chargepoint.com

ChargePoint, Inc.
254 East Hacienda Avenue | Campbell, CA 95008 USA
+1.408.841.4500 or US toll-free +1.877.370.3802

April 8, 2019

Vermont Public Utility Commission
Attn: Judith Whitney, Clerk of the Commission
112 State Street
Montpelier, VT 05620-2701

Re: Case No. 18-2660-INV – Incentives, Education, and Safety Standards

Dear Clerk Whitney,

Attached for electronic filing in the above-referenced matter, please find comments on behalf of ChargePoint, Inc. Please let me know if you have any questions.

Respectfully,

Kevin George Miller
Director, Public Policy
ChargePoint

Case No. 18-2660-INV: Incentives, Education, and Safety Standards
Comments by ChargePoint – November 5, 2018

I. INTRODUCTION

ChargePoint is pleased to offer these comments in response to the Order issued by the Vermont Public Utility Commission ("the Commission") on March 22, 2019.

II. BACKGROUND ON CHARGEPOINT

ChargePoint is the nation's leading electric vehicle (EV) charging network, with charging solutions for every charging need and all the places EV drivers go: at home, work, around town and on the road. With more than 62,000 independently-owned charging spots, ChargePoint drivers have completed more than 53 million charging sessions and driven more than 1.3 billion gas-free miles. More than 400 of our charging spots are deployed in Vermont.

ChargePoint designs, develops, and deploys residential and commercial AC Level 2 (L2) and DC fast charging (DCFC) electric vehicle charging stations, cloud-based software applications, data analytics, and related customer and driver services aimed at creating a robust, scalable, and grid-friendly EV charging ecosystem.

ChargePoint sells EV charging supply equipment (EVSE) and network services that enable EV charging station owners to provide charging services. In almost every case, ChargePoint does not own or operate the equipment. ChargePoint sells charging solutions to a wide variety of customers, including residential EV owners, employers, commercial and industrial businesses, cities and public agencies, ports, schools, public transit, delivery truck fleet operators, and multi-unit dwelling owners. ChargePoint offers a broad array of products and services that can serve light, medium or heavy-duty electric vehicles.

The site host network services offered by ChargePoint enable customers to manage their charging infrastructure using cloud-based software tools. These tools provide the station owner or operator with everything needed to manage and optimize utilization of their charging stations, including online management tools for data analysis, billing and payment processing, load management and access control. Stations connect to ChargePoint over a secure, cellular data network (or Wi-Fi in the case of single-family residential) allowing station owners to manage all their charging operations from a single dashboard. Maintenance and customer service are a priority for our company. ChargePoint offers a comprehensive set of support services, including: a 24/7/365 hotline for station users, parts and labor warranty, site qualification, installation and validation services, and a helpline for site host specific questions.

III. RESPONSES TO QUESTIONS

1. What incentives does your company or organization provide or promote to encourage the deployment of EV charging stations and the purchase and lease of EVs?

A primary goal for ChargePoint is to get everyone behind the wheel of an EV and make it easy to charge wherever they go, even if a station isn't on the ChargePoint network. ChargePoint

is leading the effort to create peer-to-peer roaming agreements that make it easy for drivers to charge wherever they go. We previously have announced roaming integrations between ChargePoint and FLO and EVBox, together representing three of the largest EV charging networks in the world. ChargePoint also announced a third roaming agreement in December 2018 with Greenlots.

ChargePoint is engaged with other top North American networks and expect to announce additional partnerships shortly to grow our coverage for payment interoperability in 2019 and beyond. These peer to peer roaming integrations are based on the Open Charge Point Interface (OCPI) protocol. OCPI is an open protocol that enables network operators to exchange key information needed to provide roaming services, such as charging station location, real-time in-use/vacant status and charging rate. OCPI also streamlines billing settlement, while ensuring the privacy of driver account information.

ChargePoint invests heavily in developing an array of services and tools that make it easier for drivers to go electric. The driver web portal provides a map of all charging stations within the geographical region of the driver, offering information on the charging station including its availability, reservation status and charging fee (if any). Drivers are able to view real time charging status, make or change reservations, join a Waitlist (virtual queue for EV charging station), view real-time status of the waitlist, customize their charging experience and view past activity. Drivers can also view fuel and greenhouse gas (GHG) savings and track the vehicle's charge history, including historical session details.

