STATE OF NEW HAMPSHIRE

BEFORE THE NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

Docket No. DE 21-078

Public Service Company of New Hampshire D/B/A Eversource Energy

DIRECT TESTIMONY OF CHRISTOPHER R. VILLARREAL

ON BEHALF OF

CLEAN ENERGY NEW HAMPSHIRE AND CONSERVATION LAW FOUNDATION

FEBRUARY 25, 2022

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I. INTRODUCTION & QUALIFICATIONS

Q. Please state for the record your name, position, and business address.

A. My name is Christopher Villarreal. I am the President of Plugged In Strategies, located at 9492 Olympia Drive, Eden Prairie, Minnesota, 55347.

Q. On whose behalf is this testimony being offered?

A. I am testifying on behalf of Clean Energy New Hampshire (CENH) and the Conservation Law Foundation (CLF).

Q. Please summarize your experience in the field of utility regulation.

A. I have over 20 years of experience working for and before state regulatory bodies, including nine years as Senior Regulatory Analyst at the California Public Utilities Commission and two years as Director of Policy at the Minnesota Public Utilities Commission. I started Plugged In Strategies in 2017 and since then I have advised state commissions around the country on issues related to rate design, grid modernization, advanced metering infrastructure, interoperability, electric vehicles, distribution system planning, and data access and privacy.

Q. Can you describe your experience with the issues raised in this proceeding?

A. On rate design issues, I worked on a number of rate design policy decisions and proceedings when I was a staff member at the California Public Utilities Commission, including assisting the Assigned Commissioner's dynamic pricing guidance issued in Decision 08-07-045[1] and development of the Order Instituting Rulemaking that led to a review of existing rate design in California.[2] As Director of Policy for the Minnesota Public Utilities Commission, I participated in the development of the Minnesota Commission's review of its rate design policies.[3]

Additionally, from 2016-2017, I was staff chair of the National Association of Regulatory Utility Commissioners (NARUC) Staff Subcommittee on Rate Design, and led the effort to publish the NARUC manual on Distributed Energy Resources (DER) Rate Design and Compensation. This document was one of the first comprehensive looks at the impacts rate design has on DER, which includes EVs.

Recently, I facilitated an effort for the Connecticut Public Utilities Regulatory Authority, with funding from NARUC, to look at the interoperability considerations for EV

[1] *Application of Pacific Gas and Electric Company To Revise Its Electric Marginal Costs, Revenue Allocation, and Rate Design*, Decision 08-07-045, California Public Utilities Commission (July 31, 2008), https://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/85984.PDF.

[2] *Order Instituting Rulemaking on the Commission's Own Motion to Conduct a Comprehensive Examination of Investor Owned Electric Utilities' Residential Rate Structures, the Transition to Time Varying and Dynamic Rates, and Other Statutory Obligations*, Order Instituting Rulemaking, California Public Utilities Commission, Docket No. R.12-06-013 (June 28, 2012), https://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/169782.PDF.

[3] *See In the Matter of an Alternative Rate Design Stakeholder Process for Xcel Energy*, Notice Seeking Comment on Procedural Schedule, Minnesota Public Utilities Commission, Docket No. E002/M-15-662 (February 16, 2016), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={AAB14AE3-EEDF-4188-8AE3-BD5BDA9EE5BA}&documentTitle=20162-118338-01.

deployment in Connecticut, including the interaction between EVs, electric vehicle supply equipment (EVSE), and the utilities.

My work experience is summarized in my resume, provided as Exhibit CRV-1.

Q. Have you testified before the New Hampshire Public Utilities Commission (Commission) or participated as an expert in any other proceeding before this Commission?

A. Yes, I submitted pre-filed testimony in Docket Nos. DE 20-170 and DE 21-030 and participated as a witness in the hearing in Docket No. DE 20-170. Additionally, I participated in several workshops before the Commission in Docket No. IR 15-296, Investigation into Grid Modernization.

Q. Have you testified before any other commission?

A. Yes, I have previously testified before the Colorado Public Utilities Commission, Massachusetts Department of Public Utilities, Michigan Public Service Commission, Public Utilities Commission of Nevada, and the South Carolina Public Service Commission. In general, I testified regarding utility distribution system planning efforts and the role of DER, including EVs, on those planning efforts, deployment of advanced metering infrastructure, and EV rate design.

Q. What is the purpose of your testimony?

A. I am testifying on behalf of CENH/CLF regarding the electric vehicle (EV) rate design proposals of Eversource Energy in DE 21-078.

