The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

May 12, 2020

Debra A. Howland, Executive Director
State of New Hampshire
Public Utilities Commission
2l S. Fruit Street, Suite 10
Concord, New Hampshire 03301-2429

RE: Docket No. IR 20-004, Investigation into Rate Design Standards for Electric Vehicle Charging Stations and Electric Vehicle Time of Day Rates

NHDES Comments on Staff Recommendations Regarding Investigation of Electric Vehicle Rate Design Standards, Electric Vehicle Time of Day Rates for Residential and Commercial Customers, Issued on April 3, 2020.

Dear Director Howland:

Thank you for the opportunity to provide written comments relative to the Public Utility Commission (PUC) Docket No. IR 20-004 “Investigation into Rate Design Standards for Electric Vehicle Charging Stations and Electric Vehicle Time of Day Rates” that was issued by Commission on January 16, 2020 and the document “IR 20-004 Recommendations Regarding Investigation of Electric Vehicle Rate Design Standards, Electric Vehicle Time of Day Rates for Residential and Commercial Customers” that was filed by Commission Staff on April 3, 2020.

NHDES is responsible for implementing laws, regulations, and policies that are protective of public health and the environment. Our air quality is directly impacted by our energy use. The transportation sector is the single largest source of air pollution in New Hampshire and in the region, emitting 54 percent of the oxides of nitrogen (NOx) that contribute to ground level ozone in 2017.[1] For the same year, the transportation sector in New Hampshire was responsible for 47 percent of the total greenhouse gas (GHG) emissions, and 42 percent of the total end-use energy.[2] Electric vehicles (EV) present economic, energy, and environmental opportunities for the state and the region by reducing overall energy consumption, reliance on energy imports from out of region, and the emission of, air pollutants, and NHDES actively supports this technology. The number of EVs on U.S. roads is projected to reach 18.7 million in 2030, up from 1 million at the end of 2018.[3]

[1] NHDES calculations May 2020, using US EPA 2017 National Emissions Inventory, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei, (Last accessed May 11, 2020).

[2] NHDES calculations February 2019, using US DOE State Energy Data System (SEDS): 1960-2017 https://www.eia.gov/state/seds/seds-data-complete.php?sid=NH, (Last accessed February 14, 2020).

[3] EEI and IEI (2018). Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030, Edison Electric Institute and the Institute for Electric Innovation, https://www.edisonfoundation.net/iei/publications/Documents/IEI_EEI%20EV%20Forecast%20Report_Nov2018.pdf, (Last accessed May 8, 2020).

In comparison to gasoline and diesel vehicles, EVs operating in the Northeast emit fewer NOx and GHG emissions, even while accounting for power plant emissions from charging the batteries. This is due, in part, to the fact that the electric grid in the Northeast is relatively "clean" in comparison to other regions, and because EVs use energy much more efficiently than internal combustion engine (ICE) vehicles, using 25 percent of the energy of a conventional ICE vehicle to travel the same distance.[4] As the ISO-New England grid becomes even cleaner, due to the transition to natural gas, and through the interconnection of distributed energy resources (DERs) and large renewable energy projects, the net environmental benefit of EVs will grow.

Currently, EVs are a small but rapidly growing part of the overall NH vehicle fleet. However, EVs can represent a relatively large percentage of electric load. While EVs reduce overall energy consumption in comparison to gasoline powered vehicles, residential EV charging can draw nearly 50 percent more power than even the most energy-intensive residential appliances. Absent price signals, a typical EV owner is likely to plug their vehicle into their home charger when they arrive home from work. This typically coincides with the evening peak demand. If charged during a time of peak demand with a standard Level 2 charger, an EV's load can be roughly equivalent to that of an entire household.[5] Currently, EV drivers do more than 80 percent of their charging at home.[6]

As EVs continue to increase as a percentage of the New Hampshire fleet and in the number of vehicles carrying visitors to the state, the rise in electric power consumption has the potential, if not properly managed, to increase the total ISO-NE daily and seasonal peaks, as well as New Hampshire's share of that peak.[7] A study from Norway, which had an EV market penetration of 10 percent as of fall 2018, showed that there is also danger in not planning for EV charging. The study found that controlled EV charging could be met with the existing distribution grid, but that uncontrolled EV charging could require grid investments of $100 to $200 billion for one city.[8] New Hampshire utilities should take EV growth projections into consideration to prevent any potential negative impact EV charging may have on the existing grid and to seek to reduce New Hampshire's peak demand in order to keep ratepayer costs down for New Hampshire residents and businesses.

