STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET NO. DG 20-092

IN THE MATTER OF:

NEW HAMPSHIRE'S ELECTRIC AND NATURAL GAS UTILITIES
2021-2023 NEW HAMPSHIRE STATEWIDE ENERGY EFFICIENCY PLAN

DIRECT TESTIMONY OF

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DATED: OCTOBER 29, 2020

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I. Introduction

Q. Ms. Ohler, please state your name, business address and position.

A. My name is Rebecca Ohler. I am employed by the State of New Hampshire, Department of Environmental Services (NHDES), located at 29 Hazen Drive in Concord NH, as the Administrator of the Technical Services Bureau of the Air Resources Division. Included in this testimony is Addendum RO-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 have been working in the field of air pollution control since 1989 and have been involved in the policy development and discussion regarding state policies aimed at reducing both criteria pollutants and greenhouse gas (GHG) emissions. I have served on the project proposal evaluation team for Renewable Portfolio Standard solicitations and for past Regional Greenhouse Gas Initiative solicitations. I currently represent the department on the Energy Efficiency and Sustainable Energy (EESE) Board, and have served on the EESE Board's Energy Efficiency Resource Standard (EERS) committee since its inception.

NHDES, which I represent, has, through work with our counterparts across the Northeast states and through our leadership of the Granite State Clean Cities Coalition,[1] extensive knowledge about and access to resources relative to electric vehicles (EV) and associated electric vehicle supply equipment (EVSE), including Level 2 and Direct Current Fast Charging EVSE. In addition, I am currently concluding my work as the clerk of the state's Electric Vehicle Charging Stations Infrastructure Commission,[2] which was created by SB517 in 2018.[3] Prior to becoming the Bureau Administrator for the NHDES Technical Services Bureau, I held a number of positions in the department's

[1] New Hampshire Granite State Clean Cities Coalition, https://www.granitestatecleancities.nh.gov/, (Last accessed October 28, 2020).

[2] NH Electric Vehicle Charging Stations Infrastructure Commission, https://www.des.nh.gov/organization/divisions/air/tsb/tps/msp/sb517.htm, (Last accessed October 28, 2020).

[3] Senate Bill 517, An Act Establishing an Electric Vehicle Charging Stations Infrastructure Commission, http://gencourt.state.nh.us/bill_Status/billText.aspx?sy=2018&id=1829&txtFormat=pdf&v=current, (Last accessed October 28, 2020).

Mobile Sources Section, focused on improving the state and region's air quality by reducing air pollution from the transportation sector.

Q. Have you previously testified before the Commission?

A. Yes. Previously, I testified before the Commission in DE 19-057 Eversource Rate Case, DE 15-137, Energy Efficiency Resource Standard, and DE 12-262 CORE Electric and Gas Energy Efficiency Programs for 2013-2014. In addition, I also recently submitted comments for IR 20-004 Investigation into Rate Design Standards for Electric Vehicle Charging Stations and Electric Vehicle Time of Day Rates.

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

A. My name is Christopher Skoglund. I am also employed by NHDES as the Climate and Energy Program Manager in the Technical Services Bureau of the Air Resources Division. 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 have been working full-time at NHDES since 2008 and have been involved in planning, projects, and programs across the electric power, building, and transportation sectors, having worked as an energy and transportation analyst and a climate and energy analyst, before assuming my current position. I have been involved in several multi-sector planning efforts, coordinating the development of the: 2009 New Hampshire Climate Action Plan, the 2012 EESE Board Review on the Independent Study of Energy Policy Issues ("SB 323 (2010) Study"); and the New England Governors/Eastern Canadian Premiers 2017 Regional Climate Action Plan Update. In addition, I also regularly testify before the NH Building Code Review Board and the state legislature, and conduct energy and GHG analysis for NHDES and the State of New Hampshire, inclusive of the electric power, building, and transportation sectors.

I was also a participant in the EERS Working Groups that were convened to consider the EERS Performance Incentive Work Group and the EERS Benefit/Cost Working Group during 2019.

Q. Have you previously testified before the Commission?

A. Yes. Previously, I testified before the Commission in DE 19-057 Eversource Rate Case. In addition, I recently 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 letter of support for key elements of the DE 19-064 Liberty Utilities Rate Case Settlement Agreement. In addition, I am presently an Intervenor in DG 17-152 Liberty Gas Least Cost Integrated Resource Plan, and have been active participant in the DE 16-576 Net Metering pilot studies, and was engaged throughout the IR 15-296 Grid Modernization proceeding, and the DE 17-136 EERS working groups.

