



February 20, 2020

Ms. Debra A. Howland
Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, New Hampshire 03301

Re: IR 20-004, *Investigation of Electric Vehicle Rate Design Standards, Electric Vehicle Time of Day Rates for Residential and Commercial Customers*

Dear Ms. Howland,

Greenlots respectfully submits the following information to the Public Utilities Commission (“Commission”) in response to the January 16th, 2020 Order of Notice seeking public comment on issues relating to rate design standards for electric vehicle charging stations and electric vehicles, electric vehicle time of day rates, and other issues raised in the memorandum filed by Staff on January 10th.

Greenlots is a leading provider of electric vehicle (EV) charging software and services committed to accelerating transportation electrification in New Hampshire. The Greenlots network supports a significant percentage of the DC fast charging infrastructure in North America and an increasing number of Level 2 chargers. Greenlots’ smart charging solutions are built around an open standards-based focus on future-proofing while helping site hosts, utilities, and grid operators manage dynamic EV charging loads and respond to local and system conditions.

Rate Design and Technology-Enabled Managed Charging Strategies

The Commission has several key principles for rate design – efficiency, equity, simplicity, continuity, and revenue sufficiency – that can and should apply to strategies to manage EV load through rates and technology-enabled managed charging. In general, Greenlots believes that the development of rates and programs that send accurate price signals to EV loads, reflecting both system-wide and local grid constraints and realities, is essential to align the increased electrification of transportation with the interests of the grid and ratepayers. EV time-of-day rates represent a rather blunt, but in some cases appropriate, beginning instrument to deliver price signals, especially at low levels of EV market penetration. However, grid conditions will evolve. Shifting peaks and changing local grid constraints will require more sophisticated strategies to ensure that EV load is managed in a way that aligns with the Commission’s key principles of rate design. Considering forward-looking strategies that account for this changing grid composition and utilization will help lower costs and maximize benefits for ratepayers.

Greenlots encourages the Commission to look beyond time-of-day rate design to technology-facilitated managed charging strategies, which can be stand-alones or complement various rate structures and offer more accurate and effective tools to shape, utilize, and dispatch flexible EV loads. Technology-based managed charging and real-time pricing represent a significant opportunity to maximize system-wide benefits and deliver cost reductions to all ratepayers. Smart networked chargers are critical to help enable consumers, especially in the residential sector, to benefit from advanced rates and charging programs utilizing pre-defined but reconfigurable “set it and forget it” preferences, or other driver-friendly approaches. Leveraging technology enables customers to take advantage of EV-specific rates and programs without active involvement or behavior change, since the network software and technology embedded within the charger can respond to price signals on behalf of the consumer or site host. By automating the customer’s response to price signals, technology can enable more advanced rate structures and rate-alternative grid management programs and strategies. Managed charging programs offer maximum customer control while simplifying engagement, effectively responding to individual price sensitivities and charging needs without relying on active and on-going behavior change, as customers leverage technology to set preferences (and can be given the option to override those preferences).

A good illustrative example of an advanced, technology-facilitated rate design and program is the vehicle-grid integration (VGI) rate offered through San Diego Gas & Electric Company’s (SDG&E) Power Your Drive pilot program. In January 2016 the California Public Utilities Commission approved the installation of up to 3,500 utility-owned and operated charging stations at apartments, condominiums, and workplaces. What makes this pilot unique is the design of the rate offered to drivers and site hosts, which aligns grid demands, charging behavior, and state policy priorities through the use of an hourly dynamic rate. Rates are tied directly to residential customer or commercial site host bills/accounts. Prices are published a day in advance, and technology can allow customers to set preferences or parameters like the maximum price they are willing to pay to charge, departure time, and minimum charging needs.¹ Advanced price signals combined with appropriate technological tools can help better align charging behavior with grid conditions. While drivers directly benefit from shifting usage to hours in which they can see lower per-kWh prices, grid benefits for all ratepayers are also maximized, both through lowering peak usage and better integrating growing renewable generation.

