

CHRISTOPHER R. VILLARREAL

9492 Olympia Drive, Eden Prairie, MN 55347
 email: chris@pluggedinstrategies.com

(415) 680-4224

EMPLOYMENT

NON-RESIDENT (ENERGY AND ENVIRONMENTAL POLICY) ASSOCIATE FELLOW
R Street Institute

SEPTEMBER 2019-CURRENT
Washington, D.C.

- Provide regulatory and policy support on topics including performance-based ratemaking, development of rules for integrated resource planning, distributed energy resources, and market-oriented solutions for customer choice and development of clean energy resources.
- Develop written materials summarizing regulatory actions on topics related to performance-based ratemaking, customer choice, distribution system planning, distributed energy resources, and other topics as needed.
- Participate in state and federal regulatory proceedings and working groups on development of performance-based ratemaking mechanisms, net energy metering, and integrated resource planning, including the review of utility proposals, participating in working groups to review and recommend metrics for performance-based ratemaking frameworks, and providing comments to state regulatory commissions on performance-based ratemaking metrics and frameworks.

PRESIDENT
Plugged In Strategies

APRIL 2017-CURRENT
Eden Prairie, MN

- Provide regulatory and policy analysis and consulting services related to evolution of electricity grid, distribution system planning, emerging customer and grid-connected technologies, and regulatory strategies
- Provide facilitation and moderation services for groups, workshops, and working groups
- Provide research and analysis services regarding utility and regulatory matters and structures
- Provide additional expert analysis on matters affecting electricity and regulatory structures, including topics such as data privacy, data access, rate design, interoperability, advanced technologies, performance-based ratemaking, and convergence of technology, industries, and markets.
- Provide expert testimony and presentations before state utility commissions on topics including distribution system planning, distributed energy resources, data privacy and data access, performance-based ratemaking, and grid modernization.
- Prepare training materials on distributed energy resources, interoperability, and grid modernization for international regulatory and policy decision-makers.

DIRECTOR OF POLICY
Minnesota Public Utilities Commission

MAY 2015- APRIL 2017
Saint Paul, MN

- Maintained high profile inside and outside the state representing the Commission on electricity matters.
- Assisted Commissioners with policy analysis to support decision-making options.
- Provided policy analysis to support development of record in proceedings.
- Provided subject matter expertise on specific topics, including rate design, energy storage, grid modernization, data privacy, data access, interconnection, and security.
- Organized workshops, including preparing agendas, inviting speakers, and moderating public panels.
- Engaged and interact with several national organizations, including National Association of Regulatory Utility Commissioners, Department of Energy, Federal Energy Regulatory Commission, National Institute of Standards and Technologies, North American Energy Standards Board, and Smart Grid Consumer Collaborative.
- Regularly spoke and participated in panels, conference, webinars, and other international, national, and state conferences on behalf of the Minnesota Public Utilities Commission.
- Engaged and worked with several state-level projects, including e21 Initiative and 2025 Energy Action Plan
- Participated in actions related to Midcontinent Independent System Operator product development, including demand response and energy storage.
- Chaired NARUC Staff Subcommittee on Rate Design, and managed development of Distributed Energy

Resources Rate Design and Compensation manual, which included meeting specific deadlines, organize and manage a group of seven staff from around the country to develop, draft, and finalize manual on time.

- Maintained an awareness and understanding of electricity policy developments across the country, including at national and state level; provide an analysis of these developments for Commissioners.