II. Overview and Summary

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

A. The purpose of our testimony is to support the overall approval of the NH Utilities' 2021-2023 New Hampshire Statewide Energy Efficiency Plan ("Efficiency Plan"), noting that the plan provides environmental, energy, and economic benefits for the whole state, and positions the NH Utilities to deliver further benefits in the years ahead.

Our testimony begins (Section III) with an explanation of NHDES' connection to this docket, specifically the considerable environmental and public health benefits that this plan would provide. The second part of our testimony (Section IV) includes discussion regarding our support for the fundamental elements of the EE Plan and their importance to the state's energy system, economy, and environment. The final part of our testimony (Section V) contains our support for specific elements of the EE Plan.

III. Environmental Benefits

Q. NHDES is the state's environmental regulatory body. How does the department's mission and expertise relate to this Energy Efficiency Plan?

A. NHDES' mission is to help sustain a high quality of life for all citizens by protecting and restoring the environment and public health.[4] NHDES is charged with overseeing environmental quality related to air, waste, water, and climate change issues.[5,6,7,8,9]

Reducing total energy consumption and electrical demand lowers emissions of smog-forming compounds and particle pollution that cause direct health impacts, mercury emissions that poison our lakes and streams, and greenhouse gas (GHG) emissions that contribute to climate change. In that respect, environmental policy is energy policy. This connection has been reinforced by the NH General Court on numerous occasions, as reflected in NH statutes, a fact which was noted during the development of the Granite State Test (GST) and the Secondary Granite State Test by the EERS Benefit/Cost Working Group during 2019.[10]

As noted by ISO-NE in the Draft 2018 ISO New England Electric Generator Air Emissions Report, shifting electricity use from on-peak to off-peak reduces the emission of criteria air pollutants, including oxides of nitrogen (NO_x) and sulfur dioxide (SO_2), and carbon dioxide (CO_2), a greenhouse gas, considerably.[11] During ozone season, shifting electricity from peak to off-peak can, on average, reduce emissions for NO_x, SO_2, and

[4] NHDES Mission and Guiding Principles, https://www.des.nh.gov/organization/commissioner/strategic-plan/documents/des-mission-guiding-princ.pdf, (Last accessed October 27, 2020).

[5] NH RSA 125-C: Air Pollution Control, http://www.gencourt.state.nh.us/rsa/html/X/125-C/125-C-mrg.htm, (Last accessed October 27, 2020).

[6] NH RSA 125-D: Acid Rain Control Act, http://www.gencourt.state.nh.us/rsa/html/X/125-D/125-D-mrg.htm, (Last accessed October 27, 2020).

[7] NH RSA 125-J: Emissions Reduction Trading Programs, http://www.gencourt.state.nh.us/rsa/html/X/125-J/125-J-mrg.htm, (Last accessed October 27, 2020).

[8] NH RSA 125-M: Mercury Emissions Reduction And Control Program, http://www.gencourt.state.nh.us/rsa/html/X/125-M/125-M-mrg.htm, (Last accessed October 27, 2020).

[9] NH RSA 125-O: Multiple Pollutant Reduction Program, http://www.gencourt.state.nh.us/rsa/html/X/125-O/125-O-mrg.htm, (Last accessed October 27, 2020).

[10] 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, (Last accessed October 27, 2020).

[11] ISO-NE (2020). Draft 2018 ISO New England Electric Generator Air Emissions Report, ISO New England Inc. System Planning, https://www.iso-ne.com/static-assets/documents/2020/04/2018_draft_air_emissions_report.docx, (Last accessed April 23, 2020).

CO_2 by 43 percent, 75 percent, and 10 percent respectively.[12] 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.[13]

Increasingly, the solutions to energy system reliability, energy system costs, and environmental impacts intersect. As clean energy technologies evolve and come down in price, they present a significant opportunity to reduce overall system costs while providing for a cleaner environment with improved public health outcomes. For that reason, NHDES has participated in previous "Core" energy efficiency programs as well as the EERS process since its inception, and has been intervening in an expanding range of PUC dockets across a variety over the past five years.

In order to further advance environmental and public health gains, NHDES has participated in investigatory dockets and intervened in rate cases and other proceedings that consider traditional energy efficiency measures as well as distributed generation, strategic electrification,[14] and energy optimization.[15] The department has also testified on these matters, as well as energy storage, before the NH General Court. These important, interrelated technologies are vital to reduce the emission of criteria pollutants and

[12] NHDES 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, (Last accessed April 23, 2020).

[13] NHDES 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, (Last accessed April 23, 2020).

[14] "Strategic electrification involves powering end uses with electricity instead of fossil fuels in a way that increases EE and reduces pollution, while lowering costs to customers and society, as part of an integrated approach to decarbonization."

