution and transmission system costs as well.

**Q. Can you elaborate on how it will reduce costs?**

A. Most important to New Hampshire policy makers, energy efficiency, dispatchable storage, and renewable energy can lower electricity rates for all consumers. It is well established that energy efficiency not only reduces overall energy consumption but also reduces peak energy demand. By reducing energy demand, there is less need for building new generation facilities as well as transmission and distribution infrastructure. Energy efficiency investments result in lower rates for all ratepayers and not just lower costs for program participants.

Similarly, dispatchable storage facilities can be used to make low-cost power available at times of higher demand and higher cost by charging the batteries when rates and demand are low and dispatching the energy when rates are high and demand is low. Finally, renewable energy systems – whether they are fully behind the meter or net metered – reduce the amount of energy supply that must be purchased to meet the load in a service territory. They can also reduce the infrastructure that must be deployed over the entire distribution system.

Reducing demand ensures that “peaker plants,” those electric generation facilities that rely on the most expensive fuels and have the highest operating cost, are called upon less frequently in

ISO-NE. The impact these plants have on energy costs is significant because when they are called into service, they set the clearing price for all the generators operating in the regional market. Keeping the peaker plants offline reduces total system cost. This effect is referred to as the Demand Reduction Induced Price Effect ("DRIPE") and it's particularly powerful when the electric utilities are allowed to invest aggressively in commercial and industrial energy efficiency measures.[17]

**Q. Why are energy efficiency, storage, and renewable energy investments important going forward?**

A. There are two trends that make transition away from fossil fuels increasingly important to New Hampshire's economy in the future. The first is the war in Ukraine and the economic sanctions on the Russian economy. The second is the impact of electrification of the building and transportation sectors, which may have implications for total consumption and demand across ISO-NE.

**Q. How could the Russian sanctions influence New Hampshire and New England energy markets?**

A. The U.S. was already experiencing higher natural gas prices as tight gas supplies in Europe in the end of 2021 and early 2022 sent prices higher and encouraged more liquefied natural gas (LNG) to be exported from the U.S. This had an impact on ISO-NE energy prices by driving up

[17] Synapse (2021). Avoided Energy Supply Components in New England. Synapse Energy Economics. https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf

spot market prices for both gas and electricity; dual fuel plants frequently resorted to relying on oil, which drove up real-time electricity prices relative to recent years.

The demand for U.S. LNG is expected to remain high following Russia's invasion of Ukraine. The European Union is highly dependent on Russian oil and natural gas for energy. In response to the war, the European Commission has released plans to curb imports of Russian gas by nearly two-thirds of its historic levels by the end of 2022. That strategy depends significantly on increasing imports of natural gas from other sources. On March 25, 2022, President Joe Biden pledged to help meet that goal by sending more liquefied natural gas to Europe.[18] This will likely put greater pressure on New England supplies of gas as the region is entirely dependent on imported pipeline gas and LNG shipments to meet its needs.

**Q. How do building and transportation electrification relate to energy efficiency?**

A. Both the adoption of electric vehicles in the transportation sector and the adoption of air and ground source heat pumps in the building sector are projected to increase significantly over the next decade in the ISO-NE region. While these technologies offer significant overall reductions in total energy within the regional economy, they do represent a fundamental reordering of the energy system through the adoption of a common energy carrier.

In its most current reporting, ISO-NE projects that by 2031 the region will grow from 35 thousand EVs to over 1.5 million in just the light-duty passenger fleet alone. Medium duty and

[18] Tollefson, J. (2022). What The War in Ukraine Means for Energy, Climate and Food, Nature, https://www.nature.com/articles/d41586-022-00969-9.

heavy duty will see separate additions.[19] In addition, the number of homes with heat pumps is projected to grow from 63 thousand to almost 1.4 million households. Similarly, commercial heating applications will experience separate growth.[20] This modeling has not been updated to reflect the effects of the recently passed Inflation Reduction Act, which includes incentives for electrification of heat and transportation. The overall effect of this transition will be an increase in consumption and demand.[21] While advanced rate-making and demand management programs are expected to be deployed, mitigating the growth in electricity consumption and demand, electrification will exert upward pressure on energy, transmission, and distribution rates. Therefore, energy efficiency programs remain especially essential since they are the only state policy counter-balancing these trends and working to keep electricity rates low.