Fortunately, EVs are effectively storage devices and as such there is a tremendous amount of flexibility as to when the vehicle charges.[9] Most drivers do not care when their EV gets charged, as long as the vehicle's battery is charged when it is needed. This is very different from other major residential electricity uses (*e.g.*, air conditioning) and creates the possibility of encouraging

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[4] US DOE (2019). All-Electric Vehicles, Office of Energy Efficiency & Renewable Energy, https://fueleconomy.gov/feg/evtech.shtml, (Last accessed April 18, 2019).

[5] Allison, A. and Whited, M. *(2017).* A Plug for Effective EV Rates: The Case for Supporting EVs, Synapse Energy Economics, https://www.synapse-energy.com/sites/default/files/A-Plug-for-Effective-EV-Rates-S66-020.pdf, (Last accessed May 5, 2020).

[6] US DOE (2020). Electric Vehicles: Charging at Home, Office Energy Efficiency and Renewable Energy, https://www.energy.gov/eere/electricvehicles/charging-home, (Last accessed May 1, 2020).

[7] Harper, C., McAndrews, G., and Sass Byrnett, D. (2019). Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators, National Association of Regulatory Utility Commissioners, https://pubs.naruc.org/pub/32857459-0005-B8C5-95C6-1920829CABFE, (Last accessed May 1, 2020).

[8] Hildermeier, J., Kolokathis, C., Rosenow, J., Hogan, M., Wiese, C., & Jahn, A. (2019). Start with Smart: Promising Practices For Integrating Electric Vehicles into the Grid, Regulatory Assistance Project, https://www.raponline.org/knowledge-center/start-with-smart-promisingpractices-integrating-electric-vehicles-grid/, (Last accessed May 5, 2020).

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

economically efficient and environmentally beneficial charging without inconveniencing consumers.[10]

Rates can have a significant influence on charging behavior and, therefore, can be used to encourage EV charging during off-peak demand periods.[11] By offering time-of-use (TOU) rates with strong price signals, utilities increase the likelihood that EV owners will hold off on charging until the daily peak has passed,[12,13] which will minimize impact on overall seasonal peak, as well as New Hampshire's share of the load. The implementation of EV TOU rates now, before EV numbers increase to a significant percentage of the on-road fleet and begin to register a negative impact to the grid, can better establish off-peak charging as the norm for EV owners from the very beginning.

While residential charging represents the majority of EV charging at present, the electrification of the vehicle fleet will additionally require substantial infrastructure investments to meet the public, workforce, and fleet charging needs in the future. Drivers concern about lack of available charging infrastructure is a significant barrier to EV adoption. Currently, there are approximately 24,000 charging stations in the U.S., compared with 150,000 gas stations. The lack of widespread charging stations leads to "range anxiety" and a chicken-and-egg problem for EV adoption.[14] One solution is increasing the availability of EV charging, particularly direct current fast chargers (DCFC).

However, under current tariffs, such charging is likely to be susceptible to demand charges, which can negatively affect the economics behind EV supply equipment (EVSE) installation. Alternatives to demand charges that do not result in cost shifting, and that recognize the needs of this emerging technology, should be developed to allow good investments while ensuring that these installations will contribute equitably to system costs in the long run.[15]

NHDES views TOU rates and demand charges as the most significant influences on EV charging behavior and EV adoption in the near term, and as such have limited its comments to these rate design mechanisms at this time. The department strongly supports the adoption of TOU rates, with strong price signals, and the development of an alternative to demand charges. More specific comments on each of the specific sections in the April 3 Staff Recommendations document are below.

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[10] Allison, A. and Whited, M. (2017). A Plug for Effective EV Rates: The Case for Supporting EVs, Synapse Energy Economics, https://www.synapse-energy.com/sites/default/files/A-Plug-for-Effective-EV-Rates-S66-020.pdf, (Last accessed May 5, 2020).

[11] RAP (2017). Getting from Here to There: Regulatory Considerations for Transportation Electrification, Regulatory Assistance Project, https://www.raponline.org/wp-content/uploads/2017/06/RAP-regulatory-considerations-transportationelectrification-2017-may.pdf, (Last accessed May 1, 2020).

