UNITIL ENERGY SYSTEMS, INC.

DIRECT TESTIMONY

OF

CINDY L. CARROLL

CARLETON B. SIMPSON

CAROL VALIANTI

EXHIBIT CSV-1

New Hampshire Public Utilities Commission

Docket No. DE 21-030

TABLE OF CONTENTS

Exhibits

I. INTRODUCTION AND SUMMARY

Q. Ms. Carroll, please state your name and business address.

A. Cindy Carroll, 325 West Road, Portsmouth, New Hampshire.

Q. For whom do you work and in what capacity?

A. I am the Vice President of Customer Energy Solutions at Unitil Service Corp. ("Unitil Service"), an affiliate of Unitil Energy Systems, Inc. ("UES" or the "Company"). Unitil Service provides, at cost, a variety of administrative, managerial and professional services on a centralized basis to Unitil Corporation's ("Unitil") affiliates, including UES. In this testimony, we refer to Unitil Service and Unitil's utility operating companies collectively as the "Unitil Companies." My primary responsibilities are the development, implementation, and advancement of Unitil's distribution utilities' business expansion and economic development programs, energy efficiency programs, and critical customer management.

Q. Please describe your professional and educational background.

A. I possess more than twenty years of experience in the utility industry working on matters directly related to business expansion, account management and customer field services. I joined Unitil Service in October 1997 and have held several positions of increasing responsibility. I hold a Master's Degree in Business Administration from Southern New Hampshire University and a Bachelor of Arts degree in Communications from the University of New Hampshire.

Q. Have you previously testified before the New Hampshire Public Utilities Commission ("Commission")?

A. Yes, I have testified before the Commission on numerous occasions on behalf of UES and Northern Utilities, Inc.

Q. Mr. Simpson, please state your name and business address.

A. Carleton Brown Simpson, 6 Liberty Lane West, Hampton, New Hampshire.

Q. What is your position and what are your responsibilities?

A. I am Regulatory Counsel for Unitil Service. In this position, I represent the Company in regulatory and legal proceedings. My primary responsibilities include the development of clean energy strategy related to electrification, transportation, energy storage, data sharing, and decarbonization.

Q. Please describe your educational background and professional experience in the energy and utility industries.

A. I have held a variety of engineering, compliance, external affairs, regulatory, and legal positions while at Unitil Service. I started my career at Unitil Service in 2013 in the role of Compliance Engineer. I was promoted to NERC Regulatory Compliance Specialist in 2016, Director of Government Affairs in 2017, and Regulatory Counsel in 2019.

I received a Bachelor of Science degree in Electrical Engineering, Summa Cum Laude, from the University of New Hampshire ("UNH") in 2012 and a Master of Science degree in Electrical and Computer Engineering from Worcester Polytechnic Institute with a concentration in electric power systems in 2014. I also earned a Juris Doctor focused in

Energy and Environmental Law from Suffolk University Law School in 2019. I am a member in good standing of the New Hampshire Bar and U.S. District of New Hampshire Bar.

In 2012, I converted a gasoline-powered motorcycle to battery electric as a capstone engineering project while at UNH and was awarded "Best Presentation" at the 2012 Undergraduate Research Conference. From August 2018 through October 2020, I served on the New Hampshire General Court's SB 517 Electric Vehicle Charging Stations Infrastructure Commission on behalf of the Company.

Q. Have you previously testified before the New Hampshire Public Utilities Commission or other regulatory agencies?

A. I have not previously filed testimony before the New Hampshire Public Utilities Commission. I have provided written testimony before the Massachusetts Department of Public Utilities in Docket 16-148, petition for approval of a request to purchase, own and operate a 1.3 megawatt ("MW") solar facility by the Company's regulated Massachusetts affiliate, Fitchburg Gas and Electric Light Company.

Q. Ms. Valianti, please state your name and business address.

A. Carol Valianti, 6 Liberty Lane West, Hampton, New Hampshire.

Q. What is your position and what are your responsibilities?

A. I am the Vice President, Communications and Public Affairs for Unitil Service. My responsibilities include the development, execution and operations leadership for the Company's strategic communications including Customer Communications, Digital

Communications, Public Relations, Employee Communications and Engagement, Community Development, and Emergency Response Communications.

Q. Please describe your business and educational background.

A. I earned a Bachelor of Arts degree in American Studies and Communications from Fairfield University in 1989. Following graduation, I was employed by Major League Baseball, working in various broadcasting and communications managerial roles. Following Major League Baseball, I was employed by Malden Mills in marketing and communications roles including as Vice President, Global Communications and then by Segway as Vice President, Global Communications. I joined Unitil Service in September of 2009 as the Vice President, Communications and Public Affairs.

Q. Have you previously testified before the Commission or any other Regulatory agencies?

A. No, I have not previously filed testimony before the New Hampshire Public Utilities Commission.

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to provide the Commission with an overview of the Company's request for approval of three programs: (1) a suite of time of use ("TOU") rate offerings, (2) an electric vehicle infrastructure development program ("EV Program"), and (3) a Marketing, Communications, and Education ("MC&E") Plan to increase customer awareness of electric vehicles ("EVs") and engage with customers about the TOU rates and EV Program offerings as described herein. These initiatives are

intended to enable adoption of distributed energy resources ("DERs"), transportation electrification, and individualized energy management to reduce carbon emissions from the electricity sector while providing savings for our customers. The technology, environmental & climate policy, and market forces driving this evolution are discussed in Part II.

Part III of this testimony discusses the suite of proposed TOU rates. The Company recognizes that varying customer behaviors may necessitate a suite of EV charging rate structures, including fixed rates and TOU options. Proper rate design will balance demand and energy charges to ensure cost causation while enabling EV adoption. Pricing structures must be simple and easily understood to promote managed or smart charging to best utilize existing system capacity and mitigate environmental impacts. The TOU rate offerings proposed includes a "whole-house" residential TOU rate and separately-metered EV TOU rates for residential, small general service, and "high demand draw" large general service customers. These rates serve as a foundation for the EV Program, customer behavioral changes to mitigate peak demand, and other future customer investments in DERs.

In Part IV of our testimony, we describe the Company's proposed EV Program that is structured to stimulate the EV market in New Hampshire. The EV Program contains two initiatives: (1) a behind-the-meter partnership program to incentivize residential customers to procure and install smart Level 2 electric vehicle supply equipment ("EVSE") for charging at their homes, and (2) a public "make-ready" EV infrastructure program to expand the availability of charging stations in New Hampshire.

Finally, Part V of our testimony discusses the MC&E Plan that is designed to meaningfully increase consumer awareness, interest in, and adoption of EVs, EV charging infrastructure and EV TOU rates. The MC&E Plan consists of two parts: (1) a Consumer EV Education Campaign; and (2) a Consumer EV Marketing and Promotion Program. The Consumer EV Education Campaign will increase awareness of and inform the Company's customers about the benefits of EVs, options for home and public charging, and the proposed EV TOU rates. The Consumer EV Marketing and Promotion Program will focus on creating experiential learning opportunities for customers, partnerships with EV dealerships, and partnerships and incentives/rebates with behind-the-meter EVSE vendors.

II. TECHNOLOGY, ENVIRONMENTAL & CLIMATE POLICY, AND MARKET EVOLUTION

Q. Have advancements in energy technology affected the environment in which electric distribution companies such as UES operate?

A. Yes. Technology innovation has both accelerated and reinforced this transformation as customers now have access to services, markets, and home energy tools previously unimagined. Advancements in technology are driving down the cost of clean energy, making it more affordable for consumers. Energy markets continue to emerge as innovators develop new ways to control and manage energy usage and market new services directly to end-use customers.

As society adopts new technologies, and as DERs are increasingly connected to the distribution system, the fundamental architecture of the electricity delivery system (the "grid") must change. The 20th Century electric grid, originally designed to distribute power from large centralized generating plants, must now integrate a wide array of distributed load, storage and generation resources. A grid that was designed for "one-way" power flow must now accommodate two-way power flow, increasing the need for sophisticated protection, communication, metering, and intelligence. The grid must also provide opportunities for customers to understand and actively participate in energy markets to enhance efficient utilization and consumption of electricity, while delivering improved reliability and power quality.

Utility operations are transitioning away from the traditional model of energy delivery, to one that integrates and optimizes the needs and interests of consumers, producers, markets, service providers and other participants. New markets and new technologies are rapidly emerging in response to public policies, climate action, and the changing preferences of customers. We are seeing a significant transformation in how customers are powering their homes and businesses, including the ability to generate and store their own electricity. More recently, the promise of significant choice in EV options has moved the market from niche to mainstream. Implementing enabling technologies and programs to facilitate this transition will meet public demands while making the electric system more efficient, economic, and environmentally friendly.