This definition comes from: Navigant Consulting (2019). Energy Optimization through Fuel Switching Study, Prepared for: The New Hampshire Evaluation, Measurement, and Verification (EM&V) Working Group, pg. 28, https://www.puc.nh.gov/regulatory/docketbk/2017/17-136/letters-memos-tariffs/17-136_2019-10-31_staff_nh_energy_optimization_study.pdf, (Last accessed October 28, 2020).

[15] "We interpret energy optimization as a strategy to minimize energy use and maximize customer benefits. Energy optimization considers efficiency and the mix of fuels used. Energy optimization measures are a subset of fuel switching measures, but the two are not synonymous because fuel switching does not necessarily account for efficiency. Similarly, energy optimization measures are a subset of [energy efficiency] EE measures, though EE measures do not necessarily consider the fuel mix. Beneficial or strategic electrification approaches may involve energy optimization, but these terms are not synonymous either. Beneficial or strategic electrification involves powering end uses with electricity instead of fossil fuels in a way that increases EE and reduces pollution, while lowering costs to customers and society, as part of an integrated approach to decarbonization, while energy optimization focuses on any strategy that minimizes energy use and maximizes customer benefits."

This definition comes from: Navigant Consulting (2019). Energy Optimization through Fuel Switching Study, Prepared for: The New Hampshire Evaluation, Measurement, and Verification (EM&V) Working Group, pg. 1, https://www.puc.nh.gov/regulatory/docketbk/2017/17-136/letters-memos-tariffs/17-136_2019-10-31_staff_nh_energy_optimization_study.pdf, (Last accessed October 28, 2020).

greenhouse gases (GHG) and can be applied across the economy in the building, industrial, and transportation sectors.

As nearly all of these topics are considered here in DE 20-092, NHDES finds an opportunity to support a New Hampshire energy system that evolves in a coordinated fashion with environmental, energy, and economic benefits for all New Hampshire residents.

IV. High-Level Recommendations

Q. Do you have any recommendations for the Commission?

A. Yes. NHDES has several recommendations for the Commission, three higher-level recommendations and three more granular recommendations.

Q. What are the higher level recommendations?

A. NHDES recommends that the Commission approve the following fundamental elements of the proposed EE Plan:

1. Energy savings goals;
2. Three-year term; and
3. Notification and modification triggers.

Each item will be addressed individually and in order.

1. Energy Savings Goals

NHDES recommends that the Commission approve the EE Plan's proposed goals of cumulative energy savings of five percent of the NH Electric Utilities' 2019 kWh delivery sales and three percent of the NH Natural Gas Utilities' 2019 MMBtu delivery sales. NHDES' recommendation is based upon the NH Utilities' demonstration that achievement of those goals would deliver significant cost-effective energy reductions, which would provide real energy cost savings to New Hampshire ratepayers, as well as significant environmental benefit.

The EE Plan goals are vital to keeping costs down as ISO-NE, based on 2019 data collected from New England states, projects that New Hampshire will to lag other states

for overall energy efficiency, behind the meter distributed energy deployment (e.g., solar photovoltaic (PV) systems), and demand management, and, therefore, the state can expect to see its share of regional transmission load during summer peak grow over the next decade from 9.5 percent in 2020 to 10.8 percent in 2029. Most other states in region are expected to see their share of summer peak load decline over that time.[16] As the amount of electricity demand in each state determines its share of the transmission cost, this growth in share of regional demand will be costly to New Hampshire ratepayers. The EE Plan's proposed electricity savings goals provide provides a mechanism to reduce the projected demand and thereby reduce costs for New Hampshire ratepayers. In 2019, ISO-NE estimated that the region would see an addition $1.4 billion in transmission investments through 2022.[17] As other states reduce their peak transmission load, New Hampshire's share of these costs will rise unless the state achieves equivalent demand reductions.

The EE Plan is projected to deliver customer energy cost savings of more than $1.3 billion over the lifetime of the measures,[18] as a result of avoiding 6.7 billion electric kWh and 9.6 million natural gas MMBtu, and further avoiding 8.3 million MMBtu from other fuels, such as oil and propane.[19] Such reductions will provide significant environmental benefits, including a reduction of more than 4.4 million tons of GHG emissions over the life of the measures,[20] equivalent to more than 25 percent of the total GHGs emitted by the New Hampshire economy in 2018.[21] By delivering such a broad range of benefits, the goals in this EE Plan present a "no regrets" opportunity for the state.

[16] ISO-NE (2020). 2020-2029 Forecast Report of Capacity, Energy, Loads and Transmission, Tab 6.2, https://www.iso-ne.com/static-assets/documents/2020/04/2020_celt_report.xlsx, (Last accessed October 28, 2020).