**Q. What sort of non-energy benefits does the transition away from fossil fuels provide?**

A. The use of electricity and natural gas in our built environment, whether for heat, lighting, production or other purposes, results in adverse environmental impacts. Using less energy to achieve the same outcome reduces harmful emissions that contribute to water pollution, local air pollution and global climate change. Such reductions will result in immediate and long-term public health and environmental quality benefits.

[19] ISO-NE (2021). 2022 Draft Transportation Electrification Forecast, 2022 CELT Report, Load Forecast Committee, https://www.iso-ne.com/static-assets/documents/2021/12/lf2022_draft_transp_elec.pdf

[20] ISO-NE (2021). Draft 2022 Heating Electrification Forecast, 2022 CELT Report, Load Forecast Committee, https://www.iso-ne.com/static-assets/documents/2021/12/lf2022_draft_heating_elec.pdf

[21] ISO-NE (2021). Draft 2022 Gross Energy Forecast, 2022 CELT Report, Load Forecast Committee, https://www.iso-ne.com/static-assets/documents/2021/12/lf2022_draft_energy.pdf.

Reducing total energy consumption lowers emissions of smog-forming compounds and particle pollution that cause direct health impacts, mercury emissions that significantly pollute our lakes and streams, and greenhouse gas emissions that contribute to climate change. In that respect, energy policy is environmental policy and vice versa. This connection has been reinforced by the NH General Court on numerous occasions, as reflected in NH statutes.[22]

As energy efficiency and other clean energy solutions evolve and come down in price, they present a significant opportunity to reduce energy costs while providing for a cleaner environment, leading to improved public health outcomes. Because the clean energy technologies can reduce energy costs, those environmental gains come with economic savings as well.

This is consistent with findings of an analysis of ISO-NE's Final 2018 ISO New England Electric Generator Air Emissions Report, which noted that shifting electricity use from on-peak to off-peak reduces the emission of Clean Air Act criteria air pollutants, including oxides of nitrogen (NOx) and sulfur dioxide ($SO_2$), and carbon dioxide ($CO_2$), a greenhouse gas, considerably.[23] During ozone season, shifting electricity from peak to off-peak can, on average, reduce emissions for $NO_x$, $SO_2$, and $CO_2$ by 43 percent, 75 percent, and 10 percent

[22] Malone, E., Woolf, T., and Letendre, S. (2019). New Hampshire Cost-Effectiveness Review: *Application of the National Standard Practice Manual to New Hampshire*, Synapse Energy Economics, https://www.puc.nh.gov/regulatory/docketbk/2017/17-136/letters-memos-tariffs/17-136_2019-10-31_staff_nh_cost_effectiveness_review.pdf.

[23] ISO-NE (2018). Final 2018 ISO New England Electric Generator Air Emissions Report, ISO New England Inc. System Planning, https://www.iso-ne.com/static-assets/documents/2022/02/20220215_draft_2020_emissions_results.pdf.

respectively.[24] On high electric demand days during the ozone season, the emission reductions can be considerably greater; at 200 percent, 307 percent, and 31 percent respectively.[25]

## IV. INTERCONNECTION REQUIREMENTS

**Q. How does Eversource approach interconnection to the grid for DERs?**

A. CENH's business members have observed that Eversource is attempting to impose costly new interconnection standards for locally generated electricity and is doing so without presenting required information in its LCIRP to the PUC to enable an assessment of the reliability, environmental, economic, and health-related impacts. The newly required improvements are not necessary for system reliability, are not just and reasonable, and are part of a portfolio of proposed interconnection changes within the larger corporation. These changes are intended to support subsidiaries working to comply with Massachusetts' clean energy policies. This is a substantial change from prior practice and is currently underway without prior notification to the PUC or approval from the PUC.