Q. What is being considered in this docket?

A. In its Order of Notice establishing this docket, the Commission stated that these proceedings raise issues:

> [R]elated to whether Eversource's proposed Make-Ready Program and [demand charge alternative (DCA)] are consistent with the settlement agreement approved by the Commission in Order No. 26,443 (December 15, 2020); whether Eversource's proposed Make-Ready Program and associated, estimated capital investments in EV charging infrastructure are reasonable and consistent with the New Hampshire Energy Policy stated in RSA 378:37, as well as existing state EV policies; whether Eversource's DCA is consistent with the New Hampshire Energy Policy stated in RSA 378:37, as well as existing state EV policies; and whether Eversource's DCA, if approved, would result in rates that are just and reasonable, as required by RSA 374:2, and by RSA 378:5 and :7.

Q. Are you sponsoring any exhibits?

A. Yes, I am sponsoring the following exhibits:

Exhibit CRV-1:	Resume of Christopher R. Villarreal
Exhibit CRV-2:	Eversource Response to CLF 1-04 (Docket No. DE 21-078)
Exhibit CRV-3:	Eversource Response to CLF 1-01 (Docket No. DE 21-078)
Exhibit CRV-4:	Eversource Response to CLF 1-06 (Docket No. DE 21-078)
Exhibit CRV-5:	Eversource Response to CLF-CENH 2-003 and Attachment 1 (Docket No. DE 20-170

II. TESTIMONY OVERVIEW

Q. What is the purpose of your testimony?

A. My testimony discusses key components of rate design and rate design principles, impacts of rate design on adoption of EVs, and addresses the demand charge alternative proposal of Eversource as submitted in docket number DE 21-078. I recommend the following:

1. The Commission modify Eversource's rate design proposal as described in my testimony;
2. The Commission should require Eversource to collect information regarding EV adoption and usage rates to help inform the pace of evolution for rate design for EVs until such time as utilization rates for Direct Current Fast Chargers (DCFCs) reach a level at which demand charges can be recovered across more usage; and,
3. The Commission should require Eversource to make available public hosting capacity maps to help identify optimal locations for the citing of EV charging infrastructure, including DCFCs.

III. ELECTRIC VEHICLE POLICY

Q. How should the Commission address EV policy?

A. A good first step in this effort is to focus on the rate design, as the Commission has directed. However, with the current levels of EV adoption across New Hampshire, the Commission should consider taking additional actions that will do much to support the growth of EVs in New Hampshire. For example, at this early stage of adoption, making a statement that adoption of EVs is a priority of the Commission would show that the Commission is ready and willing to take necessary steps to support the EV market in New Hampshire.

Q. What justification exists for the Commission to make EVs a policy priority in New Hampshire?

A. EVs present economic, energy, and environmental opportunities for the state, region, and nation as they are a vital method to lower air pollution and greenhouse gas emissions from the transportation sector, therefore providing important societal benefits. In addition, EVs can provide important grid services, which will be discussed in further detail below. The adoption of EVs across the state fleet has the potential to vastly reduce the state's overall energy consumption as electric motors are nearly four times as efficient as internal combustion engines.[4] Moreover, as transportation electrification accelerates, it will result in increased electricity consumption, which will lower electricity rates for all consumers by spreading fixed costs over more KWh sales.[5] Finally, support for EV adoption is critical to New Hampshire's tourism-based economy.

Because increased EV adoption will result in lower electricity rates and fuel costs for all ratepayers and will provide numerous environmental benefits, support for EVs is consistent with the New Hampshire Energy Policy, set forth in RSA 378:37, which states that it is "*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 . . . and to protect the safety and health of the citizens [and] the physical environment of the state.*"[6] Further, as pertains to the consideration of demand charge

[4] Where the Energy Goes: Electric Cars, Office of Energy Efficiency & Renewable Energy, US DOE (2020), https://fueleconomy.gov/feg/atv-ev.shtml.

[5] *See* Jason Frost, Melissa Whited, and Avi Allison, *Electric Vehicles Are Driving Electric Rates Down*, Synapse Energy Economics, Inc. (June 2020), https://www.synapse-energy.com/sites/default/files/EV_Impacts_June_2020_18-122.pdf.