Managed charging strategies are also a key consideration for removing barriers to electric vehicle charging infrastructure deployment broadly. Limited options for managing charging costs

¹ See “Power Your Drive.” San Diego Gas & Electric Company. Accessed February 18, 2020. <https://www.sdge.com/residential/electric-vehicles/power-your-drive>

can be a barrier for site hosts, especially at low levels of utilization. Advanced rate design and managed charging strategies that send price signals aligned with grid costs can address this barrier in a way that is equitable across customer classes and end uses, reducing the need for expensive infrastructure upgrades. Because these managed charging strategies can typically be utilized to reduce costs associated with spikes in demand, Greenlots has tended not to advocate for the removal or retiring of demand rates for DC fast charging, which are important for aligning charging behavior with grid conditions. There are, however, some situations where demand charge relief may be a necessary condition for facilitating adoption. Fleet owners, for example, may have operational constraints that prevent them from fully benefiting from leveraging the technology-driven solutions that can shift load and moderate energy costs. Rate design and managed charging strategies should account for such scenarios, which may be addressed on a case by case basis.

Indeed, it is imperative that rates and grid management strategies enable charging patterns to accommodate grid constraints to the maximum amount feasible. Demand charge relief is often associated with a trend toward unmanaged DC fast charging, premised on the notion that drivers always need full charging at full speed and that there are not feasible opportunities to align this type of charging with grid constraints. There are, in fact, opportunities to reduce costs to drivers, site hosts, and the grid through technology and dynamic rates or fee structures. For example, a driver could be given the option to save a few dollars on their charging session if they wait a few minutes to begin charging. Or they could be offered a similar discount for a slightly longer session at a lower power level. While there are limitations if other drivers are queued up, there are very workable solutions to reduce site and system costs associated with peak or non-grid-friendly DC fast charging. Greenlots recommends that the Commission consider technology-enabled managed charging strategies for all types of charging applications.

Customer Engagement Strategies

Consumer marketing, education, and outreach are extremely important for any new transportation electrification service or offering, especially given the relatively early state of the electric vehicle market. However, these efforts should not be limited to customer engagement in rate design offerings alone. Indeed, Greenlots believes that at this stage of the market consumer engagement and education efforts should include an emphasis on infrastructure deployment. A McKinsey report cites range anxiety and access to charging infrastructure as two of the top three concerns limiting EV adoption.² These concerns are two sides of the same coin and highlight the fact that infrastructure itself is the essential ingredient for scaling transportation electrification.

² See *Electrifying Insights: How Automakers Can Drive Electrified Vehicle Sales and Profitability* (2017). McKinsey & Company. <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/electrifying-insights-how-automakers-can-drive-electrified-vehicle-sales-and-profitability>

In Greenlots' experience, and in line with McKinsey's findings, prominently located public EV charging stations are in themselves an effective form of education and outreach. When consumers drive by and see available EV charging infrastructure in their community, it makes them think more realistically about electric vehicles and reduces concerns about a lack of charging infrastructure. Highly visible public placement of charging stations should therefore be a key consideration of any pilot or program.

Merging programs that incentivize infrastructure deployment at homes and workplaces with enrollment in EV rates and managed charging programs is also an effective strategy for engaging customers in grid-beneficial programs. By acting as a one-stop-shop where customers can receive general EV information, support for locating or installing infrastructure, and guidance on rates and bill impacts, utilities can help overcome customer concerns about how they will charge their vehicles and better facilitate customer enrollment in the rates and managed charging programs that will help deliver benefits to the grid.

The Role of the Utility in Deployment of Electric Vehicle Charging Infrastructure

In Greenlots' view, utilities are central to the transformation of the transportation sector, with a key role to play in maximizing the system-wide benefits of growing electric vehicle load, ensuring that electric vehicle infrastructure is deployed sufficiently and equitably, and ultimately cultivating a sustainable market for eventual private sector investment in electric vehicle infrastructure. Indeed, achieving all of these outcomes is likely to require utilities to play a variety of roles. Developing a portfolio of programs that target different geographies and customer types, with flexibility to provide both turnkey utility-owned charging solutions and investments in make-ready infrastructure, can help maximize grid benefits while ensuring equitable and sufficient infrastructure deployment.