Multiple developers of DERs in New Hampshire have relayed to CENH that Eversource has begun requiring interconnection studies that analyze both a primary and secondary path to market for DERs that interconnect onto their distribution grid  It has also subsequently been requiring the developer to fund distribution system improvements to be installed along both paths. Based on the experience of these CENH business members, this change can result in a 300 to 400 percent increase in interconnection costs, with one example reported to be an increase in

[24] Analysis of ISO-NE data, Table 5-3, 2018 Time-Weighted LMU Marginal Emission Rates—All LMUs (lbs./MWh), Draft 2018 ISO New England Electric Generator Air Emissions Report, pg., 29.

[25] Analysis of ISO-NE data, Table 5-3, 2018 Time-Weighted LMU Marginal Emission Rates—All LMUs (lbs./MWh), pg., 29, and Table 5-8, High Electric Demand Day LMU Marginal Emission Rates (lbs./MWh), pg. 36 Draft 2018 ISO New England Electric Generator Air Emissions Report.

costs to approximately $5 million dollars using Eversource's proposed policy versus a cost of $1 million using the currently published policy submitted in its LCIRP filings.

**Q. How does Eversource notice this change in requirements?**

A. In its LCIRP filings and its comments during the technical session held on June 13, 2022, Eversource has provided incomplete and inconsistent information regarding the proposed interconnection policy. Eversource makes a statement on pages 5 of the 2020 LCIRP filing stating, without support, that, "As a result, it is not just the normal, but also the abnormal – contingent conditions of the grid – that drive switching conditions to accommodate DERs, electric vehicles, and similar technologies."

In its filing, in Appendix D, Eversource includes its 2020 Distribution System Planning Guide where we would expect to see documentation of the proposed policy. This guide makes no reference to a requirement to make improvements on an alternate path. When CENH members have requested the documentation of the proposed policy, Eversource stated that the policy is still a draft and has not been published.

During the June 13th technical session, Eversource stated that a CENH member should review filings made in other states to learn more about the proposed policy. A CENH member later informed me that Eversource subsequently directed that member to review NSTAR Electric Company's d/b/a Eversource filings to the Massachusetts Department of Public Utilities in

response to that member's request for information on interconnection standards for PSNH d/b/a Eversource.

The member reports that the NSTAR Electric Company filing was an April 13, 2022, letter and materials in response to the Massachusetts Department of Public Utilities docket 20-75.[26] According to the October 22, 2020, Vote and Order Opening Investigation from the Massachusetts Department of Public Utilities, the docket is an *"Investigation by the Department of Public Utilities On Its Own Motion Into Electric Distribution Companies' (1) Distributed Energy Resource Planning and (2) Assignment and Recovery of Costs for the Interconnection of Distributed Generation."*[27]

The docket includes proposals for how system planning should be performed to support achieving Massachusetts' energy policies: *"The Straw Proposal would require a system planning analysis for infrastructure investment in consideration of [Massachusetts'] clean energy and [Massachusetts'] climate policy objectives, incorporation of DG investments, and development of associated planning criteria."*[28]

The member reports that filings from NSTAR Electric Company and other Massachusetts utilities do reference studying contingent paths on the distribution system. However, these contingent paths are to support the addition of future distributed resources, that the costs can be

[26] NSTAR (2021). NSTAR Electric Company d/b/a Eversource Energy's System Planning Analysis Proposal, DPU 20-75, MA Department of Public Utilities, https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13453369.

[27] MA DPU (2020). Investigation by the Department of Public Utilities on Its Own Motion into Electric Distribution Companies' (1) Distributed Energy Resource Planning and (2) Assignment and Recovery of Costs for the Interconnection of Distributed Generation, DPU 20-75, MA Department of Public Utilities, https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/12796087, pg. Cover.