[6] RSA 378:37 (emphasis added).

alternatives in this docket and Eversource's proposal to establish a new rate applicable to public EV charging stations that would eliminate demand charges, RSA 236:133 mandates that the Commission "determine whether it is appropriate to implement . . . [d]emand charges" for commercial customers, including for public EV charging station operators.[7]

In addition, support for EV adoption is documented in two independent New Hampshire reports on the matter. In October 2020, the Electric Vehicle Charging Stations Infrastructure Commission, which was created by SB 517 (2020), issued a final report that recommended:

> The state should commit to the development of Zero Emission Vehicle (ZEV) technology and infrastructure, including the state, private and rental residence, business, and municipal installation of EV charging stations to reduce air pollution emissions and stimulate the transformation to a lower carbon transportation system.[8]

Moreover, in July 2019, the New Hampshire Department of Business and Economic Affairs (BEA), issued a final report that observed:

> Establishing a robust charging infrastructure will not only serve the needs of New Hampshire drivers, but will sustain New Hampshire's tourism industry as EV drivers from surrounding states realize they can visit the Granite State's mountains, lakes, forests, towns, and beaches.[9]

[7] RSA 236:133.

[8] EVSE Commission (2020). Electric Vehicle Charging Stations Infrastructure Commission (Senate Bill 517) Final Report (2018), https://www.des.nh.gov/sites/g/files/ehbemt341/files/inline-documents/2020-12/20201030-final-report.pdf.

[9] Evaluating Electric Vehicle Infrastructure in New Hampshire, New Hampshire Department of Business and Economic Affairs (July 2019), https://www.nh.gov/osi/resource-library/documents/nh-ev-infrastructure-analysis.pdf.

As such, EVs should be considered for the full range of potential benefits and impacts. The rate designs that the state ultimately elects to follow will have environmental, economic, and energy impacts while affecting its competitiveness within the northeast region.

Q. What are some benefits of making EV adoption a policy priority?

A. By making EV adoption a priority, the Commission can ensure that EV adoption and growth is considered across Commission actions. Additionally, making such a statement would allow further discussion and action on identifying opportunities to leverage EVs on the electric system and creating a more efficient distribution system.

Adoption of EVs provides a benefit to New Hampshire's customers and residents by electrifying transportation, be it single-vehicle EVs, a town's transit system, or electric school buses. The costs of operating EVs are lower than internal combustion engines, and EVs do not emit emissions, creating cleaner air for all who live and visit New Hampshire.

Q. What is the status of electric vehicle adoption in New Hampshire?

A. At this time, low. For example, Eversource conducts an annual forecast that estimates EV adoption 10 years into the future. Its forecast is based on a series of assumptions related to federal tax policies, battery and gas price forecasts, and state and regional needs and forecasts. Through 2030, Eversource forecasts less than 20,000 battery-powered EVs, of which some portion of those will be fleet vehicles.[10]

[10] Ex. CRV-5.

Nevertheless, even though expanded EV production targets have been announced by the major EV producers and EVs will make up an increasing amount of the transportation sector in New Hampshire in the coming decade, Eversource estimates a rather low projection of EV deployment in New Hampshire, which provides the Commission with a significant opportunity to enact policies that support EV adoption at this early stage and that will help grow the EV market in New Hampshire. Furthermore, the passage of the federal infrastructure bill provided $5 billion in funding to support the deployment of EV charging infrastructure, some of which will be made available to New Hampshire.[11] This funding tranche is available for the purpose of creating "a network of EV charging stations along designated Alternative Fuel Corridors, particularly along the Interstate Highway System."[12] CENH Witness Skoglund's testimony provides additional details on available EV infrastructure funding. Ensuring that there are no unnecessary barriers to EV adoption at this stage will help the EV market mature, support EV adoption, and allow New Hampshire residents to benefit from the savings and environmental benefits that electrification of transportation promises. Providing policy support to help this transition, such as avoiding demand charges, can go a long way to make EV adoption a priority for the state.

Q. Can you explain the benefit of acting while adoption rates are low?

[11] *President Bident, USDOT and USDOE Announce $5 Billion over Five Years for National EV Charging Network, Made Possible by Bipartisan Infrastructure Law* (February 10, 2022), https://highways.dot.gov/newsroom/president-biden-usdot-and-usdoe-announce-5-billion-over-five-years-national-ev-charging

[12] *Id.*

A. Yes. With low adoption of EVs, any risk of cross-subsidization or impacts on its revenue requirements is likely to be minimal. Simply put, at low adoption levels, the risk of cost shifting to all customers is low. As such, any potential subsidization from other customer classes is likely to be minimal; even then, with EV adoption a priority for the state, and the Commission, it would be reasonable to allow for customers to bear some of the uncollected costs from these rates to support such a policy priority as supporting EV development in New Hampshire. Not collecting demand charges, as proposed by Eversource, should not have a substantial impact either to the site host or to customers since the low utilization rates of EV charging infrastructure means substantial costs are not being incurred. Furthermore, as proposed by Eversource, its demand charge alternative is optional, which means customers can choose to remain on their otherwise applicable general service tariff.