Our mobile app has everything a driver needs to find available EV charging spots, pay for charging, and track charging status. The ChargePoint mobile app includes easy sign up with no registration fees, real-time availability of charging stations, notifications when a charging port becomes available, ability to start & stop sessions, view real-time status of charging sessions, popular times of use, fees to charge, more ways to start and pay for charging sessions than any other mobile app, historical session details and monthly reports, ability to "connect" to get access to restricted stations or get preferred pricing, manage waitlist interactions, as well as capability to schedule home charging when utility rates are low. Notifications can be sent to drivers via email or text for certain conditions, such as when a vehicle becomes fully charged, as well as notification of station availability when using our waitlist feature.

ChargePoint also provides a comprehensive list of incentives for vehicles and infrastructure on our website.

2. **What actions can the State of Vermont take to help increase the rate of deployment of EV charging stations throughout the state? Please give examples from other states.**

There are a range of different barriers to deploying EV charging stations that can be addressed by State Government, which are summarized in a table included in Appendix A.

Generally speaking, ChargePoint recommends that policymakers and regulators align incentives to make EV charging as equitably accessible as possible and accelerate sustainable and scalable growth in the competitive EV charging market. The manner by which policymakers incentivize the deployment of EVSE can either support or hamper the long-term viability of transportation electrification and its associated infrastructure deployment in Vermont. Policies and regulations to encourage the deployment of EVSE must also encourage innovation, competition, and customer choice in EV charging equipment and network services.

A couple of examples of key actions that can be taken by the State of Vermont include:

Building Codes

Building codes are sets of rules and regulations that govern standards for how residential and commercial buildings are constructed. "EV Ready" building code requirements can vary by region, but typically require new building construction to prepare a certain proportion of parking spots for EV charging to be installed at a later date, supporting sustainability goals and EV drivers.

When buildings aren't built EV Ready, owners need to engage in expensive and time-consuming retrofitting, adding electrical capacity and running conduit to install EV charging. This can take several weeks and cost tens of thousands of dollars, delaying charging availability, taking time away from other lucrative projects and compromising people's ability to drive electric.

Some examples of EV Ready building codes include California's CALGreen, Vancouver, BC, and Atlanta, GA.

Open Access Requirements

ChargePoint strongly supports Open Access requirements for publicly available EV charging infrastructure. Such requirements have been adopted by statute in Connecticut, New Hampshire, Massachusetts, and California.

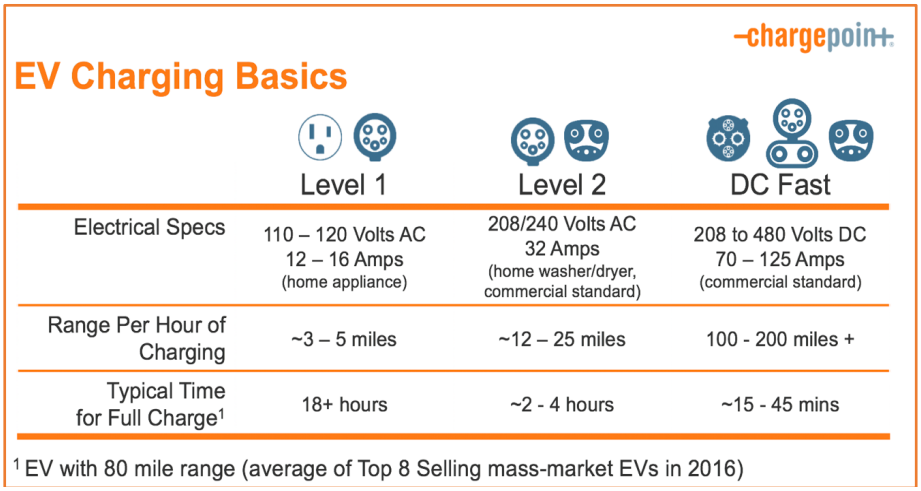
Open access provisions stipulate that publicly available charging stations may not exclusively allow for access on condition of membership or subscription, though it does allow for subscriptions and membership models to exist alongside open access models. Such provisions also stipulate that multiple payment options must be provided that allow access by the general public, which increases access to charging while remaining flexible as payment technologies evolve. Further detail and sample language are included in Appendix B.