[17] ISO-NE (2019). Regional transmission investment: Spring 2019 update, ISO NEWIRE, http://isonewswire.com/updates/2019/4/2/regional-transmission-investment-spring-2019-update.html, (last accessed October 29, 2020).

[18] EE Plan, BATES pg. 8

[19] Ibid, BATES pg. 9

[20] Ibid, BATES pg. 8

[21] New Hampshire GHG Inventory, maintained by NHDES, based on analysis of primary energy consumption data provided by US Department of Energy, State Energy Data System as well as non-energy data analysis using the US EPA State Inventory Tool. Updated August 2020.

2. Three-Year Term

NHDES' second recommendation is that the Commission approve the establishment of the three-year operating term. NHDES agrees that allowing the program to operate over a continuous three-year period would provide greater efficiency, continuity and certainty, as well as flexibility regarding program administration as described in Section 2.1.[22]

The three-year term would relieve the program administrators of the substantial burden of spending time in adjudicative proceedings before the PUC allowing them, instead, to focus their resources on developing and delivering the expanded programs to achieve the proposed targets. The three-year term would also allow the more highly subscribed programs to continue to operate and deliver savings continually, whereas historically, some have run out of funds and have had to temporarily suspend operations.

In addition, the proposed savings goals are notable increases over previous targets and would require the expansion of existing programs, as well as the implementation of new programs. A three-year term will enable the NH Utilities to undergo a phased expansion in programs and allow them flexibility to grow and adjust as needed, as discussed in Section 2.1.8, in a manner which is not feasible under the current, inflexible one-year targets.[23]

3. Commission Notification and Modification Triggers

Finally, NHDES supports adoption of the notifications and mid-term modification triggers spelled out in Section 2.1.6.[24] As previously noted, the goals are a notable increase over prior years and exogenous events have already shown their capacity to deeply influence program delivery. The proposed Commission notification provisions provide an opportunity for the NH Utilities to maintain flexibility and continuity, while keeping the Commission, Staff, and stakeholders apprised of what is occurring. However, the modification triggers assure that, should more significant specific issues arise, the

[22] EE Plan, BATES pg. 32

[23] Ibid, BATES pg. 44

[24] Ibid, BATES pg. 43

program administrators would be required to get Commission approval and stakeholders would have the opportunity to weigh in before more substantive changes are made.

V. Specific Recommendations

Q. Do you have any recommendations regarding the details of the EE Plan itself?

A. Yes. NHDES has recommendations concerning the following specific EE Plan program elements:

1. Active Demand Reduction;
2. Building Construction; and
3. Energy Optimization

1. Active Demand Reduction

NHDES recommends approval of the NH Utilities' plan to implement the Active Demand Reduction (ADR) programs described in Priority Eight[25] and Section 5.1.[26] As noted in the EE Plan, the programs would result in passive demand reduction savings that would reduce summer peak demand by 64.0 megawatts ("MW") and winter peak demand by 57.2 MW.[27] Reducing peak demand is vital as it can influence electricity supply as well as transmission and distribution costs. As noted above, New Hampshire's share of regional peak transmission is expected to rise significantly over the next decade, resulting in additional costs to all New Hampshire ratepayers. The ADR strategies proposed in the EE Plan offer the chance to further flatten peak loads beyond the passive gains made through reduced overall electricity consumption.

The focus of the ADR program is consistent with a recommendation made by the committee established by SB 125 (2017) to study the state's electricity system costs and ways to mitigate those costs, which is:

[25] EE Plan, BATES pg. 21

[26] Ibid, BATES pg. 148

[27] Ibid, BATES pg. 9

"2. *Reduce transmission costs and other costs allocated to NH by increasing spending on rigorously validated, cost-effective distributed generation, distributed resources, and energy efficiency programs that lower coincident peak demands."*[28]

By implementing the ADR programs, New Hampshire would see an improved overall load factor by shifting consumption and demand to the times of day when the generation, distribution, and transmission systems are significantly underutilized and lower emitting. Such reductions can benefit all electric customers and New Hampshire residents by:

A. Reducing projected growth in state's share of regional transmission;

B. Avoiding the need for costly distribution system upgrades; and

C. Reducing air pollution and GHG emissions.

Commercial and Industrial (C&I) Curtailment

NHDES supports the inclusion of the C&I curtailment ADR strategies, which target more flexible load. In particular, NHDES supports the program design element that explicitly prohibits "emergency only" back-up generators from participation in the program. Emergency generators have stringent limitations on the number of hours they may operate without triggering additional emission control requirements. The exclusion of such generators ensures that the program will reduce overall system costs without degrading local, state, and regional air quality.[29]

Battery Storage

NHDES supports the inclusion of the battery storage programs. Historically, electricity was the only commodity produced at the same rate that it is consumed. Energy storage, inclusive of electric batteries, fuel cells, pumped hydro, compressed air, and flywheels, changes this by providing energy when needed and absorbing it when in

[28] Final Report of the Committee to Study Transmission, Distribution, Generation, and Other Costs in the State's Electricity System (SB 125, Chapter 83:1, Laws of 2017), November 1, 2017, pg. 6, http://www.gencourt.state.nh.us/statstudcomm/reports/1337.pdf, (Last accessed October 28, 2020).