Q. What types of actions should the Commission consider to support EV adoption?

A. First, it is important that the Commission use this time to support EV adoption across the state. This would include identification of locations for the siting of DCFCs that will not have significant impacts on the electric system, and ensuring that distribution utilities do not leverage their own market power to interfere with a competitive marketplace. For example, encouraging Eversource to develop and make public EV hosting capacity maps would go a long way to minimizing customer and system costs while maximizing efficiency and leveraging available locations to locate DCFCs.

Second, by proactively stating that EV adoption is a priority for the Commission, it can recognize that EV adoption and deployment is at a nascent stage, so its policies and principles can reflect that determination.

Lastly, the Commission can adopt forecasting and reporting metrics regarding EV adoption so that Eversource, the Commission, and the public can project an adoption rate over time. This forecast is important as it can be used by utilities and the Commission to identify when certain policies can sunset and new policies adopted.

Q. Can you describe the different types of EV use cases?

A. Yes. I identify six basic use cases for EV adoption.

- Residential Level 1, 110 volt charging
- Residential Level 2, 220 volt charging
- Commercial/Public Level 2, 220 volt charging
- Commercial/Public Level 3, DCFC
- Commercial Fleet, Level 2, 220 volt charging, and
- Transit, DCFC

Each of these use cases comes with different technology options, rate design options, impacts on utility systems, and pace of adoption. As such, questions remain regarding which rate to apply to which use case. Different rate designs can also apply to these different use cases. For example, for residential customers, a utility could offer a whole home rate, where the energy used to charge an EV is rolled into the total consumption of the premise, or an EV-only tariff, where the energy used to charge the EV is measured separately from the home and billed at a different rate. However, the impacts of each use case can be very different.

Q. Please explain.

A. A cluster of residential Level 2 charging will have a different impact on utility operations and cost recovery than public DCFC, which will have a different impact from transit and fleet charging use cases. Residential customers are served by one size of transformer, typically, so changing the size of the residential transformer may be needed to address increased demand from EV charging. Of course, a residential transformer may also need to be upgraded in response to any number of new residential investments like installing a hot tub or a pool, adding a new refrigerator and freezer, or building an addition. None of those investments require the homeowner to notify the utility, and any costs incurred by the utility in response to those types of customer actions are recovered through rate base.

On the other hand, DCFC, which could draw up to 1 MW of demand per DCFC in the future, can only be located in certain areas across the distribution and transmission system and where there is available capacity to add such demand. Being able to identify those locations will help customers and developers install DCFC in locations that will not exacerbate potential constraints or overwhelm the location, and will minimize project development costs for charger installers and site hosts. In this case, having access to a utility's hosting capacity map would be useful to identify those locations with available capacity to cite a DCFC. Eversource currently provides hosting capacity information for its Massachusetts service territories. While hosting capacity does not guarantee interconnection, identifying areas of available capacity that can be provided by a hosting capacity map, that is updated regularly, can guide deployment of EV infrastructure, notably DCFC, to areas that will not negatively impact utility reliability or service, which will be a benefit to customers and the utility.

In addition to the impacts that this equipment can have on a system, these policies will also have an effect on adoption. If the tariffs include burdensome requirements or otherwise act as a barrier to adoption, then there will be a delay in customers installing charging equipment and purchasing EVs. This may also negatively impact the ability of New Hampshire to attract tourists who may prioritize locations with available charging infrastructure and policies to support development of EV charging infrastructure. This was a specific issue highlighted by BEA in its 2019 report.[13] Further as New Hampshire businesses transition to EV fleets due to the reduced operation and maintenance costs, they will need a robust charging network in place. Without a robust public charging network, the reach of these commercial EVs is generally limited to destinations within half their range from their central depot. With a public charging network, they do not have to keep half the battery "in reserve" and can visit customers farther away.

Q. How does EV policy impact the Electric Vehicle Supply Equipment (EVSE)?

A. The EVSE is likely the main point of engagement between the customer and the grid, so the EVSE will need to be able to communicate information to the customer about the cost to charge, length of time to charge, and, potentially, other signals to better manage the charging of the vehicle. However, for DCFC, it is unlikely that usage will be elastic as the role of the DCFC is different than a Level 2 charger. Notably, the use of a DCFC means that the customer needs a fast charge in order to get home or continue on their trip; in other words, the DCFC needs to provide customers with a charge in under 20 minutes. A Level

[13] *Evaluating Electric Vehicle Infrastructure in New Hampshire*, New Hampshire Department of Business and Economic Affairs (July 2019). https://www.nh.gov/osi/resource-library/documents/nh-ev-infrastructure-analysis.pdf