For over a decade, the Company has visualized the utility of the future as an enabling platform with the capabilities to unlock the full potential of today's customers, markets

and technologies. Our vision is to transform the way people meet their evolving energy needs to create a clean and sustainable future. Distributed energy resources, including EVs, are essential elements in this transition. The proposed program offerings described herein represent a step towards the Company's utility of the future.

Q. What are the environmental drivers behind these new program offerings?

A. The global imperative of combating climate change and reducing carbon emissions has driven a fundamental transformation of the energy sector. In its *2020 Corporate Sustainability & Responsibility Report*, Unitil outlined its goal to be the most technologically advanced utility in the region in order to realize the promise of a fully modernized grid and clean energy future. [1] The Company's vision of the modern grid as an "enabling platform" will empower customers to adopt new technologies through a transition of distribution operations to distributed energy resources, enhancing the customer experience, and supporting diverse actions by customers and third-party providers.

Electrification of the transportation sector represents an opportunity to dramatically reduce greenhouse gas ("GHG") emissions with electric utilities representing a critical enabling stakeholder. According to the U.S. Energy Information Administration ("EIA"), New Hampshire's largest source of carbon dioxide ("CO_2") emissions is the

[1] "2020 Corporate Sustainability & Responsibility Report." *Unitil Corporation*, https://unitil.com/2020-Sustainability-Report/.

transportation sector, representing approximately half of all CO_2 emitted.[2] Transportation is also the largest source of greenhouse gas emissions nationally according to the Environmental Protection Agency ("EPA"), with more than 90 percent of the fuels used coming from petroleum sources.[3] Addressing emissions and reducing energy intensity in the transportation sector is vital to meeting New Hampshire's environmental goals and objectives.[4] As EVs produce zero direct emissions and typically produce fewer life cycle emissions relative to conventional vehicles, transportation electrification represents a key opportunity to solve society's current climate and environmental challenges.[5]

Q. Please describe recent directives from the White House regarding advancing clean transportation.

A. On January 20, 2021, President Biden issued an Executive Order on Protecting Health and the Environment and Restoring Science to Tackle the Climate Crisis.[6] Sec. 2(iii) of the Order directs the National Highway Traffic Safety Administration ("NHTSA") and EPA to review and possibly reconsider rules related to fuel economy standards for passenger vehicles and trucks. On January 27, 2021, President Biden issued an Executive

[2] "State Carbon Dioxide Emissions Data." *U.S. Energy Information Administration*, March 2, 2021, https://www.eia.gov/environment/emissions/state/.
[3] "Sources of Greenhouse Gas Emissions." *U.S. Environmental Protection Agency*, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.
[4] "New Hampshire 10-Year State Energy Strategy." *New Hampshire Office of Strategic Initiatives*, April 2018, https://www.nh.gov/osi/energy/programs/documents/2018-10-year-state-energy-strategy.pdf.
[5] "Reducing Pollution with Electric Vehicles." *U.S. Department of Energy*, https://www.energy.gov/eere/electricvehicles/reducing-pollution-electric-vehicles.
[6] "Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis." *The White House*, January 20, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/.

Order on Tackling the Climate Crisis at Home and Abroad.[7] Part II Sec. 205(ii) outlines the Federal Clean Electricity and Vehicle Procurement Strategy to develop a plan to facilitate the procurement of "clean and zero-emission vehicles for Federal, State, local, and Tribal government fleets, including vehicles of the United States Postal Service."[8] Furthermore, on March 2, 2021, the White House hosted a meeting led by National Climate Advisor Gina McCarthy with CEOs from EV charging infrastructure companies to support the Biden Administration's goal to build more than 500,000 EV chargers.[9]

Q. Please describe the current state of EV adoption in New Hampshire and the Company's projections for the future.

A. The Company has analyzed actual EV registration data from the State of New Hampshire and developed EV adoption projections through 2031 based on compiled data from the Edison Electric Institute ("EEI") and Institute for Electric Innovation ("IEI"). From the State registration data, UES believes that approximately 5,070 EVs are registered in New Hampshire as of January 2021. Exhibit CSV-2. We estimate that 580 EVs are registered in municipalities where the Company provides electric service. Exhibit CSV-3. EEI and IEI developed a consensus forecast of EV sales projections from 2018 to 2030 based on five independent forecasts: Bloomberg New Energy Finance, Boston Consulting Group,

[7] "Executive Order on Tackling the Climate Crisis at Home and Abroad." The White House, January 27, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/.
[8] Id.
[9] "Readout of the White House's Meeting with Electric Vehicle Charging Infrastructure Leaders." *The White House*, March 2, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/02/readout-of-the-white-houses-meeting-with-electric-vehicle-charging-infrastructure-leaders/.

Energy Innovation, U.S. Energy Information Administration, and Wood Mackenzie.[10] Applying this adoption model to the Company's New Hampshire service territories yields approximately 3,753 EVs registered by 2028 and 6,767 electric vehicles registered by 2031. Exhibit CSV-3. The Company's TOU rate offerings, EV Program, and MC&E Plan are intended to support these vehicles and customers in the transition to electric transportation.

Q. Please describe recent developments from original equipment manufacturers ("OEMs") in the vehicle market.

A. Automobile OEMs have made significant commitments to develop the EV market as of late. A recent industry survey conducted by CarGurus found that more than half of Americans believe that they will probably or definitely own an EV within the next ten years.[11] Jaguar, Volvo, and General Motors have committed to fully electrifying their model ranges by 2025, 2030, and 2035, respectively.[12] Honda, BMW, Ford, Hyundai, Kia, Mercedes-Benz, Nissan, Stellantis (formerly Fiat Chrysler Automobiles), Toyota, and Volkswagen have announced that they will be releasing electrified vehicle options within the next few years.[13]

Q. Please explain the power levels and connector types for EV charging.

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[10] "Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030." *Edison Electric Institute*, November 2018, https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI_EEI-EV-Forecast-Report_Nov2018.ashx.
[11] "Are electric vehicles poised to kill the gasoline engine car? Welcome to the 'golden age' of EVs." *USA Today*, March 11, 2021, https://www.usatoday.com/story/money/cars/2021/03/11/electric-vehicles-tesla-gm-lucid-rivian-volvo-gas-cars/4581584001/.
[12] "Here Are Automakers' Plans for Adding More Electric Vehicles to Their Lineups." *Consumer Reports*, March 11, 2021, https://www.consumerreports.org/hybrids-evs/why-electric-cars-may-soon-flood-the-us-market/.
[13] Id.

A. EV charging segments include Level 1, Level 2, and Direct Current Fast Chargers ("DCFCs").[14] Level 1 charging occurs at 120 volts ("V") alternating current ("AC") using a standard electrical outlet and may require more than 24 hours to fully charge an EV, depending on charging rate and battery capacity. Level 2 chargers utilize a 240V AC connection and can fully charge most EVs in approximately 12 hours or less, depending on charging rate and battery capacity. DCFCs use direct current ("DC") with power outputs currently ranging from 50 kilowatts (kW) up to 350 kW, with higher outputs expected in the future, and can typically fully charge an EV in approximately an hour.

EV charging connectors can vary by vehicle type and manufacturer. Tesla vehicles utilize a proprietary connector for native charging at all levels, but also can be charged using the standardized connectors discussed below through the use of adaptor plugs.[15] SAE J1772 is the industry standard for all EVs charging at Level 1 or 2. For DCFC, CHAdeMO and SAE Combined Charging System (CCS) offer charging depending on the vehicle OEM. CHAdeMO currently supports charging up to 62.5 kW with a future versions supporting up to 900 kW for heavy-duty vehicles.[16] SAE CCS currently supports charging up to 350 kW.

III. TIME OF USE (TOU) RATE PROPOSALS

[14] "Electric vehicle (EV) charging standards and how they differ." *Elektrek*, March 5, 2021, https://electrek.co/2021/03/05/electric-vehicle-ev-charging-standards-and-how-they-differ/.
[15] "CCS1 to Tesla Adapter Finally Available for North American Market." *InsideEVs*, December 31, 2020, https://insideevs.com/news/463721/tesla-ccs-fast-charge-adapter-setec/.
[16] "New CHAdeMO 3.0 aims to harmonize global EV quick-charging standards." *SAE International*, May 28, 2020, https://www.sae.org/news/2020/05/chademo-3.0-to-harmonize-global-ev-quick-charging-standards.

Q. Please describe the Company's approach to offering TOU rates.

A. While current fixed electricity rate structures have proven sufficient to enable early adoption of new technologies, including EVs and DERs, the Company believes that a suite of TOU rates will encourage energy conservation, optimal and efficient use of grid facilities, and mitigate increases in peak demand. The Company offering includes a residential whole-house TOU rate, residential EV TOU rate, and EV TOU rates for small and large general service applications. Given the dynamic nature of the transportation market and the wide variety of customer travel needs, it is unlikely that any one option will be suitable for all customers. Innovative rate designs will afford customers the opportunity to adopt new technologies, manage energy consumption and enhance efficient utilization and consumption of electricity to save money.