[12] Harper, C., McAndrews, G., and Sass Byrnett, D. (2019). Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators, National Association of Regulatory Utility Commissioners, https://pubs.naruc.org/pub/32857459-0005-B8C5-95C6-1920829CABFE, (Last accessed May 1, 2020).

[13] NESCAUM (2018). Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018 – 2021, Northeast States for Coordinated Air Use Management, https://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/download, (Last accessed April 20, 2020).

[14] Kadoch, C. (2020). Roadmap for Electric Transportation: Policy Guide, Regulatory Assistance Project, https://www.raponline.org/EV-roadmap/, (Last accessed May 5, 2020).

[15] Rushlow, J., Coplon-Newfield, G., LeBel, M., & Norton, E. (2015). Charging Up: The Role of States, Utilities, and the Auto Industry in Dramatically Accelerating Electric Vehicle Adoption in Northeast and Mid-Atlantic States. Conservation Law Foundation, Sierra Club and Acadia Center, https://acadiacenter.org/wp-content/uploads/2015/10/ChargingUp_DIGITAL_ElectricVehicleReport_Oct2015.pdf, (Last accessed May 7, 2020).

NHDES Comments On PUC Staff Recommendations

PUC Recommendations - Section II. Rate Design Standards for Electric Vehicle Charging Stations

A. Cost of Service

NHDES supports with Staff's recommendation that rate design should continue under the cost of service standard.

B. Prohibition of Declining Block Rates

NHDES supports Staff's recommendation that declining block rates be prohibited for separately metered EVSE.

NHDES recommends that for General Service (GS) rate customers, who elect to install EVSE behind the GS account meter, future consideration should be given to how to incentivize "smart charging"[16] and other demand management strategies for fleet vehicles and workplace charging.

Over the next decade, as fleet electrification and workplace charging becomes may be a significantly larger issue leading to far higher daytime charging rates. The intent of TOU rates is to apply a price signal that shifts EV charging to off peak periods when energy is less expensive and lower-emitting power generation sources are being used. As workplace and fleet charging becomes more established, declining block rates may send an inappropriate price signals. While these rates may confer fleet side cost operating cost reductions, they could also lead to significant daytime charging, impacting the load on the local distribution network, and the overall system load and system peak. Consideration should be given for how to mitigate the potential electrical system impacts arising from those sites that utilize GS rates in advance of real issues arising.

C. Time of Day Rates

NHDES supports Staff's recommendation that the Commission issue guidance supporting TOU rates as an appropriate rate design component for electric vehicle charging. As noted below, NHDES recommends that each utility be required to offer off-peak, mid-peak, and critical-peak rates, with seasonal TOU generation, transmission and distribution components.

TOU rates have the potential to influence flexible load, and also have the potential to improve all-around load factor, by shifting consumption and demand to the times of day when the generation, distribution, and transmission systems are significantly underutilized.[17] By offering TOU rates with strong price signals, utilities increase the likelihood that EV owners will, when able, hold

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[16] Smart charging, sometimes referred to as managed charging refers to "is a system in which two-way advanced charging infrastructure, usually in residential or multifamily buildings, is actively used by utilities or other third parties to control when charging occurs, similar to traditional demand response programs," in Harper, C., McAndrews, G., and Sass Byrnett, D. (2019). Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators, National Association of Regulatory Utility Commissioners, https://pubs.naruc.org/pub/32857459-0005-B8C5-95C6-1920829CABFE, (Last accessed May 11, 2020).

[17] Salisbury, M. and Toor, W. (2016). How Leading Utilities are Embracing Electric Vehicles, Southwest Energy Efficiency Project, http://www.swenergy.org/data/sites/1/media/documents/publications/documents/How_Leading_Utilities_Are_Embracing_EVs_Feb-2016.pdf, (Last accessed February 19, 2020).

off on charging until the daily peak has passed,[18,19] which will minimize impact on overall seasonal peak, as well as New Hampshire's share of the load. The implementation of EV TOU rates now, before EV numbers increase to a significant percentage of the on-road fleet and begin to register a negative impact to the grid, can better establish off-peak charging as the norm for EV owners from the very beginning.