2 charger, on the other hand, will take several hours to completely charge a customer's battery. In this case, demand is more elastic and can be responsive to price or grid signal needs or managed by a third party. Level 2 EVSEs for fleets or public or workplace charging where a customer may be connected to the equipment for several hours would likely fit into this category. As such, understanding how rate design impacts adoption and utilization of the type of charger being installed and the application is important. For example, in certain situations, a time of use rate may be the most optimal way for a utility to recover its costs and send a price signal that reflects the marginal cost to serve at that location, without focusing on the demand.[14] However, time-of-use rates are ill-suited for DCFCs at this time given that the demand for DCFCs is inelastic, there are currently few DCFCs operating in New Hampshire, and the DCFCs that are operating in New Hampshire have low utilization rates.

IV. RATE DESIGN

Q. Please describe the set of principles that cover rate design.

A. It is important to ensure that any rate design offerings are done in accordance with a set of goals and principles. Generally speaking, commissions around the country tend to rely upon the rate design principles first detailed by Professor James C. Bonbright in 1961.[15] These principles are fairly broad and require the regulator to make some tradeoffs. For

[14] "EVGo Fleet and Tariff Analysis: Phase 1 California," Rocky Mountain Institute at 21 (April 2017), (RMI California Report), https://rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf,

[15] James C. Bonbright, "Principles of Public Utility Rates" (New York: Columbia University Press, 1961). *See also*, "Distributed Energy Resources Rate Design and Compensation: A Manual Prepared by the NARUC Staff Subcommittee on Rate Design," NARUC at 20-21 (November 2016), (NARUC Manual), https://pubs.naruc.org/pub/19FDF48B-AA57-5160-DBA1-BE2E9C2F7EA0.

example, one principle addresses rate stability, but another addresses cost causation; that is, the person who caused the cost should pay for it. Clearly, the principles may conflict, which is why it is important to balance the principles.

While cost causation is an important component of rate design, it is not the only one, and is often balanced against other principles such as fairness and equity. For example, with average cost ratemaking, one customer class, say the residential class, will pay the same for electricity regardless of the actual cost to serve each individual customer. This leads to intraclass subsidies to ensure certain public goals—affordability and accessibility. For EV rate design, other public purposes are also important, in addition to cost causation.

Similarly, rigidly applying the cost causation principle to EV rate design may not strike the right balance between conflicting regulatory principles. In order to achieve the public policy priority of increased EV adoption, the Commission should consider other rate-making principles, such as "diffusion of benefits." That is to say, increased EV adoption will benefit the community as a whole, and as such at this early phase in the adoption of EVs, charging infrastructure need not be held strictly to cost causation.

As I discussed above, making EV adoption a policy priority for New Hampshire would mean that the Commission can balance the rate design principles in ways that better align with the societal and policy goals. In essence, with EV adoption as a goal of the state, other rate design principles, like supporting public policy or conservation, may be weighted more favorably than other principles, like cost causation, in order to support the policy goal. So, the Commission can decide that for some period of time, developing rates that will promote EV adoption should be prioritized over other rate design principles. This also applies to

goals for revenue neutrality in rates—that is, that rates should recover the costs and not be recovered by other rate classes. Much like how residential rates subsidize those customers with higher costs to serve (*i.e.*, rural customers), and lower cost to service customers (*i.e.*, city customers) pay more than their cost to service, such cross-subsidies are done on purpose in order to promote equity, affordability, and access to electricity.[16]

Cost causation is an important principle that commissions, including this Commission, point to regarding the development of any particular rate or program. However, it is important to note that while cost causation is an important principle, it is often relegated below other principles as a commission sees fit, such as for residential rates. In the development of appropriate rates, a commission may request or require the utility to submit a class cost of service study, which attempts to identify which customer class is responsible for some percentage of a utility's revenue requirement. The ultimate determination of that responsibility is litigated before state commissions, so any rate that is ultimately adopted by a commission includes a balancing and weighting of principles by the commission itself. This also is apparent when looking at the rates inside each class. For the residential class, all customers inside the class usually pay the same price for electricity, regardless of the actual costs to serve. So, a residential customer who lives in an apartment, or lives in a house in the suburbs, or lives in a rural area will all pay the same price for electricity. In this instance, the regulator has decided that affordability or equity is more important than strictly sticking to cost causation as the main principle. To be sure, some states may have

[16] NARUC Manual at 107-108.

variations of this model; for example, in Xcel Energy's territory in Minnesota, customers who live in areas with underground distribution lines pay a higher customer charge.[17]

V. EVERSOURCE'S DEMAND CHARGE ALTERNATIVE PROPOSAL

Q. Please provide your perspective on Eversource's demand charge alternative proposal.

A. Eversource's demand charge alternative proposal would be available to public-charging sites that are eligible for Eversource's Rate GV, which is for customers with a peak demand up to 1,000 kW that receive primary distribution service.[18] Eversource's proposal differs from Unitil's and Liberty's commercial EV rate proposals in DE 20-170 and DE 21-030, which would apply to *all* commercial EV users. In contrast, here, Eversource proposes a rate that would only apply to EV public charging stations. This is notable as the economics of public charging stations are more likely to be impacted by low-utilization rates as they may be stand-alone operations.