In October of 2019, the National Association of Regulatory Utility Commissioners ("NARUC") released *Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators*.[17] The two main principles of EV-specific rate design were identified as follows: (1) rate design should encourage efficient usage of existing assets rather than undergoing expensive distribution system upgrades to serve EVs, and (2) bill increases due to EV infrastructure upgrades should be kept to a minimum for customers who do not own EVs.[18] Perhaps most importantly, the NARUC report provides that EV adoption

[17] "Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators." *National Association of Regulatory Utility Commissioners*, October 2019, https://pubs.naruc.org/pub/32857459-0005-B8C5-95C6-1920829CABFE.
[18] Id. at 25.

could lead to lower rates for all electric customers.[19] Fixed system costs, particularly when viewed in the context of TOU rates, may be spread across added volumes from electrification, potentially reducing electric rates for all customers.

The overarching objective of rate design is the pricing for grid services that adhere to the principles of fairness, transparency and economic efficiency. Transparent and economically efficient pricing structures will ensure a viable and sustainable long-term model that provides sufficient revenue to support the modernization of the electric system. Innovative rate design encourages appropriate behaviors and assures fairness and equity among customers.

The Company recognizes the evolving needs of the public that have occurred over the last several years and that are expected to continue in the future as customers transition from passive recipients to active participants in the energy market. The transition from offering traditional rate designs to tailored and more personalized options, especially for EV owners, is an important step to fulfill customers' evolving requirements from their utility. Customer education is an important aspect to innovative rate design. A strong customer communication, education and outreach plan is required to support new rate offerings. Customers will be more likely to adopt new rate structures if they are aware of and understand the new rates. Offering tools that help customers compare rate offerings is critical for beneficially influencing individual usage patterns and resulting bill impacts.

Q. Please describe the Company's proposed TOU rates.

[19] Id. at 21.

A. The Company proposes to offer a suite of TOU rates to enable customer adoption of new technologies, reduce peak demand, support energy efficiency and optimization, reduce emissions, and stimulate opportunities for retail market activity through the distribution system. The rates proposed include: (1) domestic "whole-house" TOU (TOU-D); (2) domestic EV TOU (TOU-EV-D); (3) small general service EV TOU (TOU-EV-G-2); and (4) large general service EV TOU (TOU-EV-G1). The development of these rates was informed by the Commission's findings in Order 26,394 that resulted from IR 20-004, *Investigation of Electric Vehicle Rate Design Standards, Electric Vehicle Time of Day Rates for Residential and Commercial Customers*, and the ongoing EV TOU proceeding DE 20-170, *Electric Vehicle Time of Use Rates*. Please see the Direct Testimony of Company witness John Taylor, Exhibit JDT-1, supporting the calculation of these rates.

i. Domestic "Whole-House" TOU (TOU-D)

The whole-house, domestic TOU rate is offered to allow residential customers to benefit from time-based energy optimization without the costs of a separate service. This rate is an important option for both EV and non-EV customers who want to change their behaviors and usage to reduce costs and peak demand. Customers will have the opportunity to realize savings for all uses, including EV charging.

Principles supported within the design of the whole-house TOU rate include:

- Seasonality is reflected in the rate;
- The rate incorporates load management techniques;
- The rate is based directly on cost causation principles;

- Energy supply and transmission billing components are time-varied;
- Three time periods are included (off peak, mid-peak and peak);
- The rate is seasonally differentiated ("summer" and "winter" rates that change coincident with default service adjustments);
- The peak period is five hours in duration; and
- The rate does not include a demand charge.

These principles are consistent with the guidelines set forth in Order 26,394. Please see Exhibit CSV-4 for an illustrative tariff for the TOU-D rate.

ii. Domestic EV TOU (TOU-EV-D)

EEI predicts that approximately 80% of EV charging happens and will continue to occur at the home; therefore, it is important for customers to have options for residential charging, including TOU rates.[20] The separately-metered residential EV TOU rate has been tailored to the unique charging needs and characteristics of EVs at customers' homes. As EVs are adopted in greater numbers, a dedicated residential rate class for EV charging only will represent a key customer option. The proposed rate offers incentivized off peak charging with significantly more expensive mid-peak and peak rates. An additional, dedicated meter ensures that EV charging has a discrete rate class, is controllable through demand response programs, and is individually measured and managed apart from other loads.

[20] "Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030." *Edison Electric Institute*, November 2018, https://www.edisonfoundation.net/iei/publications/Documents/IEI_EEI%20EV%20Forecast%20Report_Nov2018.pdf.

In accordance with the Commission's findings in Order 26,394 for residential EV TOU:

- Seasonality is reflected in the rate;
- The rate incorporates load management techniques;
- The rate is based directly on cost causation principles;
- All three billing components (supply, transmission, and distribution) are time-varied;
- Three time periods are included (off peak, mid-peak and peak);
- The rate is seasonally differentiated ("summer" and "winter" rates that change coincident with default service adjustments);
- The average annual price differential between off peak and peak is 3:1;
- The peak period is five hours in duration;
- The rate does not include a demand charge; and
- All customers on this rate will be separately-metered.

The Company believes that introducing a demand charge for residential customers is unnecessary at this time due to current levels of EV penetration. Residential customers are unlikely to be charging more than one EV using Level 2 charging. Therefore, significant demand increases by individual customers is not expected to result in the near term if charging occurs off peak. Furthermore, demand charges may present complexity resulting in customer confusion, requiring additional outreach and education to ensure desired charging behaviors. The Company also intends to leverage the residential EV TOU rate as a pathway to performing the alternative metering feasibility assessment as ordered by the Commission in Order 26,394. Further details are provided below in the

EV Program discussion within Part IV of our testimony. Please see Exhibit CSV-5 for an illustrative tariff for the TOU-EV-D rate.

iii. Small General Service EV TOU (TOU-EV-G2)

EV TOU rates for small general service customers are essential offerings to stimulate the EV market. Businesses, municipalities, and other small general service customers will continue to adopt and support EVs at an accelerating rate as EV availability continues to increase and become more affordable. Such customers may choose to utilize these rates to charge fleet vehicles, offer EV charging to patrons and customers, develop publicly available merchant EV charging, or other use cases. Off peak charging is necessary to mitigate peak demand and reduce charging costs for these customers as well. An additional, dedicated meter ensures that the small general service EV TOU G2 rate exists within a dedicated rate class, is manageable through demand response programs, and is discrete from other loads.

The separately-metered small general service EV TOU (TOU-EV-G2) rate is tailored to serve up to 200 kVA of load, or approximately up to ten Level 2 chargers charging at 19.2 kW peak. This customer demand designation aligns with the Company's current fixed (i.e. non time-varying) small general service (G2) customer class. In accordance with the Commission's findings in Order 26,394 for small commercial customer applications:

- Seasonality is reflected in the rate;
- The rate incorporates load management techniques;

- The rate is based directly on cost causation principles;
- Default energy supply and transmission billing components are time-varied;
- Three time periods are included (off peak, mid-peak and peak);
- The rate is seasonally differentiated ("summer" and "winter" rates that change coincident with default service adjustments);
- The peak period is five hours in duration;
- All customers on this rate will be separately-metered; and
- A temporary demand charge holiday is offered for these customers at 75% for year 1, 50% for year 2, 25% for year 3, and ending thereafter.

Unlike the residential EV TOU rate, the small general service EV TOU rate does include a demand charge component. The Company's current small general service (G2) customers have demand charges; therefore, an understanding of this billing component already exists amongst the applicable customer group. While a demand charge is present, the Company is proposing to offer customers that select the small general service EV TOU rate a temporary demand charge holiday. For years 1, 2, and 3, customers will be billed demand charges reduced by 75%, 50%, and 25%, respectively. After year 3, the full demand charge component will be billed. This program is intended to support the nascent state of the EV charging market, recognizing that during early years of operation, the demand charge component may present challenges for economic operation of EV charging sites. The demand charge holiday is further intended to support and incentivize broader customer adoption of EVs through the incentivized charging rate. Please see Exhibit CSV-6 for an illustrative tariff for the TOU-EV-G2 rate.

iv. Large General Service EV TOU (TOU-EV-G1)

The "high demand draw" large general service EV TOU rate provides passenger car fleet customers, heavy duty vehicles, or large public charging sites, including clustered Level 2 or DCFC, an optimized rate design. Off peak charging is necessary to mitigate peak demand and reduce charging costs for these customers as well. An additional, dedicated meter ensures that the large general service EV TOU G1 rate exists within a dedicated rate class, is manageable through demand response programs, and is discrete from other loads. The "high demand draw" rate is tailored to serve customers with more than 200 kVA of load, enabling sites with clustered Level 2 and DCFC chargers which currently range from 50 kW to 350 kW per charger.