3. **How does your company or organization prioritize site selection for the deployment of EV charging stations? Please include both level 2 stations and DCFC stations and explain how your site-selection guidelines might differ between the two types of technology.**

ChargePoint encourages the Commission to consider the full range of EV charging solutions to ensure widespread access to solutions that meet different charging needs for light-,

medium-, and heavy-duty vehicles. An "all of the above" approach will be necessary to support the widespread adoption of EVs in Vermont.

Fig. 1: EV Charging Levels



On average, EV drivers charged their vehicles at home 64% of the time, with about 30% of charging taking place at workplaces.[1] Publicly available charging, both AC Level 2 and DC fast charging (DCFC), remains a very important part of the overall charging ecosystem. Publicly-available charging helps to ensure that EV drivers have "range confidence" around town and for non-routine trips.

While typical EV charging needs can be met by AC Level 2 charging stations, DC fast stations will continue to play an integral role in supporting EV adoption by extending range along highway corridors and in dense urban environments where dedicated parking is often unavailable.

Publicly-available EV charging infrastructure is installed by a range of different site hosts to provide charging services to customers, employees, tenants and other EV drivers. Site hosts provide EVSE for a wide variety of reasons. Private businesses, including retailers, grocery and convenience stores, hotels, multi-unit dwelling (MUD) owners, among others, may install EVSE to attract new customers or tenants with a valuable amenity. State and local governments may install EVSE to support their emission reduction goals, electrify their own fleet vehicles, attract visitors, and provide a valuable amenity to the community.

4. **Please provide examples from other states where electric distribution utilities work with EVSE providers to support the deployment of EV charging stations. Include an explanation of any public interest or similar test that must be met before such a utility may include the costs of EVSE deployment in its rate base.**

[1] Smart, John. *Lessons Learned About Workplace Charging in the EV Project*. Idaho National Labs. 2015.

Utilities have very important roles to play in supporting transportation electrification in Vermont. First and foremost, utilities are ideally situated to ensure that the associated new load is incorporated in a safe, reliable, and efficient manner. ChargePoint is proud to be a partner of utilities around the country in deploying utility-supported charging infrastructure and pilot programs that incorporate capability for load management. We believe that there is a vital role for utilities in supporting efficient integration of EV load and that the right program design can encourage the installation of more charging stations around the state in a manner that complements, and does not duplicate or conflict with, the private market.

There are several ways in which ratepayer-funded investments in EV charging can expand access to charging while also complementing the competitive EV charging market. It would be valuable for any of these options to be evaluated by the Commission based on a set of criteria that ensure that programs lead to widespread grid benefits and complement the competitive EV charging market.

Make Ready Programs

"Make-ready" refers to the line extension on the distribution side of the meter as well as wiring, conduit, and sub-panels that are often needed to provide power to EVSE located in a site host's parking lot on the customer side of the meter. Make-ready infrastructure is essentially an extension of distribution system infrastructure, except that most of it is located behind the site host's meter and so would usually be considered the responsibility of the site host. However, deploying and maintaining distribution system infrastructure is one of a utility's core competencies. Accordingly, one of the most effective ways for a utility to support EVSE is for it to support make-ready deployments. A make-ready program could take the form of a rebate or upfront payment to a site host to use toward make-ready costs, or the utility could use existing personnel and resources to construct the make-ready for interested site hosts. Either way, the utility can receive valuable charger utilization information by providing this consideration and prepare for future load management programs to better integrate vehicles and the grid.

One advantage of make-ready programs is that the utility effectively leverages the private capital of the site host to purchase the actual EVSE. When site hosts share in the total cost of installing the EVSE, program dollars can go further. A make-ready program also has the advantage of focusing the utility on one of its core competencies – long-lasting distribution infrastructure – and allowing the site host to choose the charging equipment and network services that best meet its needs and support its own goals for installing the EVSE.

As long as the utility spends funds prudently in a way that minimizes costs and maximizes benefits to ratepayers and meets criteria established for the program by the Commission, a utility should be allowed to recover the full cost of a make-ready program from ratepayers, including administration costs. Program criteria should be established in advance and be based on the principles we discuss below. Because make-ready is essentially the extension of distribution infrastructure, a utility should be allowed to recover make-ready costs in the same manner as it recovers the cost of distribution system investments made in the ordinary course of business,

namely, by putting the value of the make-ready investments into its rate base. Recovering make-ready costs in this manner would allow a utility to earn its authorized rate of return on the value of these investments, thereby incentivizing and rewarding a utility for supporting the deployment of public EVSE and helping it maintain visibility in to this new and unplanned load.