Eversource notes its rate "is intended to be implemented in the near term, as a complement to [Eversource's] make ready proposal," also proposed in this filing.[19] Finally, this rate does not include a demand charge and Eversource has designed this rate for utilization factors up to 10 percent.[20] At a 10 percent utilization factor, the customer would be paying roughly the same under either this proposed rate or the otherwise applicable Rate GV tariff. Above a 10 percent utilization rate, Eversource expects that the customer will then switch

[17] Northern States Power Company, Residential Service, Rate Code A03, Section No. 5, 31st Revised Sheet No. 1, https://www.xcelenergy.com/staticfiles/xe-responsive/Archive/Me_Section_5.pdf.
[18] Davis, Rice, Boughan Testimony at 16.
[19] Exhibit CRV-3.
[20] Davis, Rice, Boughan Testimony at 18.

to the Rate GV tariff as it would be more economical for the customer compared to the proposed tariff.[21]

However, I do have a few concerns regarding this proposal, notably the durability of this rate, its relationship to Eversource's managed charging proposal, and tying the rate to a 10 percent utilization factor.

Q. Does Eversource define utilization factor?

A. Yes. For Eversource, utilization factor or load factor, which is used interchangeably throughout its testimony, refers to the peak demand of a station multiplied by the number of hours charged, then the monthly usage is divided by that number.[22] On the other hand, I use utilization rate as the metric to measure usage of a location, which is based on the RMI definition from its report for the Colorado Energy Office, which defines utilization rate "as the total time a charger is actively charging divided by the duration being evaluated."[23] In the RMI Report for the Colorado Energy Office, RMI "use[s] a one-month time period to calculate station utilization" and provides the following example: "in a month with 30 days, there are 720 hours. If a charger were in use for a total of 36 hours over the course of the month (on average, 72 minutes a day), the charger would have a 5% utilization rate (5% of 720 hours is 36 hours)."[24]

[21] Id. at 18-19.
[22] Ex. CRV-4.
[23] DCFC Rate Design Study for Colorado Energy Office, Rocky Mountain Institute at 12 (Revised February 2020), https://rmi.org/wp-content/uploads/2019/09/DCFC_Rate_Design_Study.pdf.
[24] *Id.*

Q. Do you agree with Eversource's rationale for not including a demand charge in this proposal?

A. Yes. I agree with Eversource that demand charges at low utilization factors can have a significant negative impact on site hosts' bills.[25] Demand charges at low utilization factors can make up a significant portion of a customer's bill and cause that customer to either remove or not install DCFCs, which are vital to supporting EV adoption. By excluding demand charges in its proposal, Eversource provides a positive starting point for supporting EV growth in New Hampshire.

Q. To what extent do demand charges impact rate design principles?

A. Demand charges can play a significant role in delaying EV infrastructure roll-out, especially at low utilization rates, as New Hampshire is currently experiencing. EV charging can result in substantial demand when the EVSE is in use, which can trigger high demand charges. However, as Eversource notes, if a public charger is used only occasionally it will not generate enough sales to pay for the high demand charge.[26] As such, demand charges can be crippling to the economics of public EV charging.

At low utilization rates, a location charged a demand charge for EV charging, especially for DCFC, may see their bill rise substantially. In an analysis done by RMI for EVGo looking at their locations in California, RMI determined that in some locations site hosts could incur a bill of up to $3,114 a month with 94 percent of that bill due to demand

[25] Davis, Rice, Boughan Testimony at 17-18.
[26] *Id.*

charges.[27] As further detailed by RMI, under the different proposals by the California utilities, those rate designs that included demand charges would continue to be a significant component of the site hosts' bills. Even at 15 percent utilization, RMI estimates that locations could see 70 percent to 88 percent of their bill be attributable to demand charges.[28]

What this research shows is that as utilization rates go up, the impacts of the demand charge are reduced, but that even at 15 percent utilization, it remains a substantial part of the bill for that location. All of this is to say that at low utilization factors, demand charges act as a penalty for installing EV charging infrastructure, especially DCFC, when the state should be trying to encourage deployment of EV charging infrastructure, including DCFC.