Commissions in states across the country have recognized the multiple benefits of utility engagement in electric vehicle infrastructure deployment and the corresponding need to design multiple program approaches. The Minnesota PUC offered a variety of viable approaches that utilities might take to deploy infrastructure, including make-ready approaches and direct utility ownership of EV chargers "which would ensure development of charging infrastructure and strongly support the growth of EVs."³ The Vermont PUC likewise encouraged utility engagement while offering flexibility around program design and ownership structure, noting that "utilities should be granted some discretion in how to address the anticipated demand from EV charging."⁴

³ *Ibid.*

⁴ See *Supplemental Electric Vehicle Report Submitted Pursuant to Section 35 of Act 59 of the 2019-2020 Vermont Legislative Session* (2019). <https://legislature.vermont.gov/assets/Legislative-Reports/EV-supplemental-report.pdf>

Utilities are, first and foremost, stewards of the grid, and any expenditures of ratepayer funds should maximize grid benefits for all ratepayers. The Brattle Group predicts that regional electrification could double monthly electric usage by 2050.⁵ Transportation electrification represents likely the single greatest opportunity to increase the utilization and efficiency of the electric grid to the benefit of all ratepayers. These benefits will not accrue automatically however, and in fact negative consequences could occur if electrified transportation load comes onto the grid in an unmanaged fashion. Utility ownership of charging stations offers maximum visibility into charging activity and greater ability to leverage flexible electric vehicle load to the benefit of all ratepayers.

Utilities also have an important role to play in ensuring that infrastructure is deployed where it is needed most, including areas that may not be attractive to investments from the private market even as the market matures. Charging locations in rural areas, for example, often face far lower utilization. However, these locations are no less needed to help develop the market overall. Turnkey utility-owned charging stations can be highly effective for ensuring that these areas are served. Ratepayer funds can also be layered with funding from other sources. In New Hampshire, the Electric Vehicle Charging Stations Infrastructure Commission (established by Senate Bill 517) has identified several corridors where charging infrastructure deployment should be prioritized to facilitate tourism and long-distance travel within the state.⁶ The state has committed Volkswagen settlement funds to support infrastructure deployment along these corridors. However, these funds alone have not been enough to attract the private investment needed to deploy infrastructure that meets the state's needs.⁷ Coordination of utility programs with state-led charging corridor initiatives could help bridge this gap.

Utility investment in electric vehicle infrastructure at this early stage, including direct ownership of charging stations themselves, is an essential tool for cultivating the conditions needed for the private market to flourish. The Washington Utilities and Transportation Commission issued a policy statement in 2017 that likened the electric vehicle market to that of energy efficiency – a market that utilities have a key role in transforming.⁸ The Commission wrote that it was in the

⁵ See *Achieving 80% GHG Reduction in New England by 2050* (2019). The Brattle Group. https://brattlefiles.blob.core.windows.net/files/17233_achieving_80_percent_ghg_reduction_in_new_england_by_20150_september_2019.pdf.

⁶ See <https://www.des.nh.gov/organization/divisions/air/tsb/tps/msp/sb517.htm>

⁷ See <https://www.nh.gov/osi/energy/programs/vw-trust-funding.htm>. No submissions received for the Direct Current Fast Charging Infrastructure Request for Proposals met minimum requirements.

⁸ See "Policy and Interpretive Statement Concerning Commission Regulation of Electric Vehicle Charging Services." Washington Utilities and Transportation Commission. Docket UE-160799. <https://www.utc.wa.gov/layouts/15/CasesPublicWebsite/GetDocument.aspx?docID=147&year=2016&docketNumber=160799>.

public interest to support “transformation of the EV market through utility provision of a portfolio of regulated EV charging services that maximize the benefits of EVs to the electric system and allow a competitive market for EV charging services to continue to develop.”⁹ The market conditions reflected in the Washington UTC’s order persist today in states across the country. In Maryland, the Public Service Commission approved a statewide network of 850 utility-owned public chargers in early 2019, finding that “it is in the public interest to allow the Utilities to own and operate a limited number of public charging stations to jumpstart the deployment of a public EV charging network, reduce EV owner range anxiety in the near term, and lay the foundation for a competitive market to develop in this space.”¹⁰

Greenlots encourages the Commission to be proactive in addressing these changing grid realities, encouraging utilities to develop portfolios of programs that will ensure infrastructure is deployed sufficiently and equitably and that growing electric vehicle load is managed in a way that helps maximize benefits for ratepayers.

Greenlots appreciates the opportunity to offer comments on these matters. We look forward to continuing to support ongoing efforts by the Commission to facilitate transportation electrification.

Respectfully,



Annie Gilleo
Manager, Policy and Market Development

Cc: Service List

⁹ *Ibid.*

¹⁰ See Order No. 88997 in Case No. 9478. Public Service Commission of Maryland. <https://www.psc.state.md.us/wp-content/uploads/Order-No.-88997-Case-No.-9478-EV-Portfolio-Order.pdf>