Utility Rebates

A rebate program would work similarly to a utility's demand-side management (DSM) rebate programs in that it would offer a specific dollar amount to site hosts for installing qualifying EVSE. It is important that the utility create a list of equipment that qualifies for the rebate to ensure that any EVSE that is installed meets functional requirements and supports the goals of the program, such as providing an open network and managed charging capabilities. The utility should also update the list of qualifying equipment regularly to keep up with the pace of innovation and allow site hosts to install the newest products.

As with make-ready programs, if the utility spends funds prudently in a way that minimizes costs and maximizes benefits to ratepayers and meets the program's criteria, a utility should likewise be allowed to recover the full cost of a rebate program for customers, including both the cost of rebates and administration costs. Such costs can be recovered similar to how the utility recovers costs for its DSM programs. Alternatively, the Commission could consider allowing a utility to treat the rebate program costs as a regulatory asset and earn its authorized rate of return on the amortized amount. While rebates are not typically included in a utility's rate base, doing so provides an efficient and effective mechanism to reward and incentivize the utility for supporting the nascent transportation electrification market and promote efficient grid integration of EV load.

Similar to the Commission's role supervising a utility's investments in its distribution system or administration of a DSM program, the Commission's role in a make-ready or rebate program is to review, approve, or modify the utility's proposal and supervise the utility's implementation of the approved program. Prior to a utility proposing a transportation electrification program, the Commission should consider establishing standards and guidelines for any utility proposal leveraging industry best practices and input from industry stakeholders.

Utility Ownership

There may be some justifiable use cases where full utility ownership and responsibility of all capital costs may be warranted, such as environmental justice and LMI communities. It is important to note that, even in such situations, the local site host participant can still play an important role in the selection and operation of the station. For example, the site host can still be the customer of record for the utility, paying the standard commercial tariff rates, while also setting the driver pricing for those stations. The utility, through ownership of the station, is able to fully cover the capital costs to deploy the stations and can provide the necessary maintenance and monitoring to ensure the station remains operational.

For example, the Commission could ensure that such programs include local site host choice of networking solution vendors and control over the pricing to the EV driver. In doing so, market forces can still be in play, private market actors will be encouraged to invest their own capital and local site hosts will be able to maximize station utilization and optimize the driver experience. Examples of such programs that include utility ownership with local site host choice and control include San Diego Gas & Electric "Power Your Drive" and Pacific Gas & Electric's EV Charge Network in California.

Examples and Evaluative Framework

Utilities around the country have successfully initiated EV charging programs that complement and support the competitive market. The following examples include utility programs that are structured as rebates, make-ready, direct utility-ownership, and "portfolio" approaches that combine some or all of these elements. These following examples allow for customer choice in hardware and network services and ensure that site hosts have operational control over pricing and access to stations, regardless of how the EVSE deployment is incentivized:

- AEP Ohio (OH): 375 ports via rebates
- Eversource Energy (MA): 4,167 ports via utility make ready investments
- National Grid (MA): 1,278 ports via rebates for EVSE and site-host owned make ready
- San Diego Gas & Electric (CA): 3,500 ports via utility-ownership
- Southern California Edison (CA): 1,500 ports with utility make ready and customer rebates for EVSE

Another example is Duquesne Light Company (DLC) in Pennsylvania, which received approval for its "EV Charge Up Pilot" Program by the Pennsylvania Public Utilities Commission (Docket No. R-2018-3000124). While the program design changed over the course of the proceeding, its original ownership-model was designed around six "Guiding Principles":

1. **Support state and local EV policies and goals**
    - The Company [DLC] will engage with its customers, such as the City [of Pittsburgh] and the … [Port Authority of Allegheny County], to help them meet their vehicle electrification goals and help facilitate the connection of … [transportation electrification] to the electrical distribution system.
2. **Support a competitive charging market while maintaining market neutrality**
    - The Company will engage with the competitive charging industry, foster competition, innovation and equipment and network choice without picking winners and losers.
3. **Maintain site host choice and control**
    - The Company will promote customer-site host equipment choice and charging control and enable customer-site hosts to choose how or if to bill EV drivers for charging services.
4. **Ensure equipment is installed safely and maintained efficiently**

- The Company will require customer-site hosts participating in the Pilot to contribute financially to help ensure equipment is deployed safely and utilized and maintained effectively.