Q. Can you describe your concerns with Eversource's proposal?

A. I have three concerns with their proposal.

First, Eversource notes that this proposal is designed to work with locations that participate in its proposed make-ready program.[29] While I support Eversource's focus on applying this rate to public charging locations, by tying its demand charge alternative proposal to its proposed make-ready proposal, I believe that they have limited the applicability and durability of this rate to the success or failure of that program, rather than focusing on the success of EV adoption more broadly. As Eversource notes in response to CLF discovery, "the demand charge alternative remains integral to the make ready program, as each is

[27] RMI California Report at 16-17.
[28] *Id.*
[29] Davis, Rice, BoughanTestimony at 18; Ex. CRV-3.

necessary for the success of the other."[30] Further, Eversource states that this rate is focused on the short-term needs to address market barriers that demand charges impose, and that this rate "could be limited based on purpose."[31] Supporting EV adoption, as I discussed above, should be a broader policy goal of New Hampshire and limiting the focus of this rate to participants in a proposed make-ready program may limit Eversource's promotion of the rate to other participants and unnecessarily introduces uncertainty to the duration and availability of this rate. Even the 10 percent utilization factor level is tied to the proposed make-ready program.[32]

My second concern is about the durability of this rate. Since Eversource states that it is tied to a specific proposal and that it may be changed at any time, there are no metrics or other ways to determine when this proposal has served its purpose. Is it upon full subscription of the make-ready program? Is it tied to utilization factors? Is the determination of a sunset for this offering based on all sites that signed up for the tariff or only those on the proposed make-ready program? Eversource describes collecting data "from a sufficient number of stations" on the proposed rate leading to "further evaluation" but does not detail any metrics or data regarding when a successor tariff would be developed or proposed.[33] This does not provide certainty to the market or customers regarding the availability of this rate and will make it more challenging for customers to run costs and billing efforts to determine the billing impacts from this rate, which includes

[30] Ex. CRV-3.
[31] *Id.*
[32] Ex. CRV-2. Eversource states that the 10 percent level was selected "as a level of utilization reasonably expected to be achieved approximately halfway through the development of charging stations under the proposed make-ready program would occur." Id.
[33] *Id.*

how long a customer can be on this rate. I believe a more durable rate design would be one that is broadly applied to supporting EV adoption across New Hampshire, rather than tying it to a limited number of locations under a short-term program.

My third concern is Eversource tying the break-even point for the rate to a 10 percent utilization factor at a location. As the RMI research notes, a demand charge can still be a significant portion of a customer's bill over 15 percent utilization. However, after 10 percent utilization, Eversource expects a customer to then switch from its proposed demand charge alternative volumetric rate over to Rate GV, which charges a full demand charge. What this means is that a customer that signs up for this proposed rate and has no demand charge, but pays a high volumetric rate, would then be subject to a demand charge with lower volumetric rates and higher overall energy bills, with no transition period between the two choices. In order for this demand charge alternative rate to be more broadly applied, Eversource should, instead, consider a rate design that scales demand charges based on utilization rates. This would mean that for utilization rates above 10 percent, the location would still incur a higher volumetric rate, as well as a demand charge that is reduced from the full demand charge under Rate GV. As utilization increases, those rate components would balance out–in other words, as utilization goes up, the volumetric rate would go down and demand charges would increase.

Q. What is the structure of Rate GV?

A. As described by Eversource, Rate GV is a three-part tariff with a customer charge, a demand charge, and a volumetric charge.[34] For the demand charge, a customer's demand is determined by the customer's highest demand, with the full demand charge determined by "either the maximum demand during peak hours or 50% of the maximum demand during off-peak hours."[35] In other words, if a customer's maximum demand occurs during off-peak hours, that total demand is reduced by half and then charged the demand charge.

Q. Do you have a proposed alternative?

A. Yes. While there is much to like about Eversource's proposal, I do not believe that it is an appropriate rate design offering to enable broad adoption of EVs and support the implementation of EV charging infrastructure. The goal of simplicity, which is one of the considerations identified by Eversource, does miss out on other considerations, especially considering how Eversource is tying this rate to a small-scale, make-ready program.