Time-sensitive rates reflect the different cost of providing electricity at different times of the day and signal this price difference to consumers.[20] If EV customers with time-sensitive rates decide to ignore price signals, then they will pay for the electricity at a higher-than-average price that reflects the higher-than-average system costs. This protects non-EV customers, and EV customers who are responding to the price signals, from subsidizing the costs that other EV customers are imposing on the system during peak periods.[21]

By using well-designed rates to encourage customers to shift their demand to less expensive times, utilities can make more efficient use of grid resources.[22] EVs can take advantage of those hours when the grid is lightly loaded to improve utilization of grid assets.[23] In addition, TOU rates may reduce the need for costly distribution system upgrades that could be needed in areas with denser EV penetration were EV charging behavior to remain unmanaged.[24,25]

This concept was supported by a recent study conducted for the New Hampshire Department of Business and Economic Affairs that noted,

> "*If the vehicles can be primarily charged off-peak (accomplished through time-of-use pricing or time-of-use incentives), then all ratepayers, not just the EV owners, will benefit*

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[18] Harper, C., McAndrews, G., and Sass Byrnett, D. (2019). Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators, National Association of Regulatory Utility Commissioners, https://pubs.naruc.org/pub/32857459-0005-B8C5-95C6-1920829CABFE, (Last accessed May 1, 2020).

[19] NESCAUM (2018). Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018 – 2021, Northeast States for Coordinated Air Use Management, https://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/download, (Last accessed February 20, 2020).

[20] Rushlow, J., Coplon-Newfield, G., LeBel, M., & Norton, E. (2015). Charging Up: The Role of States, Utilities, and the Auto Industry in Dramatically Accelerating Electric Vehicle Adoption in Northeast and Mid-Atlantic States*.* Conservation Law Foundation, Sierra Club and Acadia Center, https://acadiacenter.org/wp-content/uploads/2015/10/ChargingUp_DIGITAL_ElectricVehicleReport_Oct2015.pdf, (Last accessed May 7, 2020).

[21] RAP (2017). Getting from Here to There: Regulatory Considerations for Transportation Electrification, Regulatory Assistance Project, https://www.raponline.org/knowledge-center/getting-fromhere-to-there-regulatory-considerations-for-transportation-electrification, (Last accessed May 8, 2020).

[22] Rushlow, J., Coplon-Newfield, G., LeBel, M., & Norton, E. (2015). Charging Up: The Role of States, Utilities, and the Auto Industry in Dramatically Accelerating Electric Vehicle Adoption in Northeast and Mid-Atlantic States*.* Conservation Law Foundation, Sierra Club and Acadia Center, https://acadiacenter.org/wp-content/uploads/2015/10/ChargingUp_DIGITAL_ElectricVehicleReport_Oct2015.pdf, (Last accessed May 7, 2020).

[23] Kadoch, C. (2020). Roadmap for Electric Transportation: Policy Guide*,* Regulatory Assistance Project, https://www.raponline.org/EV-roadmap/, (Last accessed May 5, 2020).

[24] Evaluating Electric Vehicle Infrastructure in New Hampshire, July 2019, https://www.nh.gov/osi/resource-library/documents/nh-ev-infrastructure-analysis.pdf, (Last accessed April 20, 2020).

[25] Hildermeier, J., Kolokathis, C., Rosenow, J., Hogan, M., Wiese, C., & Jahn, A. (2019). Start with Smart: Promising Practices for Integrating Electric Vehicles into the Grid*.* Regulatory Assistance Project, https://www.raponline.org/knowledge-center/start-with-smart-promisingpractices-integrating-electric-vehicles-grid/, (Last accessed May 5, 2020).

> *from downward pressure on electricity rates as utilities achieve greater utilization of their assets.*"[26]

1. Whole Facility/House Meter vs. Separate Meter

NHDES supports the recommendation that separate meters be provided for customers to enroll in the electric vehicle rate class.

NHDES recommends that customers have the option to take electric service for the home and EV from a single drop and apply the TOU rate across all electric use.

NHDES also recommends consideration of the recommendation of the Office of the Consumer Advocate's consultant, Ron Nelson, in the Liberty Utility rate case (DE 19-064):

> "*The incremental cost of the [secondary] EV meter should be classified as demand related and allocated to the mid-peak and critical peak periods to strengthen the price signal*."[27]

Mr. Nelson's recommendation would have the customer charge cut nearly in half with the difference allocated to peak periods. This redistribution would likely improve effectiveness of the TOU rates since the wider the divergence between on-peak and off-peak rates, the greater the likelihood that customers will respond to a TOU price signal.[28,29]

2. Alternatives to Secondary Meter

NHDES supports Staff's recommendation regarding the feasibility assessment of an alternative to a secondary utility-owned meter. The identification of an alternative to a utility owned meter could reduce overall system costs and reduce the customer charge associated with an EV TOU rate, thereby increasing the uptake of a TOU rate offering.