[29] EE Plan, BATES pg. 149.

excess. Storage can support the development of a grid that is cleaner, more decentralized, resilient, and open for rapid innovation by storing energy when it is lower cost.[30] This includes during those times when intermittent renewable energy resources, such as solar and wind power, are generating, as well as during overnight periods when electricity demand is lowest. This stored energy can later be dispatched as necessary, whether during a peak electricity demand event or a power outage.[31] The units that provide the needed power during peak events tend to be older, less efficient, and more polluting. Battery storage can eliminate or reduce the need for their operation and thus reduce air pollution.

The EE Plan specifically targets the deployment of residential and commercial systems that can be used during peak events to offset load within the local distribution system. Such peak shaving results in savings across the entire regional energy grid for all customers by: reducing the need to run more expensive generation facilities during peak periods; by deferring or avoiding the need to build new generation and transmission infrastructure;[32] and by enabling the state to reduce its share of load at the time of the ISO-New England peak.[33]

As a co-benefit, storage can also increase the resilience to grid to disruption by reducing the time and resources needed to restore power to critical facilities such as hospitals, shelters, and wastewater treatment facilities,[34] and can be utilized by industrial facilities to maintain operations. Resiliency is of increasing importance as the top five most significant power outages have all occurred since 2008 as the result of storms. Each of these storms affected more than 230,000 customers, with outage durations that exceeded

[30] OSI (2018). New Hampshire 10-Year State Energy Strategy, NH Office of Strategic Initiativeshttps://www.nh.gov/osi/energy/programs/documents/2018-10-year-state-energy-strategy.pdf, pg. 36, (Last accessed October 28, 2020).

[31] Gheorghiu, I. (2019). New Hampshire Regulators Approve Utility-Owned Residential Tesla Battery Pilot, https://www.utilitydive.com/news/new-hampshire-regulators-approve-utility-owned-residential-tesla-battery-pi/546364/, (Last accessed October 28, 2020).

[32] OSI (2018). New Hampshire 10-Year State Energy Strategy, NH Office of Strategic Initiatives, https://www.nh.gov/osi/energy/programs/documents/2018-10-year-state-energy-strategy.pdf, pg. 40, (Last accessed October 28, 2020).

[33] Liberty Utilities (2017). Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities Request for Approval of Battery Storage Pilot, pg. 8, http://www.puc.state.nh.us/regulatory/docketbk/2017/17-189/initial%20filing%20-%20petition/17-189_2017-12-01_gsec_dtestimony_tebbetts.pdf, (Last accessed October 28, 2020).

[34] NREL (2014). Distributed Solar PV For Electricity System Resiliency, https://www.nrel.gov/docs/fy15osti/62631.pdf, pg. 1. (Last accessed October 28, 2020).

100 hours.[35] Energy storage offers the potential to reduce extreme weather impacts on critical infrastructure and economic disruption to businesses. While not explicitly related to energy efficiency, such resiliency presents a profound economic resiliency opportunity for industry and critical facilities that must maintain operations.

The information gathered from the administration of both the residential and commercial programs would also provide information that would very likely benefit the proceeding in the newly opened PUC Docket IR 20-166 Investigation into Compensation of Energy Storage Projects for Avoided Transmission and Distribution Costs.

Managed Charging

NHDES also supports the NH Utilities' consideration of a managed-charging pilot for EVs and would encourage the Commission to approve this program. NHDES believes that a managed-charging pilot would enable the Commission, NH Utilities, and stakeholders to better understand the opportunities and challenges presented by EVs as they present a significant source of new load to be managed.

However, in comparison to gasoline and diesel vehicles, EVs operating in the Northeast can provide a net environmental benefit as well. EVs result in lower NOx and GHG emissions, even when factoring in the power plant emissions from charging the batteries. This is, in part, because the electric grid in the Northeast is relatively "clean" as compared to other regions, and because EVs use energy much more efficiently than ICE vehicles, using 25 percent of the energy of a conventional ICE vehicle to travel the same distance.[36] As the ISO-New England grid becomes even cleaner, through the interconnection of distributed energy resources and large renewable energy projects, the net environmental benefit of EVs will grow.

