Eversource Proposal for Electric Vehicle Managed Charging Initiative

Docket No. DE 20-170, Electric Vehicle Time of Use Rates

EVERSOURCE ENERGY

Submitted to the State of New Hampshire Public Utilities Commission

June 15, 2021

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1. Overview

This proposal, filed by Eversource Energy (hereinafter "Company" or "Eversource") in Docket No. DE 20-170, pursuant to the New Hampshire Public Utilities Commission's ("Commission") Order in Docket No. IR 20-004, *Investigation into Rate Design Standards for Electric Vehicle Charging Stations and Electric Vehicle Time-of-Day Rates.* In its Order, the Commission directed New Hampshire electric distribution companies (EDCs) to propose separately-metered Electric Vehicle ("EV") time-of-use ("TOU") rates. The Commission also recognized that load management offerings could provide near-term ratepayer benefits without installation of metering infrastructure and other associated upgrades and, for that reason, found that load management techniques may be an appropriate strategy for electric vehicle rate design. Consistent with the Commission's Order, the Company proposes implementing an Electric Vehicle ("EV") Managed Charging initiative as a near-term alternative to TOU rates. The Company believes that managed charging may be able to functionally achieve the same objectives as a TOU rate but at a significantly lower upfront cost and with lower risk.

Since 2011, consumer demand for EVs has increased significantly with over 1.5 million vehicles currently on the nation's roads and the Edison Electric Institute ("EEI") forecasts EV sales will surpass 3.5 million by 2030.[1] This increase has direct impacts on the electric power system as EVs require vehicle chargers that draw power during both peak and off-peak times. As the adoption and use of EVs increase across the United States and in New Hampshire, utilities must consider how best to manage this additional load to benefit the electric power system and customers.

The Company supports exploring opportunities to encourage the efficient use of the electric power system by the growing number of customers who seek to charge EVs at homes, businesses, and public charging facilities. In addition, the Company supports long-held standards that rates should be based on principles of cost causation and provide proper price signals. However, the near-term implementation of more advanced TOU rate structures is likely to introduce costs and complexities to metering and billing process. Advanced rate structures based on the marginal cost of service of EV customers must be presently developed in the absence of significant data. The current number of EV customers is small and data on actual EV load profiles and customer behavior is limited. There is a risk that inappropriate rate design may inadvertently encourage inefficient use of facilities and resources, particularly on localized portions of the electric power system.

[1] EEI, Issues & Policy: Electric Transportation, available at: https://www.eei.org/issuesandpolicy/electrictransportation/Pages/default.aspx.

Eversource encourages the Commission to review this proposal for an EV Managed Charging initiative and to consider a more gradual approach to serving a growing EV customer segment in New Hampshire. An EV Managed Charging initiative could be implemented in a shorter time frame, at a lower cost, and still encourage the efficient use of the electric power system.

Managed charging strategies allow electric utilities to remotely control EV charging by turning chargers on/off or limiting the draw of power corresponding to different thresholds such as the level of demand on the electric power system or local distribution issues. EV managed charging strategies have the potential to reduce peak loads, provide system benefits, reduce the need for new energy generation, and better utilize utilities' facilities and resources. The Company is well suited to develop an EV Managed Charging initiative that can achieve these objectives through its deep understanding of system conditions and experience in running energy efficiency, demand management programs, and similar EV managed charging demonstrations in its other service territories. The Company has significant experience in providing performance-based incentives to customers through programs based on the utilization of third-party technologies such as thermostats, including utility control of such devices.

Demand-side management initiatives provide the added benefit of being flexible to reduce load when and where it is necessary, regardless of the time of day. As the timing of peaks fluctuate and change over time, an EV Managed Charging initiative would provide flexibility to quickly evolve so that the Company is continually geared toward meeting the initiative's and Commission's objectives in this Docket.