In accordance with the Commission's findings in Order 26,394:

- Seasonality is reflected in the rate;
- The rate incorporates load management techniques;
- The rate is based directly on cost causation principles;
- The transmission billing component is time-varied;
- Three time periods are included (off peak, mid-peak and peak);
- The rate is seasonally differentiated ("summer" and "winter" rates that change coincident with default service adjustments);
- The peak period is five hours in duration;
- All customers on this rate will be separately-metered; and
- A temporary demand charge holiday is offered for these customers at 75% for year 1, 50% for year 2, 25% for year 3, and ending thereafter.

Similar to the small general service EV TOU G2 rate, the large general service EV TOU G1 rate includes a demand charge component. The Company's current large general service (G1) customers have demand charges, therefore an understanding of this billing component already exists amongst the applicable customer group. While a demand charge is present, the Company is proposing to offer customers that select the large general service EV TOU G1 rate a temporary demand charge holiday. For years 1, 2, and 3, customers will be billed demand charges reduced by 75%, 50%, and 25%, respectively. After year 3, the full demand charge component will be billed. This program is intended to support the nascent state of the EV charging market, recognizing that during early years of operation, the demand charge component may present challenges for economic operation of EV charging sites. The demand charge holiday is further intended to support and incentivize broader customer adoption of EVs through the incentivized charging rate. Please see Exhibit CSV-7 for an illustrative tariff for the TOU-EV-G1 rate.

v. TOU Ratemaking, Technological, and Customer Considerations

Q. What rate design principles have influenced the TOU rates proposed?

A. Innovative rate design is driven by timely and accurate data. Data has been leveraged from the Company's Advanced Metering Infrastructure ("AMI"), Meter Data Management System ("MDMS") and Customer Information System ("CIS") for the proposed, innovative rate designs. The Company believes that rates should be based on cost of service rate design principles to ensure economic efficiency and limit cost shifting. Marginal energy costs are typically driven by wholesale electric market (ISO New England in this case) factors and may not fluctuate for different customer segments.

EV adoption forecasts have been developed and indicate that such incremental loads may require new transformers, service lines and meter upgrades over time. Instances may also arise where the addition of loads would require an upstream feeder and/or substation upgrade.

The Company's TOU rate designs also take into account the effect technology adoption will have on the electric distribution system and subsequent system planning and investment. Technology adoption rates will be forecast over the coming years and those loads will be integrated into planning studies and load forecasts. Possible changes to engineering and construction standards may be warranted to ensure reliability, safety, and appropriate equipment sizing to account for an increase in electric load. The design of electric services may need to change as well, such as shorter distances and increased conductor size to address voltage drop concerns. Ongoing capital budgeting may need to accommodate early replacement of current infrastructure that is undersized and unable to accommodate new customer loads. Additionally, the Company has concluded that the installation of interval metering for all future TOU customers is prudent given the increasingly dynamic loads and generation that have the potential to export energy onto the distribution system and necessitate more granular planning analyses.

The Company believes that the rate design options for any type of electric load should reflect cost causation principles and be designed to promote the efficient use of the electric system resources and enable customers to reduce costs. Rate options must provide proper price signals and influence customer behavior in a manner that creates beneficial outcomes for the customer (through higher system utilization) and for the

utility (through a reduction in system costs over time). To achieve these objectives, the design of the rate options should reflect system costs that are time-varying in nature, and provide customers a cost-based price signal through the rate design. The time-varying costs embedded within the rates offered here are intended to optimize system capacity and flatten the load curve.

Throughout the TOU rate design process, UES has worked to understand and evaluate how customers will respond to TOU rate options, anticipating future refinements to the TOU rate design given that load shape and resulting costs will likely change over time. The TOU rate designs aim to balance the desire of creating a significant peak-to-off-peak rate differential to increase the likelihood of a positive customer response while accurately reflecting, to the greatest extent possible, the underlying costs of the utility.

Incorporating considerations into the design of TOU rates that may be non-cost causative in the near-term will provide an opportunity to gauge the resulting longer-term impact of electrification on the electric distribution system. Affording rate benefits to customers who can change their electric usage patterns even though the utility does not experience a corresponding reduction in cost will help achieve non-cost causative objectives, such as supporting technology adoption, gaining an understanding of consumer behavior, and gaining insights into grid operations and future investment requirements by the utility.

Q. Why does the Company propose to time-vary all three billing components (energy, distribution, and transmission) within the proposed domestic EV TOU rate?

A. As a general proposition, rate design should strive to accurately reflect cost causation and avoid cost shifting. The overarching goal is to promote the transition of more customers to beneficial technologies, such as EVs. Rates with more sizable cost differentials between the peak and off peak rates will help to achieve this paradigm while mitigating peak load impacts. The Company believes including all three billing components (energy, transmission, and distribution) provides enough cost inclusion to incorporate a beneficial TOU rate differential while still reflecting a reasonable allocation of actual costs. Additionally, the Commission has expressed a preference for three-part TOU rate designs in Order 26,394 and approved a separately-metered EV TOU rate offered by Liberty Utilities in DE 19-064 (based upon the TOU rate approved for Liberty Utilities' Battery Storage Pilot Program in 17-189), which provides time-varying rates for supply, transmission, and distribution.

Q. Can customers on competitive supply select the EV TOU rates?

A. Yes. At this time, however, customers on competitive electric supply may only see or participate in time-varying distribution and transmission charges, as applicable. If competitive electric suppliers offer future products with time-varying supply service on the same intervals as the proposed TOU rates, the Company will work with those suppliers and customers to determine cost, process, and system alterations required to provide a similar service.

Q. Please describe the Company's approach to demand charges within the proposed EV TOU rates.

A. Demand charges are designed to capture the infrastructure costs to meet a customer's peak capacity requirement. Currently, only UES's small general and large general service customer classes have a demand charge component. EV charging stations, particularly DCFC, are susceptible to high demand charges as these sites draw significant amounts of energy (50 kW up to 350 kW per charging station). Some DCFC sites have low load factors and utilization, so a demand rate may create a barrier to entry for some competitive market charging infrastructure companies. UES believes that EV rates should be designed for off peak usage and to encourage managed charging capabilities (controllable power output depending on time and rate). However, for customers that cannot manage demand during peak system periods, the demand charge must reflect the service being provided. In order to stimulate the EV market in NH and meet the Commission's directive in Order 26,394 regarding demand charge alternatives, the Company has proposed demand charge holidays for the small and large general service EV TOU rates as discussed in Parts III(iii) and (iv) above.

Q. Please describe the Company's consideration of load management and demand response in designing the TOU rates.

A. Load management techniques represent an important consideration for EV rate design. First and foremost, the TOU rates as proposed encourage customers to charge EVs during times of reduced system demand via price signals. As EV adoption continues to grow, charging (particularly DCFC) has the potential to quickly magnify electricity demand peaks. However, as EV load is flexible, one goal of EV rate design should be to promote charging at times of low demand. Through rate design structures that maximize capacity

availability and minimize system upgrades and costs, the benefits of added energy volumes from EV load can flow to all customers. Such techniques are often referred to as "managed charging" or "smart charging". Additional opportunities for customers to manage load may arise through demand response offerings as part of the NHSaves energy efficiency programs which the Company believes will be complementary to TOU rates.

Q. Would non-EV customers be precluded from enrolling in the EV TOU rates?

A. Yes. These rates have been designed and optimized for EV charging with policy principles embedded to promote the adoption of EVs. The Company's strategy has been to develop a suite of rates designed with specific uses in mind, such as EV customers in this case.

Q. Please describe how the Company plans to meter customers who elect to switch to TOU rates.

A. The Company will separately meter all EV TOU installations in accordance with the Commission's findings in Order 26,394. Depending on the customer's service configuration and requirements, the Company will install an interval-based AMI meter to provide TOU billing data and interval data for customer edification.

UES initially installed AMI in 2006; today, all electric customers currently have AMI meters. This early vintage AMI uses powerline carrier technology to receive daily reads for each meter. Landis & Gyr provides UES's AMI within their Gridstream TS2 system which is capable of interval data recording using 4 separate meter registers and 2-way

communication. UES is in the process of upgrading the existing "TS2" system and deploying new Gridstream "PLX" data collectors and associated systems. The Landis & Gyr PLX system is designed to be a replacement for the TS2 technology and, as such, is backwards compatible, meaning the PLX collectors and transmitters can communicate with existing TS2 AMI meters. The system can record 15 minute metered intervals and is capable of reading PLX meters three times per day. Meters deployed to new TOU customers and under the normal meter replacement cycle will utilize PLX-compatible meters which will allow interval data for customer and Company use. The Company's MDMS and CIS already support these enhanced AMI capabilities.