SENIOR REGULATORY ANALYST

California Public Utilities Commission

MARCH 2006- APRIL 2015

San Francisco, CA

Major Accomplishments:

- Staff lead on Commission Smart Grid rulemaking: responsible for coordinating Staff work on rulemaking, working with ALJ and Assigned Commissioner's Office, organizing and facilitating workshops on a number of Smart Grid-related topics, including cybersecurity, privacy, customer data access and other customer issues, and ensuring proceeding met legislatively mandated time-frame.
- Prepared initial Orders Instituting Rulemaking on energy storage, rate design reform, and Smart Grid, and assisted in completion of final Commission decisions on Smart Grid, rate design, customer access to data, and privacy.
- Named as a Top 50 Smart Grid Pioneers for 2013 by Smart Grid Today.
- Managed and facilitated Commission workshops on emerging topics, such as privacy, cybersecurity, energy storage, and customer data access.
- Provided lead and support analysis on many electricity issues affecting customers, market participants, and utilities, including dynamic pricing, demand response, energy efficiency, rate design, electric energy storage, direct access and retail/wholesale integration.
- Responsible for monitoring activities, preparing analyses of policies, and preparing and submitting comments related to specific subject areas before FERC, U.S. Congress, California State Legislature, CEC, DOE, NIST, and Office of Science and Technology Policy.
- Participated in standard making process, and prepared and submitted comments to FERC, NIST, and NAESB.
- Chair of NAESB Energy Services Provider Interface Task Force, and a member of NAESB Executive Committee.
- Lead author and contributor on White Papers related to several emerging topics, such as Pre-Pay, cybersecurity, and microgrids.
- Presented at conferences on updates and summaries of Commission position on Smart Grid issues, such as customer education, privacy, cybersecurity, customer access to usage, rate design and tariffs, and general regulatory policy.

PARALEGAL

Patton Boggs

NOVEMBER 2005-FEBRUARY 2006

Washington, D.C.

- Performed research at FERC, other Federal agencies, Congressional legislative history, and various state agencies.
- Cite-check, proofread, and shepardize pleadings filed at FERC and various U.S. Courts of Appeals.
- Organized and maintained discovery files.

PARALEGAL

McCarthy, Sweeney & Harkaway

JULY 2004- OCTOBER 2005

Washington, D.C.

- Performed research for FERC, other Federal agencies, U.S. Congress, state legislatures and state regulatory agencies.
- Obtained and summarized pleadings filed at FERC and courts for clients and attorneys.
- Performed energy-related research (*e.g.*, monitor Energy news, obtain FERC and U.S. Court cases and opinions) and maintained extensive knowledge of many energy issues (*e.g.*, RTOs, deregulation/competition, and California/Pacific Northwest refund proceedings at FERC and U.S. Courts).
- Prepared testimony and discovery-related materials for hearing before FERC Administrative Law Judge, and provided proofreading, cite-checking, and shepardizing assistance for documents filed at FERC, U.S.

- Supreme Court, U.S. Court of Appeals and U.S. District Courts.
- Prepared briefs and appendices, and maintained and organized case files for proceedings before FERC and U.S. Court of Appeals.
- Monitored energy-related legislation and hearings before U.S. Congress and state legislatures, as well as energy-related activities at state PUC levels (*e.g.*, electric competition/deregulation activities).

PARALEGALMARCH 2003- JUNE 2004*Duane Morris, LLP**Washington, D.C.*

- Performed research at FERC and other Federal agencies. Monitored FERC meetings and prepared summaries of meeting for attorneys and clients.
- Obtained and summarized pleadings filed at FERC and courts for clients and attorneys.
- Performed energy-related research (*e.g.*, monitor Energy news, obtain FERC and U.S. Court cases and opinions) and maintained knowledge base on many energy issues (*e.g.*, RTOs, deregulation/competition, and California/Pacific Northwest refund proceedings at FERC and U.S. Courts).
- Prepared testimony and discovery-related materials for hearing before FERC Administrative Law Judge, and provided proofreading, cite-checking, and shepardizing assistance for documents filed at FERC, U.S. Supreme Court, U.S. Court of Appeals, and U.S. District Courts.
- Monitored energy-related legislation and hearings before U.S. Congress and state legislatures, as well as energy-related activities at state PUC levels (*e.g.*, electric competition/deregulation activities).