Rather, Eversource's proposal in Massachusetts Department of Public Utilities Docket No. 21-90 provides an example of an EV rate design that would be more durable and more supportive of broad adoption of EVs and EV charging infrastructure. In its Massachusetts territory, Eversource proposes an EV rate design with a demand charge based on four tranches of load factors (*i.e.*, utilization rates) that would be in place over 10 years.[36] From 0-5 percent of load factor, the customer would not have a demand charge; from 5-10

[34] Davis, Rice, BoughanTestimony at 16-17.
[35] *Id.* at 16.
[36] *Petition of NSTAR Electric Company d/b/a Eversource Energy for Approval of Phase II Electric Vehicle Infrastructure Program*, Direct Testimony of Richard D. Chin, D.P.U. 21-90 at 19 (July 14, 2021), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13758161; *Petition of NSTAR Electric Company d/b/a Eversource Energy for Approval of Phase II Electric Vehicle Infrastructure Program*, Exhibit ES-RDC-2 at 2 (July 14, 2021), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13758162.

percent load factor, the demand charge would be reduced by 75 percent; from 10-15 percent load factor, the demand charge would be reduced by 50 percent; above 15 percent load factor, then the full demand charge would apply.[37] Although Eversource's Massachusetts proposal has several advantages to its proposal in this docket, as noted from the RMI California Report, even at a 15 percent utilization rate, demand charges can still represent a significant portion of the monthly bill .

While Eversource's Massachusetts "demand charge sliding scale" proposal does not fully resolve the issue of demand charges creating a barrier to EVSE investments at utilization rates above 15 percent, that proposal is more in line with examples from around the country, notably Southern California Edison Company (SCE). SCE's demand charge alternative has a zero demand charge for the first five years, then scales up over the next five years, and was developed for commercial and industrial customers to support the growth of EV and EV charging infrastructure in SCE's service territory.[38] Even after 10 years, SCE's EV demand charge alternative only imposes 60 percent of the otherwise applicable demand charge. In other words, after 10 years, SCE will only impose up to 60 percent of its full demand charge. In comparison, while the proposed rate, here, would not charge a demand charge, Eversource expects that at a 10 percent utilization rate the customer would switch from its zero demand charge alternative to Rate GV, which would have a full demand charge.

[37] *Id.*

[38] Southern California Edison Schedules TOU-EV-8 and 9, https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/schedules/general-service-&-industrial-rates/ELECTRIC_SCHEDULES_TOU-EV-8.pdf; https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/schedules/general-service-&-industrial-rates/ELECTRIC_SCHEDULES_TOU-EV-9.pdf.

Designing a similar demand charge phase-in approach here could potentially result in a more durable rate design, provide more certainty to customers and EVSE providers, and more broadly support EV adoption in New Hampshire. A phased-in demand charge approach to rate design would maintain Eversource's overall design for utilization rates under 10 percent, but keep the implementation of a demand charge tied closer to utilization rates, which is important because at some point in the future, at a certain utilization factor, some demand charge may be appropriate. This also would preserve the business case for installing EV charging infrastructure at low utilization rates and low EV adoption levels; however, as more EVs come onto the road, it would also ensure that other ratepayers are not unduly paying for the costs of the EV charging infrastructure.

Q. To what should the imposition of a demand charge be tied?

A. Again, at some point in the future, the establishment of a demand charge may be warranted. In a separate study looking at Colorado-specific DCFC rate design options, RMI suggests that a 30 percent utilization factor provides a sufficient amount of usage for the site host to spread the demand charges across.[39] In my opinion, that seems a reasonable threshold for the Commission to set for when full, 100 percent demand charges could be implemented for EV charging infrastructure under an EV-specific rate.

Q. How else can EV rate design be improved in New Hampshire?

[39] DCFC Rate Design Study for Colorado Energy Office, Rocky Mountain Institute at 5, 17 (Revised February 2020), https://rmi.org/wp-content/uploads/2019/09/DCFC_Rate_Design_Study.pdf.

A. The Commission should consider adopting reporting requirements for each utility to collect information about EV adoption, develop forecasts for EVs, and collect utilization rates for DCFCs across utilities' service territories. Collecting this information will inform the utilities, the Commission, and stakeholders about trends and can help identify when it is time to transition to an alternate rate design, including imposition of full demand charges.

VI. RECOMMENDATIONS

Q. Please provide your recommendations for the EV proposals.

A. I recommend that the Commission:

1. Modify Eversource's rate design proposal to support more durable and widespread adoption of EVs in line with my general recommendations, above, regarding demand charges.

More generally, I also recommend that

1. Eversource should monitor EV adoption rates across its and neighboring utility service territories to help inform trends and identify timelines for rate design modifications;
2. Monitor utilization rates of DCFC in its service territories to help inform trends and identify timelines for rate design modifications; and
3. Eversource should make available hosting capacity maps that can help inform developers and customers identify optimal locations for the placing of EV charging infrastructure, especially DCFC.

Q. Does that complete your testimony?

A. Yes.