[28] Ibid, pg. 6.

significant, and that the costs of contingent paths largely or mostly for the benefit of parties other than the interconnecting project.

The member reports that the individuals it has worked with at Eversource on interconnection processes have been professional and friendly in their discussions, despite the parties not reaching agreement regarding Eversource's proposed contingent path policy. In addition to the individuals from Eversource working directly on the interconnection process, directors from Eversource with responsibility for system planning and operation participated in the discussions, according to a CENH member.

The CENH member further reports that the discussion with the Eversource directors was friendly and engaging; however, ultimately there was an impasse and an Eversource representative is reported to have said that the NH PUC did not have the authority to or interest in reviewing the proposed contingent path policy change.

**Q. Will this change result in increased reliability?**

A. No.

During the June 13, 2022, technical session, Eversource representatives agreed that while these proposed improvements could theoretically ensure that generation from a given DER was more reliably delivered to the grid, the improvements would not improve the reliability of electricity delivered to customers. During the technical session, Eversource representatives stated that the reliability benefit would be increased flexibility for Eversource, if Eversource sought to reconfigure the distribution system in the future (i.e., that Eversource would be less likely to remove all of a given DER's paths if Eversource reconfigured its system).

While it is possible that certain generators may believe that the increased reliability of their ability to bring power to market would be valuable, this type of enhanced delivery reliability should not be a requirement. If Eversource believes this type of enhancement is beneficial, the company could publish data about the frequency of outages for DERs so that developers could conduct a business analysis on the value of upgrades along a secondary path.

**Q. What effect does this change have on the cost of energy?**

A. Requiring DERs to fund upgrades for contingent paths has the potential to increase energy costs for New Hampshire ratepayers. During the June 13th technical session, a CENH member asked Eversource who would be responsible for the cost of upgrades needed to replace a path if the primary or alternative path of a DER was no longer available due to Eversource reconfiguring the distribution system. An Eversource representative stated that replacing a path would be an "Eversource capital project" (i.e., the cost or upgrades to replace a primary or alternative path would be added to the PSNH rate base). The proposed policy of requiring contingent paths essentially doubles the number of paths that may be affected by reconfiguring the distribution system and the potential costs to ratepayers. In addition, excessive interconnection costs would be reasonably expected to either reduce the number of DER ultimately constructed, reducing competition, or increase the energy price required by the DER that are ultimately constructed.

DERs and renewable energy represent the least cost source of generation that can be constructed currently,[29] which is reflected by the fact that the ISO New England Interconnection queue is approximately 95 percent renewable resources and battery storage,[30] and can easily be installed onto distribution grids. Burdensome and arbitrary utility requirements that damage the economics of DER projects foreclose the ability of developers to deploy low-cost resources and reduce energy spending for New Hampshire ratepayers.

**Q. Is there recent legislation that will impact Eversource's practices?**

A. SB262 (2022) was signed by the governor on June 8, 2022, and will become effective on September 8, 2022. The bill directs the Department of Energy to *"initiate a proceeding to investigate modification of the rules of the public utilities commission in PUC 903.01(e) to ensure cost-effective, predictable, and timely interconnection procedures for customer generators to the state's electric distribution system."*

Further, the law requires that the NH Department of Energy to consider:

- How to create transparent, consistent, and reasonable engineering standards for interconnection, with special consideration given to established best practices used by other states as set forth in the Interstate Renewable Energy Council's 2019 Model Interconnection Procedures;
- How to ensure timely, consistent, and reasonably-priced interconnection studies;

[29] Lazard's Levelized Cost of Energy Analysis, Version 15.0 available at: https://www.lazard.com/perspective/levelized-cost-of-energy-levelized-cost-of-storage-and-levelized-cost-of-hydrogen/

[30] The latest queue data can be accessed at: https://irtt.iso-ne.com/reports/external.