5. **Require detailed data from program participants**
   - The Company will require participating customer-site hosts and authorized equipment and network providers to provide detailed data, such as:
     - load profiles including interval data covering charging event duration and site specific charging load management strategies;
     - equipment performance data including but not limited to reliability and percent utilization; and
     - driver experience data including price signals, access to user apps, and 24/7 call center support information.
6. **Manage program operations and costs**
   - The Company will leverage its project management resources to administer the Pilot and track program costs. [2]

Guiding principles such as those identified by DLC facilitate the development of utility programs that accelerate sustainable and scalable growth in the EV and EV charging markets. ChargePoint recommends that the Commission consider adopting similar principles or directing the utilities to adopt these principles in any utility EVSE program proposals. Several jurisdictions have already established criteria for regulators to evaluate EV charging programs proposed by utilities. In addition to traditional cost-recovery considerations, these criteria often evaluate issues that are specific to the EV and EV charging markets, e.g.:

- California PUC Code 740.12 (a)(2)(b) as amended by SB 350 of 2015 (Sec. 32): "Programs proposed by electrical corporations shall seek to minimize overall costs and maximize overall benefits";
- Utah SB 115 of 2016: "54-20-103. Electric vehicle incentive program. (1) The commission shall, before July 1, 2017, authorize a large-scale electric utility to establish a program that promotes customer choice in electric vehicle charging equipment and service…";
- California PUC Code 740.12 (a)(1)(F) as amended by SB 350 of 2015 (Sec. 32): "The commission shall approve, or modify and approve, programs and investments in transportation electrification, including those that deploy charging infrastructure, via a reasonable cost recovery mechanism, if they are consistent with this section, do not unfairly compete with nonutility enterprises as required under Section 740.3, include performance accountability measures, and are in the interests of ratepayers as defined in Section 740.8."
- In Massachusetts, the Department of Public Utilities established a clear set of criteria for evaluating whether utility EVSE investments are eligible for cost recovery without any direction by the Massachusetts General Court (state legislature). *See* D.P.U. Docket No. 13-182-A, Final Order.

[2] The testimony of DLC Witness Joseph DeMatteo can be found in Statement No. 6 and is available at: http://www.puc.pa.gov/about_puc/consolidated_case_view.aspx?Docket=R-2018-3000124.

From ChargePoint's perspective, utility programs that appropriately make use of ratepayer funds share a set of common principles that the Commission should consider. Namely, successful utility transportation electrification programs maintain customer choice, encourage innovation, and stimulate competition; leverage matching payments from site hosts, whenever possible; support site host access and control over pricing; avoid island networks and ensure open access for EV drivers; support equitable access to electric transportation options; and encourage smart charging behavior to enable widespread grid benefits.

Maintain Customer Choice, Encourage Innovation, and Stimulate Competition

Utility transportation electrification programs should incorporate a customer-centric approach by allowing a commercial site-host to choose the type, number, and brand of EV charging stations that are installed on the site-host's property, as well as the EV charging network service associated with those stations. Different site-hosts install EVSE for different reasons and with different goals in mind. The EV drivers that will use a site-host's EVSE are also the site-host's customers, employees, tenants, or constituents, so the site-host is best positioned to assess their needs and provide the optimal charging solution. Further, some site-hosts will look for the most cost-effective option while others will be more interested in offering the most advanced features to EV drivers, in addition to cost considerations.

When site-hosts can choose the EVSE that best meets their needs, EVSE vendors strive to develop the most innovative products and compete to meet site-hosts' needs. In other words, a thriving competitive market that offers a wide variety of innovative products at competitive prices depends on a site-host's ability to choose the right product. By contrast, utility programs that rely on procurement of a charging solution through traditional RFP methods may result in a "one-size fits-all" approach that is set for several years and is not able to provide choice and flexibility to participating site hosts and EV drivers. RFPs that result in one single hardware or network offering will also essentially exclude other providers from actively participating in the service territory, making it harder for a self-sustaining market to develop and grow over time. However, RFP processes can be supportive of continued market innovation if they are used to pre-qualify multiple hardware and network service options based on minimum functional criteria that support the site host, EV drivers, and the utility's needs. This ensures that charging solutions meet minimum specifications without picking winners and losers.