2. Initiative Objectives

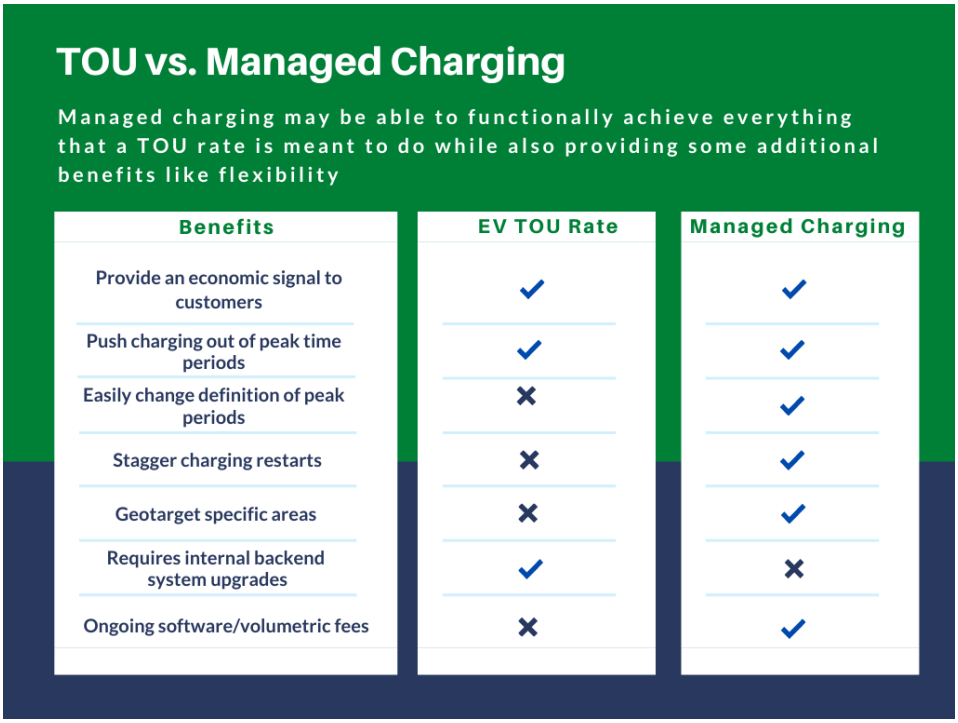
In order to meet the objectives addressed so far in this docket, as well as in Docket No. IR 20-004 and included in SB 575, the Company has designed an initiative that directly integrates EVs and vehicle chargers into the Company's non-model based distributed energy resource management system ("DERMS") to provide a potentially lower cost alternative to the development of a full TOU rate. Once an integration between the EV charger and/or manufacturer with Eversource's DERMS is complete, the Company will have the ability to gather all the information it needs to control customer's charging behaviors and issue incentives. No further metering or billing system integrations are required.

An additional benefit of integrating EVs and vehicle chargers into the Company's DERMS is that these loads can be incorporated into a more holistic energy management strategy where EVs and chargers can be controlled in conjunction with other customer devices to achieve beneficial system outcomes. In this construct, EVs can be

part of a larger portfolio of flexible load that can be deployed to help alleviate issues at the Independent System Operator-New England ("ISO-NE"), transmission, and distribution levels.

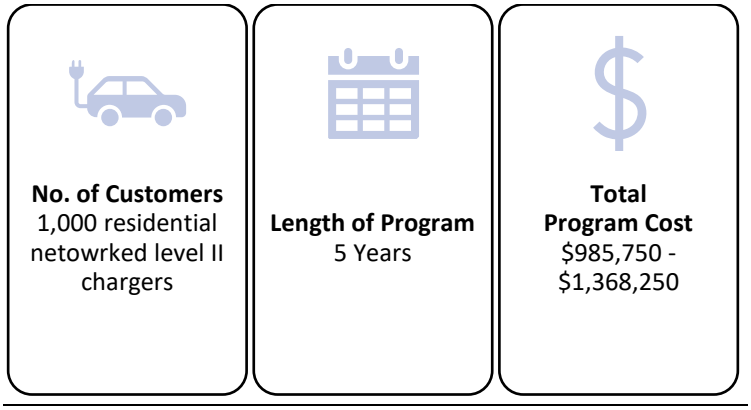
The success of TOU rates depend on customers making rational economic decisions and require customers to take affirmative actions to take advantage of the price differentials embedded in TOU rates. One advantage of demand management is that it does not require customers to take any action outside of opting into the initiative. Once a customer opts in, the Company along with its EV charging partners have the ability to directly control EV charging activities, taking that burden off of the customer. Within a demand management initiative, the Company can ramp down charging levels during times of acute system need or push a schedule to the EV or charger to tell it when to start charging. In either scenario, a customer can come home, plug in their vehicle, and not worry about taking any other actions. The initiative will optimize the charging behavior to achieve the effort's objectives.

Figure 1: TOU Rates vs. Managed Charging



The primary objective of the EV Managed Charging initiative is to utilize managed charging strategies to incentivize customers to charge during off-peak times. Over a five-year timeline, the primary goal will be to enroll 1,000 residential networked level II chargers (single-family homes) during the initial phase of the initiative. During a potential second phase, the Company would investigate the feasibility of enrolling additional chargers at Commercial and Industrial ("C&I") locations, Multi-Unit Dwellings ("MUDs"), non-networked chargers, and vehicle fleets.