Q. Has the Company provided illustrative tariffs for each of the TOU rates proposed?

A. Yes. Please see the exhibits below for each of the respective illustrative TOU tariffs. The Company has characterized these tariffs as illustrative as the rates must be calculated based on the external delivery charge ("EDC") and default service rates in effect at the time permanent rates are approved.

- Domestic Delivery Service Schedule TOU-D: Exhibit CSV-4
- Schedule TOU-EV-D: Exhibit CSV-5
- Schedule TOU-EV-G2: Exhibit CSV-6
- Schedule TOU-EV-G1: Exhibit CSV-7

Q. Has the Company outlined service requirements and the installation process for future EV TOU customers?

A. Yes. Please see Exhibit CSV-8 for a description of the service requirements for EV TOU customers.

IV. EV PROGRAM INFRASTRUCTURE PROPOSAL

Q. Please describe the Company's EV Program proposal.

A. The Company is proposing an EV Program to stimulate the adoption of EV infrastructure and the EV charging market. The EV Program is focused on increasing the availability of charging stations, lowering the investment barrier faced by customers regarding infrastructure needed for ownership of charging stations, and preparing for integration of EVs with the electric distribution system. Robust charging infrastructure is required to allow travel, alleviate range anxiety, and fundamentally change customer behavior to facilitate an economic and environmentally sound transition to EVs.

The Company is proposing to facilitate the development of EV charging stations and infrastructure in New Hampshire through two initiatives encompassing the EV Program: (1) a residential behind-the-meter EVSE installation and incentive program, and (2) a "make-ready" public EV infrastructure installation program to expand public EV charging stations in New Hampshire.

i. Residential Behind-the-Meter EVSE Installation and Incentive Program

Q. Please describe the proposed residential behind-the-meter EVSE installation and incentive program.

A. The Company proposes to offer rebates of up to $600 for the procurement and installation of smart, managed Level 2 EV chargers to 500 residential EV TOU customers. This proposed program represents a culmination of efforts from IR 20-004 and the Commission's Order 26,394, as well as ongoing efforts in DE 20-170. The Company

will further utilize the residential EV program as a means of assessing alternative metering capability from behind the meter EVSE as required in Order 26,394.

Residential customers represent an important class given the disproportionate ratio of charging at home versus other locations and the need to optimize EV loads to mitigate peak demand and new infrastructure costs. Level 2, residential home EV charging is estimated to represent approximately 80% of the EV charging market.[21] Industry analysts believe that electric system upgrades will be needed to handle the increased load from EVs and impacts will depend on charging locations on the distribution system along with the time of day when vehicles are charged.[22] Managing these impacts through smart charging can improve asset utilization and may mitigate needed system investments.

Managed charging can be accomplished in two ways: active management and passive management. Active managed charging is the practice of sending control signals to a vehicle or the charging equipment to adjust the time of charge, the rate of charge or otherwise direct charging behavior. Passive managed charging is the effort to influence charging times by modifying customer behavior through TOU rates. The Company is proposing to facilitate behind-the-meter partnerships via the incentive to encourage customers to install charging equipment that can be actively managed while providing an opportunity for the Company to assess EVSE alternative metering capabilities.

[21] "Charging at Home." *U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy*, https://www.energy.gov/eere/electricvehicles/charging-home.
[22] "Transportation & Mobility Research: Electric Vehicle Grid Integration." *National Renewable Energy Laboratory*, https://www.nrel.gov/transportation/project-ev-grid-integration.html.

Several market participants have advocated for the utilization of EVSE for metering purposes.[23] Commission Staff and the Commission have expressed a desire to further investigate this capability as a means of expanding EVSE deployment in the state while reducing barriers to customer installation of such technologies. In Order 26,394 at 13, the Commission stated that "further investigation of issues related to advanced metering functionality associated with EVSE embedded meters is warranted."

Q. How will the Company select eligible equipment that qualifies for the incentive?

A. UES will issue a public request for information ("RFI") to EVSE vendors and software providers to gather information on EVSE metering capability and participation in an evaluation pilot. The Company will seek responses from such EVSE providers, including software-based telematics equipment embedded within EVs, to gain an understanding of EVSE charging session data accuracy, availability, format, interface capabilities, data sharing, load metering, sub-metering, metering data disaggregation, remote control, volt/VAR capability, customer controls, testing, privacy, and cyber & physical security considerations. The Company will learn about embedded EVSE metering capability from the responses, determine what standards are used to ensure device accuracy and interoperability, and how stakeholders can obtain data from EVSE third parties.

From the RFI, UES will develop a residential EV charger "standard" based upon desired characteristics shared by available solutions providers. The Company will then issue a

[23] *See* Comments of Chargepoint, Inc in Docket No. IR 20-004: February 20, 2020 and July 31, 2020 and Docket DE 20-170: December 9, 2020 and January 8, 2021; Written Comments of Tesla, Inc. in Docket No. IR 20-004, July 25, 2020; Comments of Clean Energy NH, Conservation Law Foundation, NHDES, City of Lebanon and OCA in Docket DE 20-170: December 9, 2020

request for proposal ("RFP") to EVSE vendors for inclusion on the Company's list of chargers and solutions eligible for customers to receive a purchase incentive up to $600. In order for a charging solution to receive an incentive, the charger/software vendor must agree to share all charging session and embedded metering data with UES for five years. All participating residential EV customers will be required to enroll in the separately-metered domestic EV TOU rate where a Company AMI meter will be provided, enabling 15 minute interval data and enhanced data sharing capability. The Company will collect the data from participating EVSE vendors and the Company's EV TOU meters. UES will analyze and compare historical embedded EVSE data against the utility metering interval data to assess accuracy, availability, format, interface capabilities, data sharing, load metering, sub-metering, metering data disaggregation, remote control, volt/VAR capability, customer controls, testing, privacy, and cyber and physical security, along with other considerations that arise during the assessment.

The Company hopes to develop behind-the-meter partnerships with EVSE equipment providers and local installers as part of the EV Program to assist customers with the installation process. UES believes that the residential behind-the-meter EVSE installation and incentive program will provide benefits to customers, the electric grid, the local economy, and society-at-large. By incentivizing customers to install smart, managed EV charging equipment during the early stages of EV market growth, EV customers will benefit from future demand management, energy efficiency and optimization offerings. Managed charging functionality allows EV loads to be flexible, curtailing or adding charging load as electric system conditions warrant. While managed

charging programs do not currently exist within the NHSaves energy efficiency programs, this is an area of interest and likely development. Encouraging customers to adopt this functionality at the beginning of EV ownership will enable future participation in demand management programs.

The Company will submit an annual report to the Commission outlining the number of residential customer participants in the program, incentives distributed, third party partners within the program, and periodic findings related to embedded metering and future use cases. At a time to be determined, but to likely coincide with efforts on going in DE 20-170, the Company will offer a recommendation for next steps in leveraging EVSE data for future service offerings specific to EV customers.

Q: Has the Company performed any cost benefit analysis on the proposed residential behind-the-meter EVSE installation and incentive program.

A: Yes. For illustrative purposes, the Company has screened the residential behind-the-meter EVSE installation and incentive program using the Granite State Test recently approved by the Commission to evaluate cost-effectiveness of the energy efficiency programs administered by UES under the Energy Efficiency Resource Standard ("EERS").[24] Exhibit CSV-9. This analysis was conducted to determine, generally, if the behind-the-meter EVSE installation and incentive program would be cost effective if operation of charging equipment is limited during the ISO-NE summer and winter peak periods. This would demonstrate tangible benefits from the program above and beyond

[24] On December 30, 2019, the Commission issued Order 26,322, approving the Benefit-Cost Working Group's recommendations to take effect for the 2021-2023 EERS term.

the benefits of advancing public policy and further assessing alternative metering capability from behind-the-meter EVSE.

Q: Explain the details of how the Company performed the cost benefit analysis on the proposed residential behind-the-meter EVSE installation and incentive program.

A: The Company used the same energy efficiency benefit cost model used to evaluate the 2021-2023 statewide energy efficiency plan. The modeling assumptions were as follows:

- 500 ENERGY STAR certified EV chargers enrolled with demand response capability through open communication protocols. Chargers are required to be networked so that they can be monitored and controlled remotely.
- Incentive is $600 per unit (equals total utility cost)
- The measure has a 10 year life, during which time the equipment is controlled during peak periods.
- Energy Savings = 50 kWh per unit annually as compared to a non-ENERGY STAR charger
- Demand Savings = 0.5 kW average per unit per year
- Energy load shape = all summer / winter peak
- Peak coincidence factor is 100% summer / winter

Q: What were the results of the analysis?