LEGAL ASSISTANTAPRIL 2001-MARCH 2003*McGuireWoods LLP**Washington, D.C.*

- Performed research at FERC and other Federal agencies. Monitored FERC meetings and prepared summaries of meeting for attorneys and clients.
- Performed energy-related research (*e.g.*, monitor energy news, obtain FERC and U.S. Court cases and opinions) and responsible for monitoring energy issues for attorneys (*e.g.*, RTOs, deregulation/competition, generation interconnection, and California/Pacific Northwest refund proceedings at FERC and U.S. Courts).
- Prepared testimony and discovery-related materials for hearing before FERC Administrative Law Judge, and provided proofreading, cite-checking, and shepardizing assistance for documents filed at FERC, U.S. Supreme Court, U.S. Court of Appeals for D.C. Circuit and 9th Circuit, and U.S. District Court for D.C.
- Monitored energy-related legislation and hearings before U.S. Congress and state legislatures, as well as energy-related activities at state PUC levels (*e.g.*, electric competition/deregulation activities).

ENERGY SPECIALISTMARCH 1998- APRIL 2001*Verner, Liipfert, Bernhard, McPherson, & Hand**Washington, D.C.*

- Performed research at FERC, SEC, Library of Congress, U.S. Congress, NRC, Department of Interior, National Archives, EPA, U.S. Supreme Court, U.S. Court of Appeals for D.C. Circuit, U.S. District Court for D.C., and other state agencies.
- Performed and monitored energy and environmental-related research.
- Made filings at FERC, U.S. Court of Appeals for D.C. Circuit, U.S. District Court for D.C., and SEC.
- Provided proofreading assistance, including cite-checking and shepardizing of documents.
- Attended U.S. Congress hearings on Energy issues and summarized for attorneys.
- Organized and maintained Energy Group library and trade press.
- Supervised Energy Group Summer intern.

EDUCATION

BACHELOR OF ARTS IN HISTORY
Baylor University

1993-1997
Waco, Texas

ASSOCIATIONS

- Board of Directors, Minnesota Conservative Energy Forum
- Board of Directors, Minnesota Solar Energy Industries Association
- Associate Member, GridWise Architecture Committee
- Planning Commission, City of Eden Prairie, MN (2017-2020)
- Board of Directors, Emeritus, North American Energy Standard Board
- Executive Committee, Emeritus, Retail Markets Quadrant, North American Energy Standards Board
- Board of Directors, Emeritus, Smart Grid Consumer Collaborative
- Chair, Staff Subcommittee on Rate Design, National Association of Regulatory Utility Commissioners (November 2015-April 2017)
- Co-Chair, Business and Policy Domain Expert Working Group, Smart Grid Interoperability Panel (2014-2016)

PUBLICATIONS

- *Investigating Interoperability for Electric Vehicles: A Case Study from Connecticut*, National Association of Regulatory Utility Commissioners, on behalf of the Connecticut Public Utilities Regulatory Authority (October 2021)
[http://www.dpuc.state.ct.us/2nddockcurr.nsf/4b3c728dd1c0d642852586db0069aa70/4bbe04558990992285258764005afb5e/\\$FILE/NARUC%20CT%20Case%20Study%20on%20EV%20Interoperability-submission.pdf](http://www.dpuc.state.ct.us/2nddockcurr.nsf/4b3c728dd1c0d642852586db0069aa70/4bbe04558990992285258764005afb5e/$FILE/NARUC%20CT%20Case%20Study%20on%20EV%20Interoperability-submission.pdf)
- *AMI in Review: A Lens into an Unfolding Future*, T&D World (March 5, 2021)
<https://www.tdworld.com/smart-utility/metering/article/21157103/ami-in-review-a-lens-into-an-unfolding-future>
- *Enabling and Benefiting from Distributed Energy Resources in Texas*, R Street Policy Study No. 211, R Street Institute (November 2020)
<https://www.rstreet.org/wp-content/uploads/2020/11/Final-No-211-DERs.pdf>
- *Net Metering and Distributed Energy Resources Policy: R Street Shorts No. 93*, R Street Institute (August 2020)
<https://www.rstreet.org/wp-content/uploads/2020/08/Short-No.-93-Net-Metering.pdf>
- *AMI in Review: Informing the Conversation*, U.S. Department of Energy, Advanced Grid Research (July 2020)
https://smartgrid.gov/files/documents/AMI_Report_7_8_20_final_compressed.pdf
- *Smart Grid Interoperability: Prompts for State Regulators to Engage Utilities*, National Association of Regulatory Utility Commissioners (April 2020).
<https://pubs.naruc.org/pub/28950636-155D-0A36-313C-73CCEA2D32C1>
- *Framework and Roadmap for Smart Grid Interoperability Standards Regional Roundtables Summary Report*, NISTIR 8284, National Institute of Standards and Technology, *et al.* (February 2020).
<https://doi.org/10.6028/NIST.IR.8284>