3. Energy Supply, Transmission, and Distribution

NHDES supports Staff's recommendation that time varying rates include components for generation, distribution, and transmission.

Shifting EV charging from peak to off peak periods has the potential to reduce the generation and transmission costs associated with the annual peak and, as a result, influence the rates for all New Hampshire ratepayers. Shifting EV charging to off-peak also can affect the distribution system

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[26] Evaluating Electric Vehicle Infrastructure in New Hampshire, July 2019, https://www.nh.gov/osi/resource-library/documents/nh-ev-infrastructure-analysis.pdf, (Last accessed April 20, 2020).

[27] Direct Testimony of Ron Nelson, https://www.puc.nh.gov/regulatory/docketbk/2019/19-064/testimony/19-064_2019-12-06_oca_testimony_nelson.pdf, BATES 74 (Last accessed April 22, 2020).

[28] Faruqui, A., Hledik, R., and Palmer, J. (2012). Time-Varying and Dynamic Rate Design, Regulatory Assistance Project, https://www.raponline.org/knowledge-center/time-varying-and-dynamic-rate-design/, (Last accessed May 5, 2020).

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

by reducing demand during peak periods and thereby avoiding costly system upgrades.[30,31] Such upgrades might be localized at first, but as EV penetration increases, the need for upgrades to the distribution network may increase across the system. By developing a TOU rate for each aspect of the rates, a stronger more effective price signal can be developed. As noted above, the wider the divergence between on-peak and off-peak rates, the greater the likelihood that customers will respond to a TOU price signal.[32] There is precedence for this in New Hampshire in the Liberty Utilities Battery Storage Docket which included an off peak, mid peak, and critical peak price for generation, distribution, and transmission for rate D-11.[33] A similar rate, with these three components, has been proposed as an EV rate in the Liberty Utilities rate case, DE 19-064.[34]

4. Consistency Among Utilities

NHDES supports Staff's recommendation regarding consistency of electric vehicles rates across the utilities.

5. Quantification of Incremental Costs

NHDES supports Staff's recommendation that each utility seeking approval of an electric vehicle TOU rate provide an assessment of incremental costs associated with that offering, including but not limited to those costs associated with billing, metering, and marketing.

NHDES agrees that the successful integration of a new technology onto the electric grid at scale will require an evaluation of the incremental costs associated with providing service. Further, understanding that cost will provide the means to evaluate the costs and benefits of alternative rates and load management measures that may be proposed or applied.

D. Seasonal Rates:

NHDES supports Staff preference for seasonally differentiated EV rates consistent with the underlying cost causation of summer and winter seasons.

Such rates would be reflective of the seasonal difference in electricity consumption and follows an already established process of Liberty Utilities battery storage pilot rate D-11.[35] Liberty Utilities

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30 Evaluating Electric Vehicle Infrastructure in New Hampshire, July 2019, https://www.nh.gov/osi/resource-library/documents/nh-ev-infrastructure-analysis.pdf, (Last accessed April 20, 2020).

31 Hildermeier, J., Kolokathis, C., Rosenow, J., Hogan, M., Wiese, C., & Jahn, A. (2019). Start with Smart: Promising Practices for Integrating Electric Vehicles into the Grid. Regulatory Assistance Project, https://www.raponline.org/knowledge-center/start-with-smart-promisingpractices-integrating-electric-vehicles-grid/, (Last accessed May 5, 2020).

32 Faruqui, A., Hledik, R., and Palmer, J. (2012). Time-Varying and Dynamic Rate Design, Regulatory Assistance Project, https://www.raponline.org/knowledge-center/time-varying-and-dynamic-rate-design/, (Last accessed May 5, 2020).

33 Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities, Updated Compliance Tariff No. 20, Rate D-11 Battery Storage Pilot, https://www.puc.nh.gov/regulatory/docketbk/2017/17-189/letters-memos-tariffs/17-189_2020-04-01_gsec_updated_compliance_tariff.pdf, (Last accessed May 5, 2020).