A: The result of the modeling is a benefit / cost ratio of 2.2. The net present value of the benefits when modeled are $654,000 with a total cost of $300,000 ($600 per unit with 500 total units). The Company is providing this analysis to illustrate that the behind-the-meter EVSE installation and incentive program could be cost effective however, since many of the assumptions used in this modeling could be adjusted for sensitivity analysis, the Company is providing this modeling in Exhibit CSV-9 for illustrative purposes only.

ii. "Make-Ready" Public EV Infrastructure Program

Q. Please describe the proposed "make-ready" public EV infrastructure program.

A. As part of the EV program, UES proposes to offer a make-ready EV infrastructure program essential to the development of public EV charging stations throughout New Hampshire. The make-ready program targets investment of approximately $4.0 million over five years to deploy EV charging at approximately 37 Level 2 and 8 DCFC public sites (total of 45 sites) in the Company's service area. UES further proposes to install required upgrades on the distribution system and to contract with third-party electrical contractors to install behind-the-meter "customer-side" infrastructure. Specifically, the make-ready investments the Company proposes to install and own includes the following electrical equipment, infrastructure, and connections:

- The distribution primary lateral service feed;
- The necessary transformer and transformer pad;
- The new service meter;
- The new service panel; and
- The associated conduit and conductor necessary to connect each piece of equipment.

At a minimum the "make-ready" program will provide adequate capacity for future growth. The Company recommends "future-proofing" installations by class as follows:

- 0 kVA to 200 kVA Make-Ready (Level 2 Charging):
  - Install make-ready infrastructure for 200 kVA load (up to ten Level 2 chargers)
  - Customer to supply a minimum of two Level 2 chargers initially

- 200 kVA to 1000 kVA Make-Ready (DCFC/Clustered Level 2):
    - Install make-ready infrastructure for up to 1000 kVA load
    - Customer to supply a minimum of two DCFC chargers initially with a peak cumulative output exceeding 200 kW

The Company has provided additional information regarding make-ready service requirements in Exhibit CSV-10.

The exact number of charging ports deployed will be determined in collaboration with participating customer site hosts, considering the unique real property, service requirements, and site layout. UES will help customers understand their options within the make-ready program with the goal of optimizing the number of charging ports to maximize the number of vehicles that can charge at each location. Participating customers will be required to provide EVSE with non-propriety charging plugs and networked functionality.

The Company will target make-ready site hosts with publicly-available, long-dwell time parking including but not limited to the following types of customers:

- Workplaces
- Fleet parking facilities
- Public parking lots, garages, parks, beaches, and transit hubs
- Hotels, hospitals, and educational institutions
- Federal, state, and municipal properties
- Dining, entertainment, and shopping plazas
- Multi-family and apartment buildings
- Low to moderate income communities

The proposed make-ready program represents a significant increase in Company-supported, customer-sided and behind-the-meter infrastructure. UES believes that the make-ready program is necessary to expand New Hampshire's network of charging stations, that the make-ready program is in the public interest, and will reduce barriers to investments in EV charging infrastructure.

According to the U.S. Department of Energy, New Hampshire has approximately 281 public charging outlets in the state.[25] This is significantly less than all surrounding states including Maine (503), Vermont (786), Massachusetts (3,469), Connecticut (1,154), and Rhode Island (474).[26] Experts in the EV field believe that New Hampshire is lagging behind other states in the region both in terms of EV adoption and the deployment of EV charging infrastructure.[27] The Company's proposed make-ready program will therefore meet a need regarding the adoption of electric vehicles and associated public charging infrastructure in New Hampshire.

Q. Is the Company proposing to make any investments in owning and operating EV charging stations within the make-ready program?

A. At this time, UES is not proposing to own or operate EV chargers within the make-ready program. The focus of the make-ready program is to support the installation and deployment of the electrical infrastructure required to promote and serve publicly

[25] "Electric Vehicle Charging Outlets by State." *U.S. Department of Energy, Alternative Fuels Data Center*, https://afdc.energy.gov/data/10366.
[26] Id.
[27] "If electric vehicles are the future, is New Hampshire ready? Are you?" *Megan Fernandes, Fosters Daily Democrat*, March 24, 2021, https://www.seacoastonline.com/story/news/local/2021/03/24/electric-vehicles-new-hampshire-charging-stations-range-anxiety/4665825001/.

available EVSE, including the infrastructure behind-the-meter, by offering a turn-key installation solution. UES intends to work with owners and operators of publicly available parking sites to deploy make-ready infrastructure with the eligible customer providing the EVSE charging stations utilizing non-proprietary, open standard connectors at their cost.

The Company will evaluate the success of the make-ready offering throughout the course of the program. If the make-ready infrastructure deployment goals are not met or additional EV charging needs are identified in New Hampshire, the Company will consider deploying Company-owned and operated EVSE in a future proposal to the Commission.

Q. How many sites are you proposing to develop with make-ready infrastructure?

A. The modeling of the five year program includes an investment in 37 Level 2 Public sites and 8 DCFC Public sites (total of 45 sites) in the UES service area. The US Department of Energy's ("DOE") Electric Vehicle Infrastructure Projection Tool ("EVI-Pro") Lite was used as a guide when choosing the number of sites to model. By entering the number of EVs to support with EVSE, the tool calculates the number of Public Level 2 and Public DCFC plugs needed. The Company's modeling as provided in Exhibit CSV-3 indicates that approximately 3,753 EVs will be registered in the UES electric service territory through 2028. This figure was entered into the EVI-Pro calculator along with the percent of drivers with access to home charging. According to U.S. Census Bureau data, approximately 71% of New Hampshire's homes are owner-occupied, meaning that

such customers have control over their ability to charge at home.[28] The Company intends to provide full support for both battery electric vehicles ("BEVs") and plug-in hybrid electric vehicles ("PHEVs") and used the DOE's recommended vehicle mix for distribution of such models. The resulting EVI-Pro calculation indicates that in order to support 3,753 EVs, 338 public Level 2 charging plugs/ports and 51 public DCFC charging plugs/ports will be required. These results are provided in Exhibit CSV-11. This calculation led to the Company's recommendation to develop make-ready infrastructure at approximately 37 Level 2 sites and 8 DCFC sites with approximately 10 Level 2 plugs/ports and 6 DCFC plugs/ports at each respective site.

Q. Did the Company develop estimated make-ready costs for the Level 2 and DCFC scenarios?

A. Yes. UES developed estimated cost scenarios for both the Level 2 and DCFC proposals: (1) five 19.2 kW Level 2 chargers with ten total plugs/ports for a total of 96 kW of connected load, and (2) six 50 kW DCFC for a total of 300 kW of connected load. The Company estimates installed make-ready costs to be approximately $77,000 for the (1) Level 2 scenario and $143,000 for the (2) DCFC scenario. A breakdown of these estimates is provided in Exhibit CSV-12.

Q. Has the Company evaluated the economics of the proposed investment?

A. Yes, the Company has evaluated the proposed make-ready program using a discounted cash flow ("DCF") analysis. To perform this analysis, the Company used its existing and

[28] "QuickFacts: New Hampshire." *U.S. Census Bureau*, July 1, 2019, https://www.census.gov/quickfacts/fact/table/NH/PST045219.

long-standing customer contribution model. Under this approach, a DCF analysis is performed that compares the estimated distribution revenues (i.e., excluding revenues attributed to supply) to the estimated cost of service. The cost of service reflects the incremental costs associated with the program, including investment in facilities, depreciation expense, and property and income taxes. The distribution revenues reflect estimated customer usage applied to the respective distribution rates for each customer class. The annual cost of service and revenue cash flows are discounted to the present value at the Company's after tax real weighted average cost of capital. If the Net Present Value ("NPV") of the cash flows is at or above zero, then the proposed investment is considered economically feasible and should be accepted.

Using the Company's DCF analysis, we have modeled the proposed five year program in Exhibit CSV-13. The Company utilized the estimated costs discussed above and in Exhibit CSV-12 of $77,000 per Level 2 site (five 19.2 kW Level 2 chargers with ten total plugs/ports for a total of 96 kW of connected load**)** and $143,000 per DCFC site (six 50 kW DCFC for a total of 300 kW of connected load), respectively. The modeling of the program includes an investment of approximately $3.99 million over five years. The modeling uses UES' existing distribution rates to calculate revenue estimates in order to assess the economic feasibility of the projects at existing rate and forecasted demand. The analysis returns a NPV of $243,869 over a dynamic 10 year term (14 Years total). Modeling the program demonstrates that the additional revenues generated under existing distribution rates and expected usage and demand are sufficient to cover the Company's after-tax weighted-average cost of capital and provide recovery of project costs over a

period of 10 years. From a financial perspective, these projects should be accepted and the incremental costs will not be borne by existing customers.