While the impact of EVs on the environment and economy is likely to be a net positive, the impact to the energy sector and specifically the electric sector has the

[35] PUC (2019). New Hampshire Historical Outages All Utilities For Wide Scale Storms, NH PUC Safety Division, https://www.puc.nh.gov/Safety/safety-pdfs/Safety-Chart-Of-Historical-Storms.pdf, (Last accessed October 28, 2020).

[36] US DOE (2019). All-Electric Vehicles, Office of Energy Efficiency & Renewable Energy, https://fueleconomy.gov/feg/evtech.shtml, (Last accessed October 28, 2020).

potential to be mixed and must be better understood. As the EV fleet in New Hampshire grows, it would displace motor gasoline and on-road diesel consumption, reducing total energy consumption and total imported energy, while increasing electricity consumption.

Based on NHDES calculations, it is estimated that EVs registered in the state in 2018, representing 0.28 percent of the passenger vehicle population, consumed 10,100 MWH annually. If EVs were to rise to 30 percent of the passenger fleet, all else being equal, that could require an additional 1,100 GWH of generation.[37] As noted above, New Hampshire is already projected to fall behind most other states in terms of reducing peak demand and therefore will see its regional share of peak transmission load grow. Staying ahead of EV deployment and charging is imperative to ensure charging does not occur during peak periods, resulting in energy supply, distribution, and transmission impacts, as well as an increase in electric power system emissions.

While the near-term risk of a 30 percent market penetration is low the introduction of many new models in a variety of body types, along with longer ranges, and falling purchase price, the rate of EV adoption in New Hampshire is expected to increase. ISO-NE projects that there could be more than 20 times as many EVs registered in New Hampshire by 2029.[38] This is would represent under 6 percent of current passenger vehicles, but a substantial new source of load all the same. It is worth noting that other states in NE are expected to realize similar or greater growth, and that New Hampshire is a frequent destination for travelers from these states.

Currently, EV drivers do more than 80 percent of their charging at home.[39] As EVs continue to increase as a percentage of the New Hampshire fleet and in the number of vehicles carrying visitors, the rise in electric power consumption has the potential, if not properly managed, to increase the total ISO-NE daily and seasonal peaks, as well as

[37] NHDES calculations, December 2019. Assumes EV-registration fraction equal to EV passenger-miles fraction and 3.5 miles per KWH.

[38] ISO-NE (2020). Final 2020 Transportation Electrification Forecast, https://www.iso-ne.com/static-assets/documents/2020/04/final_2020_transp_elec_forecast.pdf, pg. 9 (Last accessed October 28, 2020).

[39] US DOE (2020). Electric Vehicles: Charging at Home, Office Energy Efficiency and Renewable Energy, https://www.energy.gov/eere/electricvehicles/charging-home, (Last accessed October 28, 2020).

New Hampshire's share of that peak.[40] However, if forecasted and managed properly, EV electricity consumption could result in an improved load factor, with more kWh over which to spread each NH Utilities' fixed costs.[41] NH Utilities need to be prepared to mitigate any potential negative impact EV charging may have on peak demand and this proposed pilot could provide invaluable information to that effort.

2. Building Construction

NHDES comments on building construction are divided into two parts: building codes and standards; and ENERGY STAR homes tiers and incentives. The building codes and standards portion focuses on support for improving the "floor", by elevating the efficiency of all homes and commercial buildings constructed in the New Hampshire. The comments on the ENERGY STAR homes program focus on support for increasing the building energy performance and innovation among the most advanced buildings in New Hampshire.

NHDES has long been supportive of advancing modern building energy codes, and compliance with those codes, as a way to reduce energy demand in the commercial and residential building sector. Energy for heating, cooling and electrical use in residential and commercial buildings accounts for about half of all energy consumed in the state. Maximizing building-energy efficiency during new construction and major renovations reduces the cost associated with installing energy efficiency measures, while increasing the durability of the building, providing increased safety and comfort, reducing air pollution, and avoiding significant energy costs for the building's occupants.[42]

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[40] Harper, C., McAndrews, G., and Sass Byrnett, D. (2019). Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators, National Association of Regulatory Utility Commissioners, https://pubs.naruc.org/pub/32857459-0005-B8C5-95C6-1920829CABFE, (Last accessed October 28, 2020).

[41] Page 13. 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. 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, (Last accessed October 27, 2020).

[42] NH OEP (2014). 2014 New Hampshire 10-Year Energy Strategy, https://www.nh.gov/oep/energy/programs/documents/energy-strategy.pdf, pg. 32, (Last accessed October 28, 2020).