- How to ensure just and reasonable pricing of grid modernization upgrades mandated by the distribution utility for interconnection of distributed energy resources, including transparency and consistency in pricing guidelines and appropriate cost-sharing among parties benefitting from such upgrades.
- How to ensure distribution system upgrades paid for by customer-generators are not claimed as part of the utility rate base;
- Whether it is appropriate to establish an "Interconnection Working Group" convened at the department of energy to regularly assess if interconnection standards need modification; and
- Any other topic the department reasonably believes it should consider to diligently conduct the proceeding.

Based on the above, it is inappropriate to allow Eversource to enact this new requirement, without notice or deliberation, in advance of the findings of the DOE's statutorily required proceeding.

## V. ADDITIONAL CONSIDERATIONS

**Q. Is there anything else that should be considered?**

A. Yes. Eversource should pursue the development of performance-based ratemaking (PBR).

A potential challenge in developing an LCIRP is the current cost-of-service ratemaking model, in which utilities earn a return based largely on the cumulative value of the prudently deployed infrastructure and may exert an "infrastructure bias" towards capital-intensive

solutions.[31] This bias, created by the regulatory framework rather than by the utility itself, may discourage utilities from seeking more efficient solutions that do not depend on large capital investments. Performance incentive mechanisms focused on specific topic areas may correct the infrastructure bias.[32]

PBR is recognized as having the potential to shift the utility business-model towards one that rewards utilities for performing well on key metrics, such as reliability, efficiency, customer service and greenhouse gas emissions reduction.[33] PBR can enable greater economic efficiency, and integration of distributed generation and energy storage, demand-side management measures, electric vehicles, and smart-grid technologies.[34] Further, PBRs can utilize performance incentives that encourage utilities to better align utility planning, investments, and operations with societal goals.[35]

The adoption of a PBR mechanism would fulfill the state energy policy in RSA 378:38 overall direction to align the economic, social, and environmental interests by enabling the utility to meet its share hold obligations while eliminating the infrastructure bias and enabling grid modernization to go forward and speed the energy transition.

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[31] HI PUC (2018). Order No. 3541 Instituting A Proceeding To Investigate Performance-Based Regulation, Docket No. 2018-0088 Instituting A Proceeding To Investigate Performance- Based Regulation, https://dms.puc.hawaii.gov/dms/documentviewer?pid=a1001001a18d18b60624j02464, (Last accessed April 28, 2020).

[32] RIDPU & RI OER, (2017). Rhode Island Power Sector Transformation: Phase One Report to Governor Gina M. Raimondo, http://www.ripuc.ri.gov/utilityinfo/electric/PST%20Report_Nov_8.pdf.

[33] Holden, C. (2019). More States Explore Performance-Based Ratemaking, but Few Incentives Are in Place, Greentech Media, https://www.greentechmedia.com/articles/read/more-states-explore-performance-based-ratemaking-but-few-incentives-in-plac.

[34] Littell, D. *et* al. (2018). Next-Generation Performance-Based Regulation Volume 1: Introduction - Global Lessons for Success, Regulatory Assistance Project and National Renewable Energy Laboratory, Technical Report NREL/TP-6A20-70822-1, https://www.raponline.org/wp-content/uploads/2018/05/rap_next_generation_performance_based_regulation_volume1_april_2018.pdf.

[35] Ibid.

Precisely because the grid mod docket resulted in only non-binding guidance, as reiterated in Order No. 26,575 in that docket, rather than in an adjudicative proceeding with a binding order, it failed to address a significant and necessary consideration; what utility business model reform is necessary to incentivize the deployment of DERs and other demand management rather than traditional utility infrastructure.

The adoption of a PBR mechanism would be a strong step in the right direction. PBR could better allow the PUC and the utility to consider how to balance innovation, new market actors, and the traditional utility business model. In order to integrate existing and emerging technologies, and enable new service providers to participate, utility incentives and rewards developed and modified through PBR would encourage and enable utilities to adopt a new, sustainable business model.