Q. How does the Company categorize and propose to recover the costs associated the make-ready EV infrastructure program?

A. As described in the direct testimony of Kevin E. Sprague, costs associated with the make-ready EV infrastructure program are categorized within the Company's Grid Modernization Plan. As Mr. Sprague explains in more detail, such costs undergo rigorous planning and budgeting processes to ensure the most cost-effective solution is proposed. The recovery of make-ready EV infrastructure and other Grid Modernization costs are proposed to be included in annual step adjustments described in the testimony of Messrs. Goulding and Nawazelski.

Q. Please describe the process for make-ready project approvals with customers.

A. The process for project approval will be as follows:

- Receive application from customer;
- Preapproval assessment with customer site visit;
- Determine where power source will come from (site must be within 300 ft of power source, not over a public way, and outside environmentally sensitive areas);
- Receive signed site host agreement and license agreement;
- Generate work order with engineering study;
- Obtain proof of purchase of EVSE (i.e. charging station) from customer;
- Arrange installation with 3rd party contractor

Please also reference Exhibit CSV-10 for additional make-ready installation detail.

Q. Will make-ready program installations be required to enroll in the Company's EV TOU rate offerings?

A. Yes. Any customer who develops EV charging stations through the Company's make-ready program will be required to enroll in the applicable TOU rate. Customers that develop make-ready sites from 0-200 kVA will be required to enroll in the small general service EV TOU rate (Schedule TOU-EV-G2). Customers that develop make-ready sites above 200 kVA will be required to enroll in the large general service "high demand draw" EV TOU rate (Schedule TOU-EV-G1).

Q. Have similar EV programs been approved in other jurisdictions?

A. Yes, make-ready programs have been approved by regulatory commissions as such investments are viewed as being in the public interest, will reduce barriers to investments in EV charging infrastructure, will meet a need regarding the adoption of electric vehicles that is unlikely to be met by the competitive EV charging market, and will not impede the competitive EV charging market.[29] State utilities commissions have approved make-ready programs in Massachusetts (Eversource, D.P.U. 17-05), Rhode Island (National Grid, Docket No. 4780), New York, (Consolidated Edison, Case No. 19-E-0065 and National Grid, Case No. 17-E-0238), California (Pacific Gas & Electric, Case A1701022,

[29] MA D.P.U. 13-182-A, Investigation by the Department of Public Utilities upon its own Motion into Electric Vehicles and Electric Vehicle Charging at 13.
https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/9233599

San Diego Gas & Electric, Case A1801012, and Southern California Edison, Case A1701021) and Minnesota (Xcel Energy, Docket 18-643), among others.

Q. Please describe how your proposals align with New Hampshire's public policy initiatives.

A. Make-ready programs align with New Hampshire policy objectives and have been supported by several EV market participants and stakeholder groups.[30] In July 2019, the New Hampshire Department of Business and Economic Affairs ("NH BEA") released a report (*Evaluating Electric Vehicle Infrastructure in New Hampshire*) following an extensive stakeholder process.[31] The most common policy recommendation identified was "approval of reasonable utility make-ready investments as necessary investments in the distribution system and therefore eligible for rate-basing. Make-ready investments include the utility infrastructure just up to the [electric vehicle supply] equipment".[32]

Senate Bill (SB) 575-FN was introduced in 2018, aiming to establish requirements for electric vehicle charging stations. This bill led to the Commission's investigation in IR 20-004 and subsequent docket DE 20-170, both regarding the development of EV TOU rates. UES supported SB 575-FN and testified that further development of electric vehicle infrastructure is essential to meet New Hampshire's environmental and

[30] See Comments of Greenlots in IR 20-004, February 20, 2020; Written Comments of Tesla, Inc. in IR 20-004, July 25, 2020; and Comments of Chargepoint, Inc. in IR 20-004, May 11, 2020 and DE 20-170, January 8, 2021.
[31] "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.
[32] Id. at 2.

transportation goals.[33] The bill received bipartisan support throughout the legislative process and was signed into law by Governor Sununu on June 12, 2018.

In addition to SB 575-FN, another EV bill was passed by the New Hampshire legislature and signed into law by Governor Sununu in 2018, SB 517, *Establishing an Electric Vehicle Charging Stations Infrastructure Commission*.[34] UES also supported SB 517 and was a member of the SB 517 commission ("EV Commission") to provide input to the legislature on how EV infrastructure can be advanced within the state.[35] UES, Eversource, Liberty Utilities, and the New Hampshire Electric Cooperative jointly proposed to support the make-ready work required to install DCFC and Level 2 chargers funded by the VW Settlement Trust.[36] The legislative EV Commission has requested "the electric utilities work with the Public Utilities Commission to design and obtain approval for a 'make ready' program from New Hampshire that is designed to work in conjunction with the RFP and beyond."[37] The NH BEA stakeholder group also supported these investments stating, "New Hampshire utilities have outlined a proposal for investment in DCFC that combines utility investments in make-ready infrastructure with a portion of the Volkswagen Settlement funding. This proposal is widely supported

[33] NH Senate Transportation Committee SB 575-FN, relative to electric vehicle charging stations, January 23, 2018, http://gencourt.state.nh.us/bill_Status/HearingReport.aspx?id=9685&sy=2018.
[34] Senate Bill 517 – Final Version, An Act establishing an electric vehicle charging stations infrastructure commission, May 30, 2018, http://gencourt.state.nh.us/bill_Status/billText.aspx?sy=2018&id=1829&txtFormat=html.
[35] NH Senate Transportation Committee SB 517, establishing an electric vehicle charging stations infrastructure commission, January 30, 2018, http://gencourt.state.nh.us/bill_Status/HearingReport.aspx?id=10182&sy=2018.
[36] NH Electric Vehicle Charging Stations Infrastructure Commission Meeting Minutes, June 28, 2019, https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/20190628-meeting-notes.pdf.
[37] Id. at 2.

by stakeholders surveyed."[38] While the competitive RFP process is still underway for the first phase of this effort, UES will continue to support the development of EV charging in NH and intends to seek recovery of any investments as part of the proposed make-ready program.

V. ELECTRIC VEHICLE (EV) & TIME OF USE (TOU) MARKETING, COMMUNICATIONS AND EDUCATION PLAN

Q. Please describe the Company's MC&E Plan.

A. The Company is proposing a comprehensive, multi-channel MC&E Plan that is designed to meaningfully increase consumer awareness, interest in and adoption of EVs, EV charging infrastructure and EV TOU rates during the initial five years of the EV Program. The MC&E Plan consists of two parts: (1) a Consumer EV Education Campaign (EVs, charging infrastructure, EV/TOU rates); and (2) a Consumer EV Marketing and Promotion Program. The Consumer EV Education Campaign will increase awareness of and inform the Company's customers about the benefits of EVs, new EV and PHEV technologies, available vehicle models, federal and state incentives for vehicle purchases or leases, options for home and public charging, when, where, and how to charge EVs safely, and new EV/TOU rates to encourage customer savings and electric system demand benefit from off-peak charging. The Consumer EV Marketing and Promotion Program will focus on creating experiential learning opportunities for

[38] Id.

customers, partnerships with EV dealerships, and partnerships and incentives/rebates with EV charging infrastructure dealers.

Q. Why does the Company need an education campaign to promote EVs to its customers?

A. In order to help drive the transition to electric transportation and meet Company, federal and state goals, consumers must be educated on the benefits of EVs to create an awareness of and interest in EV ownership. An effective education and outreach initiative can increase the adoption rate for electric vehicles. Of the 71 utilities across the country with active EV adoption strategies/programs, the majority have an integrated education and outreach initiative design to increase awareness of what EVs are and how they work, the difference between plug-in hybrid electric vehicles and battery electric vehicles, the benefit of EV TOU-specific rates, and increase customer understanding of EV charging at home, work, and public locations, and the implications for the customer and the electric system of unmanaged charging. According to the UC Davis International EV Policy Council, although EVs are becoming more popular, "consumer awareness and knowledge of PEVs remains too low in many markets, limiting market growth."[39]

To capitalize on any increased interest in EVs, barriers inhibiting consumers from purchasing an EV should be identified and then countered with educational messaging

[39] "Driving the Market for Plug-in Vehicles: Increasing Consumer Awareness and Knowledge," *UC Davis International EV Policy Council*, March 2018, https://phev.ucdavis.edu/wp-content/uploads/Consumer-Education-Policy-Guide-March-2018.pdf.

that removes these barriers from consideration when customers shop for vehicles. Market research has identified the primary consumer barriers currently inhibiting EV sales as: cost to purchase and maintain an EV; range of travel distance possible on a fully charged battery; limited access to public charging infrastructure; and average time it takes to charge an EV.[40]