Leverage Private Funding

The most impactful and cost-effective utility EVSE programs do not rely exclusively on ratepayer funding. Instead, effective EVSE programs require site-hosts to have some "skin-in-the-game" by sharing in the cost of the EVSE that is deployed. For make-ready and rebate programs, skin-in-the-game typically means that a site-host will pay for any upfront costs of the EVSE, including installation costs, not covered by the utility's make-ready program. Site-hosts can also contribute to overall EVSE costs by providing signage and giving up a portion of their parking lot for EV charging.

Leveraging private funding has two major benefits. First, when site-hosts contribute to the total upfront cost of EVSE, the ratepayer funds dedicated to the program go further and lead to the deployment of more EVSE than they would if the utility were covering 100 percent of the costs.

Second, when site-hosts share in the cost of EVSE, they are motivated to maximize the value of their investment. In practice, maximizing the value of an investment in EVSE means that a site host will try to maximize the utilization of the EVSE by experimenting to find the most effective fee structures, providing visible signage to attract EV drivers, enforcing parking policies so that non-EVs do not block the EVSE, and generally ensuring that the EVSE remains functional and in good repair. By contrast, if a commercial site host has no financial responsibility or vested interest in the station operations they may not be motivated to maximize EVSE utilization, promote awareness, or have any consideration of the driver experience.

Support Site-Host Access and Control Over Pricing

In order to fulfill its own unique goals for hosting EVSE, a site host must be able to access the EVSE's back-end network and have control over pricing of the EV charging services to the drivers. When a site-host has access to the EV charging network, the site host gains valuable insights into how the EVSE is used, such as learning how many charging sessions have occurred, what time of day the EVSE is most often used, the average duration of charging sessions, among other key utilization insights. When a site host can understand and measure how its EVSE is being used, it can manage the EVSE accordingly to maximize the value it provides both to itself and to EV drivers.

Further, a site host must be able to adjust pricing to drivers as it sees fit because different pricing schemes can help site-hosts achieve their various goals. For example, a big-box retailer may want to offer free charging for the first hour to encourage EV drivers to shop in its store, but then charge a fee to encourage drivers to move their vehicles. A MUD owner may want to offer free or discounted charging as a benefit to residents, but charge guests a fee. A convenience store may want to vary the fee it charges throughout the day to encourage charging and attract customers during slower times. Whatever the site host's goal, various pricing structures can help the site-host achieve that goal. As with the skin-in-the-game principle, when a site-host is invested in the success of the EVSE, drivers reap the benefits and ratepayers benefit from a higher utilized grid.

Avoid Island Networks and Ensure Open Access for EV Drivers

Any EVSE program should be designed with EV drivers in mind. Over the long term, transportation electrification efforts will only be successful if EV drivers' overall experience of EV ownership, including public charging, is positive. To ensure positive experiences, an EV driver should be able to charge her vehicle at any publicly available EVSE that is supported by ratepayer dollars regardless of the driver's make of vehicle or membership in an EV charging network. Many EV drivers may choose to join an EV charging network for the convenience that it provides, but

membership should not be a requirement to use a charging station. Similarly, EVSE must not be restricted to customers of the utility that supported the deployment of the EVSE. Finally, publicly available EVSE should accept multiple forms of payment, including credit cards, to ensure that charging at public stations is easy and convenient.

Avoiding creating island networks – in which there are networks that only certain drivers can use and which make it difficult for members of the island network to use other charging stations – is crucial to the value proposition for drivers considering purchasing an EV. Island networks make it difficult for EV drivers to travel or move to new cities or in and out of specific utility territories. By contrast, protecting open access for EV drivers ensures a seamless, hassle-free experience that encourages other drivers to purchase EVs.

To ensure that EV drivers have access to EVSE, site-hosts must also be empowered to oversee parking spaces that are restricted to EVs while actively charging. Site-hosts should be allowed (and perhaps required) to install signage restricting parking spaces and permitted to tow vehicles that park in designated parking spots but do not use the EVSE. Such enforcement policies are crucial to ensure that EVSE is accessible to EV drivers when they need it.