Figure 2: Proposal Summary



3. Initiative Design & Dispatch Considerations

As noted previously, Eversource has the experience and resources needed to effectively develop and implement the proposed initiative. The Company is committed to providing its customers the tools and programs to efficiently charge EVs, and has designed and will deploy the initiative in a thoughtful and balanced manner.

As a governance structure for the program, the Company will alert control room operators and call center supervisors as to when a dispatch will be called and which Eversource's system operations can override, if necessary. Dispatch is the period of time when electric utility or grid operators can call upon participants to reduce electricity consumption. For this initiative, customers will be dispatched daily every summer weekday (i.e., non-holiday weekend). All dispatch periods would have a maximum time period of eight hours. Customers can opt out of 20 percent of events (per season) and still receive the incentive at the end of the season.

As the demand for EVs increases, utilities face several risks including substation and transformer impacts, peak load increases, and timer peaks. Timer peaks are periods of the day, typically early morning or late evening, where customers have scheduled their EVs to begin charging at the moment off-peak rates begin (in locations where TOU rates are in effect) resulting in sharp load ramps. To avoid these timer peaks, the Company will experiment with staggering the start and end times for customers by creating groups that are on different charging schedules.

3.1 Managed Charging Strategies

Eversource's proposed initiative would use demand-side managed charging strategies to incentivize customers to charge their EVs during off-peak times. The Company's proposed EV managed charging strategies, throttling

and scheduling, are discussed below. The Company will work with their managed charging program partners to develop the optimal strategy.

- **Throttling.** This managed charging strategy will allow Eversource to send a signal to a networked level II charger to limit the instantaneous draw of power of the charger for a predefined period of time. A typical residential level II charger has a normal power draw of 7 kilowatts ("kW"). During a throttling demand management event, the Company could throttle down (decrease) the rate of charging from 7 kW to 0 or 1 kW for a period of time, and
- **Scheduling.** This strategy is where a schedule is pushed to the EV charger, informing the device when it should start charging. Eversource could set a schedule that only allows for off-peak charging but also allows customers to opt out of the schedule if they have an emergency. The Company proposes that by sending a throttling signal every day at the same time of day, Eversource could essentially replicate a scheduling strategy.

3.2 Customer Incentives

To establish the proper customer incentive for the EV Managed Charging initiative, the Company evaluated potential customer savings realized when EV TOU rates are in effect. To establish average customer savings for EV owners on TOU rates, the Company reviewed a 2016 International Council on Clean Transportation whitepaper that used customer savings data from the top six cities for plug-in vehicle sales: San Francisco, Atlanta, Los Angeles, San Diego, Portland, and Seattle (*in order from highest to lowest number of EV sales*).[2] The review calculated the costs of charging exclusively during peak and off-peak hours under the rate plans to determine the value of off-peak TOU charging to the average household. Among the top five cities with TOU rates, customer savings varied from $116 per year to $237 per year depending upon the utility. After reviewing this literature and its own internal analysis, the Company proposes to offer participants $150 per year.

For other demand management and energy efficiency programs, customer incentives are processed by a third-party vendor who mails checks directly to customers. These incentives provided to participating customers are not dispersed through the utility bill. Instead, customers are incented to participate in these programs through cash rebates, checks, or gift cards. The Company is researching alternative offerings to incentivize customer

[2] FleetCarma, "H*ow Much Can You Save with Off-Peak Charging*?", Jul. 21, 2016, available online at: https://www.fleetcarma.com/electric-vehicle-off-peak-charging-cost/. Please note that Seattle was the only city that did not offer an EV TOU rate.

participation in the EV Managed Charging initiative, including offering an annual utility bill credit, prepaid gift cards (i.e., Mastercard or Visa), and charging credits for EV charging stations.[3]

4. Administrative Activities

As the Administrator, the Company has determined that the following activities (detailed in Figure 3) will need to be undertaken to run the EV Managed Charging initiative at the proposed scale across its three-state service territory: [4]

Figure 3: Administrative Activities[5]

5. Integration with Distributed Energy Resources System Architecture

If approved, the Company would need to integrate the EV Managed Charging initiative with its existing DERMS architecture. The Company has already integrated many of the largest residential EV charger OEMs into its DERMS platform and would be able to begin operating this program almost immediately after Commission approval. Going forward, the Company would continuously evaluate opportunities to incorporate additional residential EV charger OEMs into the DERMS platform. Key considerations for future OEM integration would include: (1) the charger must be Wi-Fi enabled or have the ability to communicate, and (2) the charger OEM must integrate into the Company's DERMS platform or have an integration plan in place.