34 Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities, Electricity Delivery Service Tariff - NHPUC No. 21 (Filed April 30, 2019), https://www.puc.nh.gov/regulatory/docketbk/2019/19-064/initial%20filing%20-%20petition/19-064_2019-04-30_tariff_perm_rates.pdf, (Last accessed May 5, 2020).

35 Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities, Updated Compliance Tariff No. 20, Rate D-11 Battery Storage Pilot, https://www.puc.nh.gov/regulatory/docketbk/2017/17-189/letters-memos-tariffs/17-189_2020-04-01_gsec_updated_compliance_tariff.pdf, (Last accessed May 5, 2020).

has proposed a TOU EV rate, with seasonal components, in the Liberty Utilities rate case, DE 19-064 with a summer period from May 1 to October 31, and a winter period from November 1 to April 30.[36]

E. Interruptible Rates

NHDES supports Staff's recommendation regarding interruptible rates at this time. However, as EV penetration increases, interruptible rates should remain in consideration as they may be appropriate for certain applications.

F. Load Management Techniques

NHDES supports Staff's recommendation regarding load management techniques and agrees that utility managed charging should only be considered after implementation of a TOU rate. Load management may not be cost effective until there are higher EV adoption rates.

G. Demand Charges

NHDES support Staff's recommendation that utilities should explore alternatives to customer peak based demand charges and agree that demand charges are likely not justified in residential charging applications.

The purpose of demand charges is to encourage more uniform energy demand throughout the day and thereby avoid costly upgrades to the distribution network. Well-designed TOU rates are intended to perform the same function. Demand charges traditionally found in commercial and industrial (C&I) tariff structures were designed for large manufacturing facilities, which use electricity much more constantly than EV charging. As a result, they do not account well for the flexible nature of, nor the actual costs to serve, EV charging.[37]

The use of demand charges is likely to have a chilling effect on EV adoption in the state, affecting residents, businesses, and visitors alike with implications for the entire economy and the environment. Businesses may resist installing EVSE for workforce or customer charging in order to avoid the possibility of higher demand charges.[38] This could impact New Hampshire's tourism-based economy by discouraging visitors from surrounding states and provinces, all of whom have adopted to policies that support EV purchases.

Vehicle charging can cause spikes in demand, triggering a high demand charge. Demand charges can effectively become a fixed charge that cannot be avoided by better managing EV charging into lower cost times of day. For businesses subject to a demand charge in their tariff, installing vehicle charging can greatly increase their overall monthly utility bills, discouraging them from providing charging to employees or patrons. For potential owners and operators of electric

[36] Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities, Electricity Delivery Service Tariff - NHPUC No. 21 (Filed April 30, 2019), https://www.puc.nh.gov/regulatory/docketbk/2019/19-064/initial%20filing%20-%20petition/19-064_2019-04-30_tariff_perm_rates.pdf, (Last accessed May 5, 2020).

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

[38] Allison, A. and Whited, M. *(2017).* A Plug for Effective EV Rates: The Case for Supporting EVs, Synapse Energy Economics, https://www.synapse-energy.com/sites/default/files/A-Plug-for-Effective-EV-Rates-S66-020.pdf, (Last accessed May 5, 2020).

transportation technologies, including fleet operators, trucking companies and individual drivers, demand charge rates can lead to fuel costs that are greater than the costs of gasoline or diesel, which eliminates the potential economic benefit of electrified transportation.[39]

With today's EV market penetration and current public DCFC utilization rates, demand charges can be responsible for over 90 percent of electricity costs.[40] Therefore, the value proposition for third parties owning and operating DCFC limits the current availability of these chargers and prospects of additional investment. This results in fewer stations being built, reducing the viability of owning an EV, reducing the business case for owning DCFC, and the cycle continues. Alleviating the impact that demand charges have on profitability of DCFC stations, and thereby increasing their economic viability, is likely to result in a greater number of stations across the state. This issue has been documented independently.[41,42,43,44,45] To address this, DCFC chargers should be on tariffs with reduced, delayed, or no demand charges until the EV market matures and DCFC utilization rates are high enough that demand charges constitute a normal portion of monthly bills (*e.g.*, 30 percent rather than 90 percent).[46]