Support Equitable Access to Electric Transportation Options

The transition to electric transportation should not leave any groups behind. Utility EVSE programs should include and even emphasize environmental justice and economically disadvantaged communities, perhaps through increased incentives, targeted technical assistance, and encouraging electrification of public transit and/or ride-hailing services to provide solutions to those who do not own their own vehicle. These communities can often benefit the most from transportation electrification through reduced emissions and increased transportation options. The Commission should ensure that any utility transportation electrification proposals account for the unique needs of these communities and include them in their programs.

Encourage Smart Charging Behavior to Enable Widespread Grid Benefits

EVs can be more than simply new load for utilities. With the right policies, rate structures and incentives, EVs can be beneficial loads. For example, through EV-specific TOU rates, a utility can encourage EV drivers to charge during off-peak hours or during peak solar hours, depending on the utility's needs. Customers with smart chargers can also opt in to demand response programs.

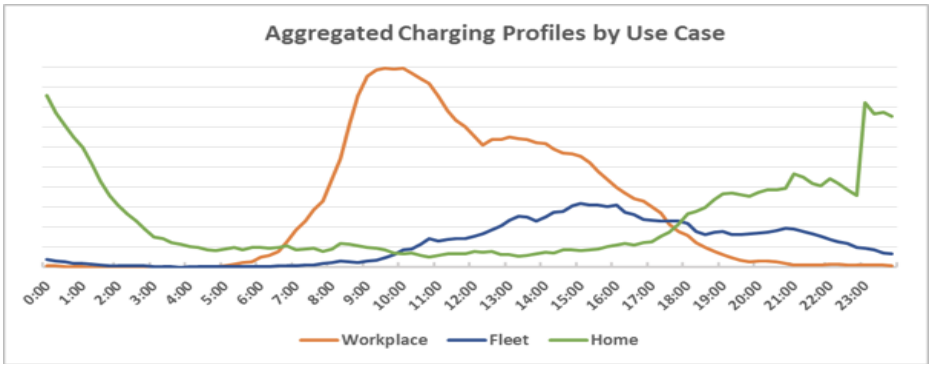
ChargePoint recommends that the Commission encourage utilities to consider programs and pilots that can enable such grid benefits through the use of networked charging solutions capable of smart charging and provided detailed charging data. In practice, that means that EVSE must have embedded metering, two-way communications, and have smart charging capabilities including compliance with OpenADR2.0.

It is important to note that utilities do not need to own or operate EVSE in order to enjoy the benefits of smart charging capabilities. Using both incentives and targeted rate structures, utilities can manage energy flows through EVSE without directly owning or controlling the infrastructure itself. In the event the utility does own some EVSE, it can (and should) allow local site-hosts to choose the network services that run on the EVSE and be able to set the default EV driver pricing to align with their specific use case.

5. **How can EV and EVSE companies assist in facilitating the achievement of the goals of the State's Comprehensive Energy Plan and its greenhouse gas reduction goals?**

ChargePoint encourages the Commission to consider the variety of ways in which the new load stemming from increased adoption of EVs can facilitate the achievement of State energy and environmental goals. The types and levels of benefits to the grid from EV charging taking place under an energy management program will vary greatly by EV charging use case, as illustrated in Fig. 2. We encourage the Commission to "right-size" the rate design and load management approach for each use case weighing factors such as potential coincidence with peak load, absolute proportion of charging in such use case, EV driver's flexibility in charging time and requirement, program complexity, and alignment of incentives throughout the EV charging ecosystem.

Fig. 1: Normalized EV Charging Utilization by Use Case



ChargePoint recommends that the Commission keep two key questions in mind when considering the relative value of energy management programs in different EV charging use cases: (i) what will be the impact on driver experience, and (ii) is this the best use case for energy management?

- Residential charging is perfectly suited for demand-side management programs due to the long dwell times available for charging, the ability to shift charging within that time period, and the EV driver typically serving as their own "site host". As noted previously, EV drivers charge their vehicles at home 64% of the time. In addition, numerous studies have shown that residential charging is very responsive to TOU rates.

- Fleet charging is an ideal use case to support demand-side management and smart charging of EVs. This is due to long dwell times, certainty around vehicle operational

needs, and the direct relationship between the vehicle's owner and the charging station's owner.

- Workplace charging presents opportunities to shape charging during the day due to the extended dwell times and repeat users of such charging stations. Workplace charging can be incentivized to avoid early morning peaks or to serve as a "sponge" for overgeneration of solar in the middle of the day.