- *Distributed Energy Resources Rate Design and Compensation Manual*, National Association of Regulatory Utility Commissioners, Staff Subcommittee on Rate Design (November 10, 2016).
<http://pubs.naruc.org/pub/19FDF48B-AA57-5160-DBA1-BE2E9C2F7EA0>
- *Microgrids: A Regulatory Perspective*, California Public Utilities Commission, Policy and Planning Division (April 14, 2014).
<http://www.cpuc.ca.gov/NR/rdonlyres/01ECA296-5E7F-4C23-8570-1EFF2DC0F278/0/PPDMicrogridPaper414.pdf>
- *Utility Investment Valuation Strategies: A Case for Adopting Real Options Valuation*, California Public Utilities Commission, Policy and Planning Division (October 3, 2013).
<http://www.cpuc.ca.gov/NR/rdonlyres/D5C63A2B-40F2-468D-964A-F265B90346B1/0/Final2RRM.pdf>
- *Cybersecurity and the Evolving Role of State Regulation: How it Impacts the California Public Utilities Commission*, California Public Utilities Commission, Grid Planning and Reliability/Policy and Planning Division Policy Paper (September 19, 2012).
<http://www.cpuc.ca.gov/NR/rdonlyres/D77BA276-E88A-4C82-AFD2-FC3D3C76A9FC/0/TheEvolvingRoleofStateRegulationinCybersecurity9252012FINAL.pdf>
- *A Review of Pre-Pay Programs for Electricity Service*, California Public Utilities Commission, Policy and Planning Division Policy Paper (July 26, 2012).
<http://www.cpuc.ca.gov/NR/rdonlyres/152ED1D4-DD85-4D6F-984B-B84847933A18/0/Prepaypolicypaper0712.pdf>
- *Electric Energy Storage: An Assessment of Potential Barriers and Opportunities*, California Public Utilities Commission, Policy and Planning Division (July 9, 2010).
<http://www.cpuc.ca.gov/NR/rdonlyres/71859AF5-2D26-4262-BF52-62DE85C0E942/0/CPUCStorageWhitePaper7910.pdf>

TESTIMONY

- *In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution*, Direct Testimony of Christopher Villarreal on Behalf of Michigan Environmental Council, Natural Resources Defense Council, and Sierra Club, before the Michigan Public Service Commission, Case No. U-20134 (September 10, 2018)
<https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000002ftVkAAI>
- *In the matter of the application of DTE ELECTRIC COMPANY for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority*, Direct Testimony of Christopher Villarreal on Behalf of Michigan Environmental Council, Natural Resources Defense Council, and Sierra Club, before the Michigan Public Service Commission, Case No. U-20162 (November 7, 2018)
<https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t000000329ckAAA>
- *Application of Duke Energy Carolinas, LLC for Adjustments in Electric Rate Schedules and Tariffs and Request for an Accounting Order*, Direct Testimony of Christopher Villarreal on Behalf of South Carolina Solar Business Alliance, before the Public Service Commission of South Carolina, Docket No. 2018-319-E (February 26, 2019)
<https://dms.psc.sc.gov/Attachments/Matter/499c7e9c-65b6-4469-afbd-9d7614711b84>