The Company's customer communication channels have universal reach throughout our service territory in New Hampshire, and the Company communicates with customers on at least a monthly basis through bills, home energy reports, and regularly through other channels such as email, social media, call center interaction, and direct mailings. The Company currently communicates to customers about energy efficiency products and services, in collaboration with other program administrators under the NHSaves brand. Therefore, the Company proposes to leverage these capabilities and develop a Consumer EV Education Campaign that will educate consumers on the benefits of EVs, the decreasing costs to purchase and maintain an EV, advances made in extending driving range, continued increases in charging station availability, newer charging technologies that greatly reduce EV charging time, and federal and state incentives and rebates for EVs and EV charging infrastructure. The Campaign will also educate customers on EV charging issues such as residential (at home) charging options, when to charge an EV for optimal cost-savings and impact to the electric infrastructure, and how to safely charge an EV. Customers will be educated about the Company's newly proposed suite of EV/TOU

[40] "NESCAUM Multi-State ZEV Action Plan." *NESCAUM*, May 2014, http://www.nescaum.org/documents/multistate-zev-action-plan.pdf/.

rates developed to encourage EV adoption including rates for (a) residential whole-house TOU rate; (b) residential EV TOU rate; (c) small general service EV TOU rate; and (d) large general service EV TOU rate using cost comparison tools that allow customers to compare usage and savings potential.

Q. What are the goals of the Consumer EV Education Campaign to promote EVs?

A. The Consumer EV Education Campaign seeks to increase customer awareness, familiarity, and interest in EVs by making available information about EVs through a mix of utility customer channels, collaborative marketing efforts with other utilities, auto dealers, and EV advocacy groups. Helping customers understand new vehicle types, advances in EV technology, available state and federal incentives, and availability of charging stations and options will increase customers' consideration of EVs and help foster a step change in the way EVs are viewed by the consumer.

Q. Why is the Company interested in customer adoption of EVs?

A. The Company has made a commitment to sustainability to ensure the actions we take today, as a business and as members of our community, deliver long-term value to our customers. The Company must transform our business and provide solutions that advance our region's environmental goals while providing the safe, reliable, affordable service our customers expect. Meeting the Company's environmental goals, as well as federal and state decarbonization targets requires a transformation of the consumer light-duty vehicle market from traditional fossil fuel-based vehicles to EVs. This type of transformation of one of the largest consumer markets in less than a decade requires a

collective effort of all stakeholders in the electric vehicle value chain, including New Hampshire car buyers, utilities, automotive manufacturers and dealers, as well as EVSE vendors.

Q. How will the Company know if the Consumer EV Education Campaign is successful?

A. The Company proposes to conduct a consumer awareness study to establish baseline information about our customers' understanding and attitudes toward EVs in order to assess the effect of the education and outreach program and to compare what happens before and after the program has been implemented. Without baseline data, it is difficult to estimate any changes or to demonstrate progress. Following the baseline study, education and outreach efforts can be measured through a mixture of metrics the Company establishes for each education and marketing tactic. The Company will establish milestones for the Campaign and at the end of the education and outreach phase perform qualitative and quantitative analysis (website analysis and social media sentiment and engagement, message testing, surveys) to measure progress versus the baseline study to evaluate the success and efficacy of the Consumer EV Education Campaign.

Specifically, the Company will also measure web traffic to an informational area on the Company website. For any direct email communications to customers, the Company would measure how many customers read (opened) or engaged with an email about EVs, and also track visibility and engagement of its campaign messages on Company social media channels. Initiatives such as these help determine the effectiveness of awareness

campaigns. The Company's goal will be to promote its EV benefits messaging to the Company's more than 77,000 New Hampshire electric customers over a five year period. The Company will accomplish this by messaging directly to account holders through their bills and email addresses, and by having messaging about EVs available for customers that are interested when they reach out to our call center. Goals and metrics for each initiative will be developed as part of the campaign design effort.

Q. How will the Company develop the Marketing and Promotion Program and what tactics will it use?

A. The Company will work with internal Communications and Customer Energy Solutions teams, an advertising agency, research firm, and partners to develop campaigns that will:

- Identify and prioritize consumer benefits for EV education
- Identify and prioritize barriers to EV adoption for education and barriers to hosting for business, public site hosts
- Develop multiple messages that highlight benefits, remove barriers, and increase adoption of EVs and EV charging infrastructure and drive EV adoption and participation in the EV TOU rates
- Deliver developed messaging through multiple channels such as:
    - Company-owned
        - Dedicated informational area on Company website
        - Targeted social media advertising (UES Customer Zip codes only)
        - Email campaign (UES Customer Zip codes only)
        - Bill inserts (UES Customers only)

- Call centers
  - Customer Cost Comparison tool to compare EV TOU rate impact
  - Partner Channels (other utilities, EVSE vendors, and trade groups)
  - Press Coverage (local print, broadcast, and digital media outlets)
  - Purchased Media (advertising: social media advertising, banner ads)
  - EV Events (National Drive Electric Week, and Ride & Drive)
  - EV Manufacturers, Dealer Promotions (Dealerships with New & Pre-Owned EV inventory)
  - EV Advocacy Groups

The Company proposes the above as foundational strategies that will be refined with the advertising agency using data derived from research with input from the partners prior to any campaign launch.

Q. Will the Company work with partners in developing these campaigns?

A. Yes. The Company will first identify and then contract with an external advertising agency and a research firm each with large consumer awareness marketing experience, an understanding of New Hampshire consumers and experience developing messages geared toward sustainability and energy efficiency. Then, the Company will identify and partner with strategic stakeholders in the EV value chain to develop as comprehensive and as aligned an approach as possible to increase campaign effectiveness, expand reach and control costs. Partners may include:

- Other utilities
- EVSE Providers

- Business/Trade Groups/Partnerships/Networking Associations
- Event sponsors

Q. What are the estimated costs of the MC&E Plan?

A. The Company's estimate of the proposed MC&E Plan costs is $370,000 as shown in Exhibit CSV-14.

Q. How did the Company develop the estimated costs for the proposed MC&E Plan?

A. The Company first identified recent, similarly themed and sized awareness and participation campaigns to establish baseline costs of similarly-structured educational campaigns. The Company prioritized leveraging "Company-owned" communications channels and materials (website, social media, email, bill inserts, call center) to maximize efficiency and reduce costs. The Company also researched the cost of available cost comparison tools to provide educated estimates, including required web development and integration. While the final strategy may alter tactics and associated costs, the Company believes the aggregate total that is presented in this filing is what would be necessary to successfully meet the goals put forth in its TOU rate offerings and EV Program.

Q. How will the Company measure effectiveness and cost efficiency?

A. To ensure that its campaign tactics and messaging are effective and cost-efficient, the Company will:

- Perform qualitative and quantitative analyses (site traffic analysis, event attendance, focus groups, sentiment, surveys) at established milestones for the Consumer EV Education Campaign and the Consumer EV Marketing and Promotion Program

- Continue messaging and tactics that are meeting established goals/metrics for each campaign and change or replace those that are not

The most successful campaigns require some refining after launch due to the constantly shifting markets, technological improvements, and competing priorities. The Company anticipates that the initiatives under the MC&E Plan will be no different and would adjust and refocus tactics in response to any anticipated or unanticipated results.

Q. Why does the Company need to promote the benefits of its TOU rates and EV Program to consumers and prospective charging site hosts?

A. To increase EV adoption, the Company must address the barrier concerning at-home EV charging by increasing consumer awareness and understanding of the benefits of residential EV at home charging using smart Level 2 chargers when paired with specifically designed a residential EV TOU rate. The Company is proposing a behind-the-meter EVSE installation and incentive program with up to $600 rebates for 500 customers to drive adoption. Efforts are also needed to increase prospective public charging station site hosts' familiarity with EV charging as an amenity for employees, customers, tenants, or visitors. The Company's make-ready program is designed to address these barriers through simplifying and reducing the cost of installing public EV charging equipment. The MC&E Plan will support the broad marketing of the make-ready program to potential site hosts across the Company's New Hampshire service territory. The Company believes marketing to potential site hosts is essential to the development of EV charging infrastructure in New Hampshire.

Q. Are there other EV related costs the Company is proposing for recovery?

A. Yes, in addition to the make-ready EV infrastructure costs the Company has outlined, the Company proposes to recover the actual and incremental costs associated with the Residential Behind-the-Meter EVSE Installation and Incentive Program and MC&E Plan through the External Delivery Charge ("EDC"). The Company will include an estimate of these costs in the annual EDC filing which would be reconciled to actual costs consistent with the operation of the EDC.

Q. Does this conclude your testimony?

A. Yes it does.

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