This has long been recognized by leading bodies on energy use in New Hampshire. The 2009 New Hampshire Climate Action Plan (the "Plan"),[43] developed by the twenty-nine-member Climate Change Policy Task Force (comprised of a broad array of business and energy interests in the state), included maximizing building energy efficiency as one of the ten over-arching strategies to achieve the State's GHG emission reduction goals. The Task Force members recognized that,

> *"By ensuring the regular update of New Hampshire's residential and commercial building energy codes with reference to the latest national/international model code as a baseline, the state would set as its 'floor' the latest technologies and practices inherent in that most recently updated code."*[44]

The Plan further noted that,

> *"Energy codes can be used to regulate energy use in new construction and substantial renovation of all buildings, and, when administered in tandem with "stretch codes" or "beyond code" provisions, can also inform more stringent high-performance (or "green") construction standards to serve additional state policy objectives. However, any effort to capture savings from building energy codes has to come with the understanding that the best code is only as good as the compliance with that code."*[45]

Similarly, the State Energy Advisory Council noted in the 2014 New Hampshire 10-Year Energy Strategy,

> *"Every building that is constructed in an inefficient manner is a lost opportunity to keep more of our energy dollars in state, and retrofitting a building later costs more than building it efficiently from the start."*[46]

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[43] CCPTF (2009). 2009 New Hampshire Climate Action Plan, Climate Change Policy Task Force, http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm, (Last accessed October 28, 2020)

[44] CCPTF (2009). 2009 New Hampshire Climate Action Plan, Climate Change Policy Task Force, Appendix 4.1, Recommendation RCI Action 1.4A, http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/032509_nhccptf_appendix_4.1.pdf, pg. 25 (Last accessed October 28, 2020).

[45] CCPTF (2009). 2009 New Hampshire Climate Action Plan, Climate Change Policy Task Force, Appendix 4.1, Recommendation RCI Action 1.4B – Improve Building Energy Code Compliance, http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/032509_nhccptf_appendix_4.1.pdf, pg. 29, (Last accessed October 28, 2020).

[46] NH OEP (2014). New Hampshire 10-Year Energy Strategy, https://www.nh.gov/oep/energy/programs/documents/energy-strategy.pdf, pg. 32, (Last accessed October 28, 2020).

The NH Utilities building construction programs, as described in the EE Plan address each of the points made by those bodies.

Building Codes and Standards

NHDES recommends that Commission approve the NH Utilities' programs designed to support updated building code adoption and compliance. The state adopted new building energy codes, the International Energy Conservation Code (IECC) 2015, through HB 562 in 2019 and they became law as part of RSA 155-A:1 in 2019.[47] This edition of building energy codes offers significant energy savings over the previous codes for both electric and thermal loads in commercial and residential spaces and will result in economic and environmental benefits for decades to come. The US Department of Energy estimates that, for a NH home built to IECC 2015 in Climate Zone 5 and 6, a homeowner could expect to save $7,697 to $11,231 respectively over a thirty-year period. The simple payback on the upfront investments would occur in four to five years.[48] Many of the energy-efficiency measures would continue to save money and provide additional comfort beyond this time frame.

Achieving these savings requires not only the inclusion of codes in RSA 155-A:1, but also compliance with them. NHDES appreciates the NH Utilities' recognition in the EE Plan regarding both code adoption and compliance, including a section "Compliance Support for Base and Stretch Code"[49] and "Stretch Code Development Support".[50] In these sections, the NH Utilities plan to support an expanded codes compliance program, which would provide the foundation for achieving greater building energy code compliance through training programs to builders, municipal officials, and code enforcement officers, as well as technical assistance.

[47] NH RSA 155-A:1 Definitions, http://www.gencourt.state.nh.us/rsa/html/xii/155-a/155-a-mrg.htm, (Last accessed October 27, 2020).

[48] US DOE (2015).National Cost-Effectiveness of the Residential Provisions of the 2015 IECC, Pacific Northwest Labs, https://www.energycodes.gov/sites/default/files/documents/2015IECC_CE_Residential.pdf, (Last accessed October 26, 2020).

[49] EE Plan, BATES pg. 113.

[50] Ibid, BATES pg. 114.

As a complement to the expansion of traditional building energy code programs, the NH Utilities also are proposing to provide their technical expertise to support adoption of more modern versions of the building energy code before various state technical review boards, such as the Building Code Review Board and legislative committees, as well as potential support for development of "stretch codes" that could be voluntarily adopted by municipalities. The appearance of the NH Utilities before these bodies would be invaluable in informing future discussions concerning the adoption of more modern and more efficient versions of the code.