- *Application of Duke Energy Progress, LLC for Adjustments in Electric Rate Schedules and Tariffs and Request for an Accounting Order*, Direct Testimony of Christopher Villarreal on Behalf of South Carolina Solar Business Alliance, before the Public Service Commission of South Carolina, Docket No. 2018-318-E (March 1, 2019)
<https://dms.psc.sc.gov/Attachments/Matter/ce0917d7-35f2-4bb0-8715-5c2345a5026c>
- *In the matter of the Application of Indiana Michigan Power Company for authority to increase its rates for the sale of electric energy and for approval of depreciation rates and other related matters*, Direct Testimony of Christopher Villarreal on Behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, before the Michigan Public Service Commission, Case No. U-20359 (October 17, 2019)
<https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t00000077IYRAA2>
- *In the matter of the Application of DTE Electric Company for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority*, Direct Testimony of Christopher Villarreal on Behalf of the Environmental Law & Policy Center and the Natural Resources Defense Council, before the Michigan Public Service Commission, Case No. U-20561 (November 6, 2019)
<https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000007X6ZiAAK>
- *In the matter of the Application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief*, Direct Testimony of Christopher Villarreal on Behalf of Michigan Environmental Council, Natural Resources Defense Council, Sierra Club, and Citizens Utility Board of Michigan, before the Michigan Public Service Commission, Case No. U-20697 (June 24, 2020).
<https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t000000CIwhzAAD>
- *In the matter of the Application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief*, Direct Testimony of Christopher R. Villarreal on Behalf of Michigan Environmental Council, Natural Resources Defense Council, Sierra Club, and Citizens Utility Board of Michigan, before the Michigan Public Service Commission, Case No. U-20963 (June 22, 2021).
<https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t000000Pvx0LAAR>
- *Electric Distribution Utilities Electric Vehicle Time of Use Rates*, Direct Testimony of Christopher R. Villarreal on Behalf of Clean Energy New Hampshire and Conservation Law Foundation, before the New Hampshire Public Utilities Commission, Docket No. DE 20-170 (October 13, 2021).
https://www.puc.nh.gov/Regulatory/Docketbk/2020/20-170/TESTIMONY/21-170_2021-10-13_CENH_CLF_DIR-TESTIMONY-VILLARREAL.PDF
- *Application of Nevada Power Company d/b/a NV Energy and Sierra Pacific Power Company d/b/a NV Energy for approval of their joint Economic Recovery Transportation Electrification Plan*, Testimony of Christopher R. Villarreal on Behalf of Bureau of Consumer Protection, before the Public Utilities Commission of Nevada, Docket No. 21-09004 (October 25, 2021).
http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2020_THRU_PRESENT/2021-9/13470.pdf
- *Unitil Energy Systems, Inc.*, Direct Testimony of Christopher R. Villarreal on Behalf of Clean Energy New Hampshire and Conservation Law Foundation, before the New Hampshire Public Utilities Commission, Docket No. DE 21-030 (November 23, 2021).
https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-030/TESTIMONY/21-030_2021-11-23_CENH_CLF_TESTIMONY-VILLARREAL.PDF