Further, Eversource should develop and publish loading capacity maps that would enable the company and third-party DERs and solar providers to prioritize the siting and installation of NWS, expanding on the maps required in recently signed SB262 (2022) that modifies RSA 362-A:9. The publication of such maps and expansion of grid mod investments would enable an invaluable transition in utility service provision. Such maps are essential for third-party developers to provide grid services that ultimately suppress and even reduce rates and energy costs.

## VI. RECOMMENDATIONS

**Q. Do you have any recommendations for the Commission?**

A. Yes.

I recommend that Eversource resubmit its LCIRP with an expanded analysis of the required sections in RSA 378:38, and a full plan for how the company will implement distribution system management to reduce the electric supply, distribution system, and transmission costs through investments in the distribution system.

As noted in my previous responses, the filed LCIRP provides a high-level description of its process and its approach to distribution system management. What is needed, however, is a LCIRP that provides a demonstration of where the utility territory is headed under current conditions and the costs that will incur and a plan that demonstrates how a lower cost alternative with greater social and environmental benefits can be obtained.

I recommend that Eversource not be allowed to mandate interconnection studies that require a secondary path analysis and to mandate improvements along a secondary path unless and until such a time that it is determined by the Department of Energy that such studies and improvements are required for reliability or are in the interest of all ratepayers.

Further, I recommend that Eversource propose the development of a PBR mechanism and the development and publishing of loading capacity maps for use by DER providers to prioritize siting assets that can serve as NWS.

## VII. CONCLUSION

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

A. Yes.

**Addendum CS-1**

**Qualification of Christopher J. Skoglund**

My name is Christopher J. Skoglund. I am employed as the Director of Energy Transition by Clean Energy New Hampshire (CENH). My business address is 14 Dixon Ave in Concord, NH.

I earned a Bachelor of Arts in Biology from Johns Hopkins University in 1997 and a Master of Science in Natural Resources from the University of New Hampshire in 2012. In between those degrees, I was principally employed teaching environmental and science education to middle and high school students across the country.

In 2007, I began working part-time as a Climate Program Specialist working on developing background data and analysis and planning tools to support a potential state climate action plan. In 2008, I was hired full time as an Energy and Transportation Analyst, primarily coordinating the development of the 2009 NH Climate Action, which included managing the analysis of the electric power, building, and transportation sectors. In this position, I was also engaged in transportation planning and analysis, working with the NH Department of Transportation and the four Metropolitan Planning Organizations in the southeast corner of the state.

In 2010, I moved into the Energy and Climate Analyst position, focusing more on building and electric sectors with high-level energy and climate-change planning focused at the local, state, and regional level. In 2012, I oversaw the state's Energy Efficiency and

Sustainable Energy Board's development of the 2012 EESE Board Review on the Independent Study of Energy Policy Issues ("SB323 (2010) Study").

In 2016, I moved to the Climate and Energy Program Manager position at NHDES. In this role, I regularly tracked legislation and testified before the state legislature. I was also a regular participant in PUC dockets, including Grid Mod, Net-Metering, Utility Energy Efficiency Programs, and the individual electric utility rate cases.

While at NHDES, I was also a member of the New England Governor's Eastern Canadian Premiers (NEG/ECP) Climate Change Steering Committee and helped lead efforts in 2015 and 2016 to establish a new regional GHG emissions reduction target for 2030. In 2016 and 2017, I led the successful effort to develop an update to the region's 2001 climate action plan, a plan that was economy wide and inclusive of the electric power, building, and transportation sectors.

Throughout this time at NHDES, I maintained the statewide GHG inventory, inclusive of the electric power, building, and transportation sectors and took a lead role in the GHG inventory for the entire NEG/ECP region.

I joined CENH in January of 2022. In this role, I am the organization's lead at the NH Public Utilities Commission, while also providing leadership and support for legislative, planning, and educational initiatives.