Even if utilized, non-coincident demand charges for EV charging may result in suboptimal energy, environmental, and economic outcomes, as demand charges do not provide any information regarding the hourly cost to generate electricity or the emissions associated with producing that electricity. While demand charges may result in charging behavior that avoids demand spikes and possibly avoid distribution system upgrades, they may no alleviate wider utility system costs and environmental impacts, if customers charge their vehicles more during system peak hours.[47]

NHDES asserts that alternatives to traditional demand charges are necessary for sites with separately metered EVSE, including high voltage DCFC stations, and/or sites with multiple Level 2

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

[40] Fitzgerald, G. and Nelder, C., (2017). EVgo Fleet and Tariff Analysis: Phase 1: California, Rocky Mountain Institute, https://rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf, (Last accessed May 7, 2020).

[41] Utility Dive (2019). PG&E Wants EV Demand Charges to Mimic Smartphone Plans. Regulators Are Skeptical, https://www.utilitydive.com/news/pge-wants-ev-demand-charges-to-mimic-smartphone-plans-regulators-are-skep/563757/, (Last accessed April 28, 2020).

[42] Fitzgerald, G. and Nelder, C., (2017). From Gas to Grid: Building Charging Infrastructure to Power Electric Vehicle Demand. Rocky Mountain Institute, https://rmi.org/insight/from_gas_to_grid/, (Last accessed May 11, 2020).

[43] Fitzgerald, G. and Nelder, C., (2017). EVgo Fleet and Tariff Analysis: Phase 1: California, Rocky Mountain Institute, https://rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf, (Last accessed May 7, 2020).

[44] Salisbury, M. and Toor, W. (2016). How Leading Utilities are Embracing Electric Vehicles, Southwest Energy Efficiency Project, http://www.swenergy.org/data/sites/1/media/documents/publications/documents/How_Leading_Utilities_Are_Embracing_EVs_Feb-2016.pdf, (Last accessed April 29, 2020).

[45] Allison, A. and Whited, M. (2017). A Plug for Effective EV Rates: The Case for Supporting EVs, Synapse Energy Economics, https://www.synapse-energy.com/sites/default/files/A-Plug-for-Effective-EV-Rates-S66-020.pdf, (Last accessed May 5, 2020).

[46] Fitzgerald, G. and Nelder, C., (2017). From Gas to Grid: Building Charging Infrastructure to Power Electric Vehicle Demand. Rocky Mountain Institute, https://rmi.org/insight/from_gas_to_grid/, (Last accessed May 11, 2020).

[47] Allison, A. and Whited, M. (2017). A Plug for Effective EV Rates: The Case for Supporting EVs, Synapse Energy Economics, https://www.synapse-energy.com/sites/default/files/A-Plug-for-Effective-EV-Rates-S66-020.pdf, (Last accessed May 5, 2020).

chargers in order to give owners of public access or workplace charging stations much greater potential to recover costs and make a business case for their stations.

To address these concerns and needs, NHDES recommends that the Commission explore the issue of demand charges in greater detail in order to develop an alternative to demand charges that addresses cost causation and does not negatively impact other ratepayers. This should include consideration for how to incentivize battery storage and smart charging at public DCFC sites to address the demand issues as site use increases.

Demand Charge Alternatives Examples for Consideration[48]

- The California Public Utilities Commission (CPUC) approved a modified proposal from PG&E that is designed to address some of the challenges with demand charges.[49] The new rates apply to smaller workplaces and multifamily dwellings, as well as larger installations such as those for public fast chargers. With this rate design, the company is replacing demand charges with "subscription pricing," a monthly fee that allows customers to choose the amount of power based on their charging needs.

  For example, a customer will pay a certain price for a 50-kWconnection. If that demand is exceeded during the month, the customer could pay an overage after a three-month grace period; the subscription price does not change. In this case, the overage does not establish a new demand level that could automatically ratchet up a demand charge. Energy usage will be based on TOU pricing with peak, mid-peak and off-peak rates. PG&E expects this design to result in significant savings over existing C&I rates, particularly for fast charging and workplace charging. Critically, these new rates are not "subsidized" by other customers as they are designed to recover the costs to serve the EV customers. [50]

- Southern California Edison recently gained approval from the CPUC for a new tariff design for commercial customers that eliminates demand charges for the first five years of the program.[51] The charge will be phased back in over the following five years, as EV adoption is expected to grow. With higher utilization rates, the per-kWh costs at individual chargers will decline, making the impact of demand charges more manageable from the perspective of an individual driver or commercial business that wishes to offer EV charging.[52]

[48] Modified from: California Trucking Association and Ceres (2020). The Road To Fleet Electrification: Eight Ways Utilities, Regulators, and Policymakers Can Enable Fleet Operators to Electrify Commercial Transportation and Reduce Carbon Emissions, pg. 7, https://www.ceres.org/sites/default/files/reports/2020-05/The%20Road%20to%20Fleet%20Electrification.pdf, (Last accessed May 5, 2020).