NHDES, in recognition of the energy, economic, and environmental benefits that efficient buildings provide, further supports the NH Utilities' proposal to collaborate with stakeholders to develop an evaluation plan that would enable the measurement and attribution of savings from these building energy code adoption and compliance efforts during the 2021-2023 term.[51]

ENERGY STAR Tiers and Bonus Incentives

Also related to building construction, NHDES recommends approval of the NH Utilities' ENERGY STAR tiers and bonus incentives designed to "Encourage Sustainability" as described in Section 4.2.3, inclusive of all five items: US DOE Zero Energy Ready Home ("ZERH") Program; Passive House Certification; EV-Ready Homes; All Electric Package; and Above-and-Beyond Code Measures. Homes built in each of these categories offer the potential to reduce overall energy use, reduce energy costs, and improve environmental outcomes. [52]

While the previous building construction section focused on improving base building energy code and compliance with that code, these ENERGY STAR tiers and incentives would encourage building construction well beyond base code and even ENERGY STAR building construction standards. The importance of such program offerings is that they would support the building community in voluntarily adopting new

[51] EE Plan, BATES pg. 114.

[52] Ibid, BATES pg. 108.

technologies and techniques before codes mandate them and in doing so, support market transformation.

By incentivizing the construction of passive houses, ZERH, PV-ready, and EV-ready homes, the NH Utilities' programs support more rapid development of familiarity and expertise among New Hampshire's builders, contractors, and tradespeople with new products and technologies. As this experience and expertise grows, the building community would be more prepared for the future when familiarity and demand for these technologies and features may rise among homeowners, and base codes may require such features.

Importantly, the incentives offer a significant opportunity to support reductions in energy consumption and load without incurring the full cost of certain measures. A key element of the NH Utilities' program proposal is "Ready," whether zero-energy-ready, all-electric-ready, or EV-ready. Through these programs the NH Utilities' propose incentivizing the installation of wiring or conduit that would enable homeowners to take steps later to install energy appliances. Installing the wiring and conduit at the time of construction is much cheaper than installing in an already built home, and it lowers the cost barriers that might otherwise prevent a homeowner from pursuing technologies such as air-source heat pumps (ASHPs), EV chargers, or solar PV systems.

3. Energy Optimization

NHDES also supports the inclusion of the Energy Optimization pilot offering cold climate ASHPs capable of providing heating and cooling. New Hampshire is heavily dependent upon oil and propane for winter heating fuels and cold climate ASHPs offer a more efficient, lower emitting alternative to these traditional combustion appliances. The state has also seen an increase in the cooling degree of nearly 30 percent days over the past two decades,[53] as a result of our warming climate. Temperatures are projected to continue to rise over the next several decades and the demand for summer cooling will

[53] NHDES analysis of cooling degree days 1998-2019, Concord NH meteorological station, obtained from NOAA (2020). National Centers for Environmental Information, Climate Data Online Search, https://www.ncdc.noaa.gov/cdo-web/search, (Last accessed October 28, 2020)

likely increase. This pilot will provide the Commission, NH Utilities, and stakeholders an additional opportunity to learn about this technology and the opportunities and challenges it presents before it become more widespread.

ASHPs are similar to EVs in that they offer real cost savings in homes and businesses, and lower levels of air pollutants and GHG emissions, but they also present a new source of load that, if unmanaged, could increase energy supply, distribution, and transmission costs. As more homeowners, landlords, and business owners become familiar with this technology, more vendors emerge to market and install these devices, and the market continues to offer more efficient units, it is likely that adoption of ASHPs will increase.

While these systems may replace electric resistance units and provide significant house-level reductions in winter electric use and demand, many units would appear in previously fossil-fuel heated homes. In its 2020 Heat Electrification Forecast, ISO-NE projects that up to 8.5 percent of homes in New Hampshire could have ASHPs installed in them by 2029, replacing 9 percent of the existing electric resistance heating systems.[54] This equates to 46,300 newly electric heated (and possibly newly cooled) homes.[55] However, the same ISO-NE analysis shows that Maine is projected to have ASHPs installed in 258,600 homes by 2029 representing nearly 43 percent of all homes.[56] This equates to 243,000 newly electrified homes[57] with only 6 percent of existing resistance heated homes converted.[58] Regardless of whether future policies emerge in New Hampshire and accelerate deployment of ASHPs to similar levels as seen in Maine, the proposed pilot would provide crucial information to prepare for this new source of consumption and load.

Q. Does this conclude your testimony?

[54] ISO-NE (2020). Final 2020 Heating Electrification Forecast, https://www.iso-ne.com/static-assets/documents/2020/04/final_2020_heat_elec_forecast.pdf, pg. 8 (Last accessed October 28, 2020).

[55] EE Plan, BATES pg. 9

[56] Ibid, BATES pg. 8

[57] Ibid, BATES pg. 9

[58] Ibid, BATES pg. 8

A. Yes.