[3] Eversource notes that to provide an annual bill credit to customers there would be an associated Information Technology ("IT") cost. In addition, JuiceBox EV charging stations are manufactured by Enel X which offers its own incentive reward system (JuicePoints) to customers for charging during off-peak times. The Company would have to work with the manufacturer to issue charging credits for JuiceBox residential and C&I applications (if offered as an alternative to the traditional customer incentive).

[4] If 17-12-03RE04 in Connecticut and Managed Charging in Massachusetts are approved, 2 Full-Time Equivalents ("FTEs") will be necessary across all three states served by Eversource (CT, MA, and NH).

[5] OEM stands for Original Equipment Manufacturer.

6. Budget & Enrolled Customers

The Company looks to acquire 200 customers annually over the five-year period of the initiative, ending with a cumulative 1,000 customers enrolled. As the number of customers enrolled increases, so will the costs of the EV Managed Charging initiative due to more customer incentives being disbursed, internal Company administrative costs, and upgrades to software and third-party vendor networks/platforms. For the purposes of establishing the initiative's budget, a description of the cost categories are detailed in Table 1 below:

- **Customer Incentive.** Funds paid directly to customers for their participation in the initiative,
- **Administrative Costs.** This includes labor and administrative overhead, and
- **Software & Vendor Costs.** This includes the EV platform fee, start-up costs, integrations and OEM fees, device fees, incentive processing fees, and fixed and variable DERMS fees.

Table 1: Budget and Enrolled Customers

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
No. of Customers*	200	400	600	800	1,000	
Customer Incentive	$30,000	$60,000	$90,000	$120,000	$150,000	$450,000
Administrative Costs**	$35,000 - $95,000	$35,000 - $95,000	$35,000 - $95,000	$35,000 - $95,000	$35,000 - $95,000	$175,000 - $475,000
Software/Vendor Costs**	$45,550 - $68,050	$51,350 - $66,350	$69,650 - $84,650	$87,950 - $102,950	$106,250 - $121,250	$360,750 - $443,250
Total	**$110,550 - $193,050**	**$146,350 - $221,350**	**$194,650 - $269,650**	**$242,950 - $317,950**	**$291,250 - $355,250**	**$985,750- $1,368,250**

*These are residential networked level II chargers (single-family homes).
**Assuming that the Company can split costs across its three-state service territory and initiatives/programs. Does not include EM&V costs. Cost ranges are based on New Hampshire proportional costs based on allocation of devices and Megawatts under control under different scenarios depending on program approvals in other Eversource jurisdictions.

7. Data Collecting

Eversource plans to use data collected to refine peak and off-peak periods for the initiative allowing the Company to avoid running dispatch events when customers are not charging their EVs anyway. The data will be collected at a minimum of 15-minute intervals and provide the Company insights into charging start time, charging end time, energy consumption in kilowatt-hours ("kWh"), average power (in kW), peak power (in kW), cumulative energy consumption, and locational/geographic distribution information

8. Optional Components for Initiative

The Company will continue to make improvements and enhancements to the initiative as data is collected, EM&V results are reviewed, and customer and vendor feedback is received. Some optional components that may be integrated into the initiative in future years may include an off-peak rebate pathway, a pathway for non-networked chargers, and the use of EV's onboard telematics. In addition, as referenced in Section 2, the Company will look to enroll additional chargers at C&I locations, MUDs, and for vehicle fleets in a secondary phase of the EV Managed Charging initiative.

9. Conclusion

The Company appreciates this opportunity to provide further comment on how electric utilities may effectively serve their customers as more New Hampshire residents and businesses seek to purchase and drive EVs. Eversource believes that its proposed EV Managed Charging initiative will advance "energy conservation, optimal and efficient use of facilities and resources by [utilities], and equitable rates for electric customers."[6] The Company remains committed to providing its customers the tools to efficiently charge EVs and expects that this will be best accomplished through a range of demand-side management approaches that it designs and deploys on a thoughtful and balanced basis. The Company looks forward to the continued engagement of the Commission and stakeholders as it seeks to accomplish these goals in this Docket.

[6] New Hampshire Public Utilities Commission, Memorandum with Recommendations and Order of Notice, Docket No. IR 20-004, *Investigation into Rate Design Standards for Electric Vehicle Charging Stations and Electric Vehicle Time-of-Day Rates*, Jan. 10, 2021.