- *Petition of NSTAR Electric Company d/b/a Eversource Energy for approval of its Grid Modernization Plan for calendar years 2022 to 2025, et al.*, Direct Testimony of Christopher R. Villarreal on behalf of the Conservation Law Foundation, before the Massachusetts Department of Public Utilities, D.P.U. 21-80, *et al.* (January 14, 2022).
<https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/14405896>
- *In the Matter of the Application of Public Service Company of Colorado for Approval to Amend the Certificate of Public Convenience and Necessity for its Advanced Grid Intelligence and Security (AGIS) Initiative*, Cross Answer Testimony of Christopher R. Villarreal on Behalf of Colorado Solar and Storage Association and Solar Energy Industries Association, before the Colorado Public Utilities Commission, Proceeding No. 21A-0279E (January 25, 2022).
https://www.dora.state.co.us/pls/efi/efi.show_document?p_dms_document_id=964954&p_session_id=

Public Service Company of New Hampshire d/b/a Eversource Energy
Docket No. DE 21-078

Date Request Received: November 15, 2021
Data Request No. CLF 1-04

Date of Response: December 03, 2021
Page 1 of 1

Request from: Conservation Law Foundation

Witness: Davis, Edward A

Request:

Please explain why Eversource's demand charge alternative rate in this docket is designed for utilization of up to 10 percent? Did Eversource consider designing its demand charge alternative based on a different and/or higher utilization rate and, if, so, why was this not selected? If other utilization rates were considered, please provide any analyses performed or work papers created by the Company in relation to such evaluations

Response:

The Company selected 10% 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. This midpoint was selected because it is during the initial period (e.g., the first 3-4 years; see figures 2-3, testimony of Davis, Rice and Boughan, Bates 22 and 23) that low utilization and sensitivity to demand charges was considered to be greatest. Various levels of utilization were considered, but as different levels are applied, the effective rate per kWh also changes. Thus, another consideration is whether a higher or lower rate per kWh than that proposed would be appropriate. The 10% utilization rate also strikes the best balance regarding rate per kWh for charging stations during the initial period. Then once a 10% utilization rate is reached, a switch to Rate GV could be made by customers to avoid higher costs than would be incurred on the demand charge alternative at utilization rates above 10%. With data collected from a sufficient number of stations taking service under the proposed demand charge alternative, further evaluation could be made regarding the utilization levels and ramp rates, the volumetric rate design, cost of providing service, and more detailed utilization characteristics to determine whether it's appropriate to continue the rate offering as is, modify the rate design, or develop a successor rate design reflecting information gathered and evolution of the market.

Public Service Company of New Hampshire d/b/a Eversource Energy
Docket No. DE 21-078

Date Request Received: November 15, 2021
Data Request No. CLF 1-01

Date of Response: December 03, 2021
Page 1 of 1

Request from: Conservation Law Foundation

Witness: Davis, Edward A

Request:

Please provide the duration of the demand charge alternative proposed in this docket? How was this determined? Did Eversource consider a longer duration for its demand charge alternative proposal and, if so, why is that not proposed in this docket?

Response:

The Company's demand charge alternative is intended to be implemented in the near term, as a complement to the Company's make ready proposal. The demand charge alternative remains integral to the make ready program, as each is necessary for the success of the other. As discussed in the prefiled testimony in this docket (Testimony of Edward A. Davis, Brian J. Rice and Kevin M. Boughan, Bates 25-27), the proposal is intended to address immediate customer needs and the state's goals and provide a demand charge alternative to currently available rates that include demand charges, as those charges currently present a market barrier to potential commercial charging customers in New Hampshire. The Company has not proposed a sunset on the term of service for the demand charge alternative. While the Company has not proposed a duration for the rate offering, the duration of the rate could be limited based on purpose, particularly to support near-term market growth, with a successor rate designed around future goals and objectives as the market develops. As indicated in the portion of testimony cited above, the Company recognizes there are existing and evolving alternatives and market growth that will occur over time, and that "variations of its proposed design or consideration of more complex approaches may be more suited for development of next generation designs, following deployment and growth of public EV charging applications in New Hampshire." See also, Bates 26, line 12 through Bates 27, line 6.