Publicly-available charging is the least optimal use case for demand-side management programs for a few key reasons. First, a very small percentage of total EV charging is, or will be, conducted at publicly-available stations. Only 2-3% of charging taking place outside of home and workplace.[3] Such charging is often randomized and occurs throughout the day. While publicly-available charging will likely grow as vehicles begin to support longer-distance travel, the majority of all charging will continue to take place at longer dwell-time, more predictable locations.

Second, there is an inherent difficulty in aligning the incentives between the site host (customer of record for the utility), the transient EV driver, who may or may not be a native utility customer, and the utility.

Finally, drivers that plug into publicly-accessible EV charging stations are often relying on a quick charge to get back on the road. Any load curtailment or interference with their "refueling" would result in a poor driver experience and significantly impede EV adoption.

IV. CONCLUSION

Thank you for the opportunity to provide comment on these questions. ChargePoint looks forward to participating in the workshop on April 23.

[3] Smart, John. Lessons Learned About Workplace Charging in the EV Project. Idaho National Labs. 2015.

Appendix A: Barriers to EV Charging

Use Case	Barrier
Residential *Single Dwelling*	● Lack of garage/dedicated parking ● Lack of EV-specific signals/load management to encourage off-peak charging ● Requirement for secondary utility meter for EV charge tracking & potential billing
Residential *Multifamily*	● Lack of decision-making authority to install EVSE (e.g., permission from condo board) ● Technical/power challenges: insufficient capacity; distance to parking stall(s); etc. ● Restrictions on using advanced features in networked EVSE (e.g., power management to avoid capacity upgrades; embedded metrology to avoid cost of additional meters; etc.) ● Multi-Unit Dwellings (MUDs) have multiple use cases: shared vs assigned parking ● Lack of EV Ready requirement leads to higher retrofit installation costs ● Upfront cost of installation
Quasi-Public *Workplace*	● Upfront cost for installation; ● Restrictions on using advanced features in networked EVSE (e.g., power management to avoid capacity upgrades; embedded metrology to avoid cost of additional meters; etc.) ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging
Public *Level 2*	● Upfront cost for installation; ● Municipal permitting/zoning requirements ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Lack of EV Ready requirement leads to higher retrofit installation costs
Public *DC fast charging (community)*	● Upfront cost of equipment and installation ● Lack of available electrical capacity at existing sites and high cost to supply sufficient utility distribution service ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Electric interconnection costs ● Three different common charging connectors ● High operating costs of DC fast chargers due to low load factor & traditional, demand-based electricity rates
Public *DC fast charging (corridor)*	● Upfront cost of equipment and installation and operation ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Access to appropriate site hosts with adequate amenities and safety ● Lower expected utilization along corridors ● Electric interconnection costs ● High operating costs of DC fast chargers due to low load factor & traditional, demand-based electricity rates
Overarching *Policy, regulatory, & industry*	● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Regulatory clarity regarding utility role in competitive EV charging market ● Rate structure options & mitigation opportunities for fast charging ● Ability to roam between networks

Appendix B: Open Access Requirements

Purpose of Policy:
EV drivers should be able to access any publicly available EV charging station, regardless of the system provider.

Requirements:
(1) A person shall not be required to pay a subscription fee to use a public electric vehicle charging station or be required to obtain a membership in a club, association or organization as a condition of using the station; provided, however, that owners and operators of public electric vehicle charging stations may have separate price schedules conditional on a subscription or membership
(2) The owner or lessee of a publicly available parking space, whose primary business is not electric vehicle charging services, may restrict the use of that parking space, including by limiting use to customers and visitors of the business.
(3) The owner or operator of a public electric vehicle charging station shall provide payment options that allow access by the general public.

Necessary Definitions
"Public electric vehicle charging station"- An electric vehicle charging station located at a publicly available parking space.

"Publicly available parking space"- A parking space that has been designated by a property owner or a lessee to be available to and accessible by the public and may include on-street parking spaces and parking spaces in surface lots or parking garages; provided, however, that publicly available parking space shall not include a space that is part of or associated with a private residence or a parking space that is reserved for the exclusive use of an individual driver or vehicle or for a group of drivers of vehicles including employees, tenants, visitors, or residents of a common interest development or residents of an adjacent building.

Citations
Connecticut: Public Act No. 16-135
Massachusetts: Ch. 448 of the Acts of 2016
New Hampshire: SB 575
California: SB 454