[49] CPUC (2019). Application 18-11-003, Decision 10-10-005 on October 24, 2019. California Public Utilities Commission, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M318/K552/318552527.PDF, (Last accessed May 5, 2020).

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

[51] CPUC (2018). Application 17-01-021, Decision 18-05-040 on June 6, 2018, California Public Utilities Commission, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M215/K783/215783846.PDF, (Last accessed May 5, 2020).

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

Demand Charge Variations Examples[53]

- Duke Energy divides the rate by the total kWh consumed during a billing period. If the rate exceeds a predetermined cap in terms of $/kWh, the bill is recalculated at the capped rate (kWh consumed * capped $/kWh rate).
- Minnesota Power prohibits demand charges in excess of 30 percent of a DC fast-charging company's bill; part of a pilot project approved by regulators in late 2019.
- Xcel Energy caps the demand charge component of a rate at an amount equal to the customer's energy consumption (kWh) divided by 100 hours.

Demand Charges – Peak Coincidence or Volumetric Pricing Structure Alternative

NHDES acknowledges, as stated above, that demand charges are an important mechanism to manage load and reduce overall cost. NHDES recommends that alternatives to demand charges be developed that allow appropriate recovery of costs incurred by EV charging and that allow such charging to be economical.

Demand Charges – Rate Design Alternative Analyses

NHDES supports Staff's recommendation.

Demand Charges – Peak Coincidence Billing/Metering Feasibility

As noted above, NHDES recommends a more significant exploration of alternatives to demand charges, inclusive of utility, PUC staff, and stakeholder input.

PUC Recommendations - Section III. Residential and Commercial Time of Day Rates for Electric Vehicle Charging

NHDES supports Staff's recommendation that the Commission open an adjudicative proceeding and direct each electric utility to file an EV TOU rate proposal residential and small commercial customer applications and an EV TOU rate proposal for separately metered high demand draw commercial customer applications that may incorporate DCFC or clustered level 2 chargers.

Additional NHDES Comments

Integrated Planning That Includes EVs

New Hampshire already requires electric and gas utilities to submit least cost integrate resource plans outlining the resource needs to meet expected energy demand over a long-term planning horizon. An increasing number of states are starting to require integrated distribution planning that

[53] Modified from: California Trucking Association and Ceres (2020). The Road To Fleet Electrification: Eight Ways Utilities, Regulators, and Policymakers Can Enable Fleet Operators to Electrify Commercial Transportation and Reduce Carbon Emissions, pg. 7, https://www.ceres.org/sites/default/files/reports/2020-05/The%20Road%20to%20Fleet%20Electrification.pdf, (Last accessed May 5, 2020).

is broader and inclusive of innovation, and includes upgrades to aging infrastructure, incorporation of DERs, and grid modernization.[54]

NHDES recommends that the Commission consider issuing guidance that utilities account for: EV load growth in the state; utility involvement in charging; and opportunities to optimize the resources that EV load can provide to the grid. It is established that EVs can absorb low-cost renewable energy when it is available because load is able to be controlled. There is also an emerging opportunity for EVs, in aggregate, to serve as dispatchable energy storage, which grid operators can draw upon when needed to manage peak load.[55]

Respectfully,

/Rebecca E. Ohler/

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Administrator
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Enclosure

cc. Docket No. DE 20-004 Service List

[54] Kadoch, C. (2020). Roadmap for Electric Transportation: Policy Guide, Regulatory Assistance Project, https://www.raponline.org/EV-roadmap/, (Last accessed May 5, 2020).

[55] Kadoch, C. (2020). Roadmap for Electric Transportation: Policy Guide, Regulatory Assistance Project, https://www.raponline.org/EV-roadmap/, (Last accessed May 5, 2020).