Public Service Company of New Hampshire d/b/a Eversource Energy
Docket No. DE 21-078

Date Request Received: November 15, 2021
Data Request No. CLF 1-06

Date of Response: December 03, 2021
Page 1 of 1

Request from: Conservation Law Foundation

Witness: Davis, Edward A

Request:

Also at the October 25, 2021 technical session, Eversource's witnesses described how it defines utilization rate. Please provide that description in writing.?

Response:

For purposes of the Company's projection and illustrations of public charging (e.g., Figure 2 in pre-filed testimony, Bates 22) and billing, utilization rate represents the load factor of a charging station. Thus, in the year 2025 in Figure 2, a station with a peak demand of 200 kW and average monthly usage of 14,600 kWh has a 10% load factor, or utilization rate ($14,500 \text{ kWh} / (200 \text{ kW} \times 730 \text{ hours})$). The terms "load factor" ("Annual LF") in the figure, and "utilization rate" in testimony were used interchangeably in this context. To the extent utilization rate refers to the amount of kWh usage relative to the total capacity of a station, individual charging port or otherwise, it would be important to state that context for clarity of understanding.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 20-170

Date Request Received: 08/13/2021

Date of Response: 08/27/2021

Request No. CLF-CENH 2-003

Page 1 of 1

Request from: Conservation Law Foundation & Clean Energy New Hampshire

Witness: Kevin Boughan, Michael R. Goldman

Request:

Please explain whether Eversource has conducted any forecasts of expected EV adoption levels in its service territory for the next 2-, 5-, and/or 10-year periods. At the August 9, 2021 technical session, Eversource noted that it had conducted forecasts in developing its demand charge alternative proposal and for a separate NH PUC proceeding earlier this year. Please produce these forecasts, as well as any other forecasts that Eversource has conducted regarding expected EV adoption levels.

Response:

Yes, the Company annually conducts an internal forecast of expected EV adoption levels in its service territory in New Hampshire. The latest, prepared in September of 2020 forecasts baseline adoption through 2030, and is included below as Attachment 1.

In developing its demand charge alternative proposal, the Company was informed by the typical load factor forecast for a DC Fast Charger as estimated by the Rocky Mountain Institute in its February, 2020 report "DCFC RATE DESIGN STUDY FOR THE COLORADO ENERGY OFFICE" (Attachment 2), page 5:

- *"A 5% utilization rate for the first three years to represent a typical public DCFC load in today's early EV market*
- *A 10% utilization rate for the next three years to represent what a typical public DCFC load might be when the market begins to grow*
- *A 30% utilization rate for the next four years to represent what a typical public DCFC load might look like as the market matures"*

Eversource Baseline NH EV Forecast (Fall 2020)

Year	Vehicles in Operation (cumulative)		
	BEV	PHEV	Total
2011	3	27	30
2012	45	218	263
2013	146	405	551
2014	229	542	771
2015	294	658	952
2016	374	827	1,201
2017	484	1,217	1,701
2018	980	1,624	2,604
2019	1,656	1,841	3,497
2020	2,214	2,111	4,325
2021	3,070	2,507	5,577
2022	3,940	2,579	6,519
2023	4,890	2,468	7,358
2024	5,682	2,423	8,104
2025	7,312	2,951	10,263
2026	9,269	3,507	12,775
2027	11,617	4,089	15,706
2028	13,691	4,342	18,032
2029	16,514	4,714	21,228
2030	19,716	4,993	24,709

Methodology uses the following national factors:

- Battery and gas price forecasts
- New model release plans
- Federal tax and emissions standards policies

And the following regional / state factors:

- State ZEV / GWSA commitments
- Regional energy price forecasts
- State vehicle / charger rebate programs and policies
- Planned / expected EVSE investment

Other Notes:

- Historical to 2017 figures based on Auto Alliance (grey)
- Incorporates fleet turnover
- Accounts for pandemic related slowdown in vehicle sales

Baseline forecast for a nascent market – will be revised often as more information becomes available