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VIA ELECTRONIC FILING

February 5, 2019

Judith Judson, Commissioner
Department of Energy Resources
100 Cambridge Street, Suite 1020
Boston, MA 02114

Re: Clean Peak Standard (CPS) Stakeholder Questions

Dear Commissioner Judson,

Attached for electronic filing in the above-referenced matter, please find comments on behalf of ChargePoint, Inc., in response to the request for comments as posted the Department of Energy's website.

Respectfully,

Kevin George Miller
Director, Public Policy
ChargePoint

CC: Michael Judge, Director, Renewable & Alterative Energy Division
Will Lauwers, Director, Emerging Technology

Clean Peak Standard (CPS) Stakeholder Questions
Comments by ChargePoint, Inc.

1. Introduction and Background

A. Introduction

ChargePoint appreciates the opportunity to provide comments to support the Department of Energy Resource's ("DOER," or "the Department") in its effort to develop a Clean Peak Standard. Our comments are limited to the extent to which electric vehicles ("EVs") and EV charging stations are incorporated into a Clean Peak framework.

B. Background on ChargePoint

ChargePoint is the nation's leading 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 access to more than 59,000 independently owned charging spots, ChargePoint drivers have completed more than 50 million charging sessions, saving upwards of 53 million gallons of gasoline and driving more than 1.2 billion gas-free miles. More than 2,400 of our charging spots are deployed in Massachusetts.

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.

2. Transportation Electrification as a Demand Response Resource

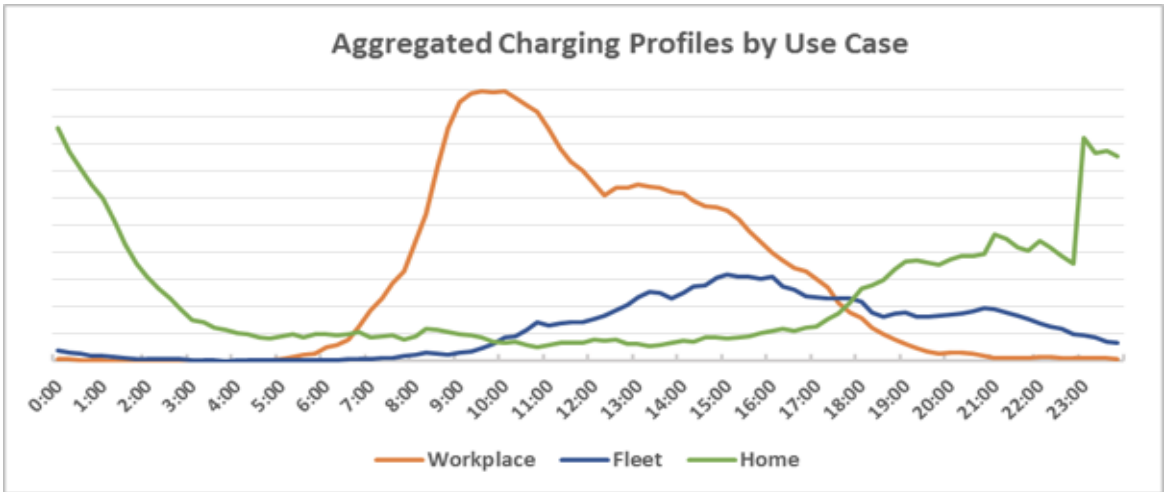
A. Electric vehicles can improve grid reliability and resilience

Transportation electrification has the potential to improve grid reliability and resilience, create value for all ratepayers, and support a Clean Peak Standard. Several studies highlight that the expected long-term energy revenues from incremental EV load generally exceeds the costs for the grid to support that load, such as *Engaging Utilities and Regulators on Transportation Electrification* (E3, 2015), *Plug-in Electric Vehicle Cost-Benefit Analysis: Massachusetts* (MJ Bradley, 2016), and others. In effect, investments in EVSE exert a downward pressure on unit energy costs that can benefit all utility customers regardless of EV ownership. However, this is predicated on the EV load not resulting in excessive new investments in distribution infrastructure costs and avoiding high cost "peak" generation and/or distribution time periods. The associated benefits of additional EV load to all utility customers could be significantly increased and grid infrastructure risks lowered by leveraging connected, smart charging infrastructure as and effectively managing that load.

B. Different charging use cases present different value to the grid

ChargePoint encourages the Department to consider the variety of ways in which the new load stemming from increased adoption of EVs can be shaped to create widespread grid benefits through electric rate design and load management techniques. 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. 1. We encourage the Department to "right-size" its 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 Department 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". Furthermore, charging at home is far the location where the most EV charging will occur. One analysis conducted through the Idaho National Labs found that, on average, EV drivers charged their vehicles at home 64% of the time.[1] In addition, numerous studies have shown that residential charging is extremely responsive to price signals through time-of-use ("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. The same INL study noted above also found that approximately 33% of EV charging is conducted at work. 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.

a. Public charging will have limited grid impact.

Publicly available charging, including L2 and DCFC, is 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. However, 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.[2] 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.

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

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.

C. Technology for transportation electrification load management

There are many different technologies that can be used to manage the new load associated with greater transportation electrification. ChargePoint's stations and cloud services, and those provided by our competitors, provide the ability for independent station operators to conduct load management of the allowable power level in real time in response to price signals.

EV charging networks can provide the ability for station operators to grant access rights to utilities to conduct demand response on their stations. Like any other utility demand response program, the site host participants would likely receive some incentive in exchange for offering this capability. For example, ChargePoint offers the ability to utilize standards-based application programming interfaces, or APIs, to automatically send demand response commands to the ChargePoint Cloud and control stations in the field. Furthermore, the ChargePoint server is certified as OpenADR2.0b compliant, providing a common and open standard-based interface for utilities to conduct load management events.

Allowable charging power levels can be completely shed, partially shed on a percentage basis of the actual load, or set to fall under a lower power level ceiling. Such load management events can be scheduled to expire after a period of time, returning to the equipment normal maximum power output, or the event can be immediately rescinded at any time. These demand response events can be programmed to occur for individual charging ports or any desired groups of ports.

In addition to load management capabilities, utilities or other stakeholders can also be granted access to interval-level charging data that are recorded via the embedded meter of the charging station. These, and other, data provide valuable insight into the load profiles, charging dispersion by geographic locations and clustering, station uptime, and utilization trends over time for all stations involved in any utility program. Insights drawn from analyzing this data can inform system planning help to evaluate the effectiveness of a utility's EV charging program.

With existing technologies provided by networked charging solution providers, utilities and third-party aggregators can easily integrate with a variety of platforms (similar to smart thermostats) to issue load shedding commands, confirm response, and analyze charging data. In addition to load shedding events, price signals to residential or commercial customers of record that host charging stations can also be used to encourage off-peak charging of EVs.

D. Metering requirements should focus on functional capabilities

ChargePoint recommends that the Department consider the range of options to safely, accurately, and reliably measure and monitor electricity usage attributable to EVs.

The successful integration of transportation electrification into a Clean Peak Standard framework hinges on the ability to accurately measure the energy usage that is solely attributable to EV charging on a per-port basis. This can be achieved through the installation of a new "under the glass bulb" meter on a per circuit level, though that is not the only way.

ChargePoint, and other smart charging solution providers, integrates a meter as part of the charging station. These meters are capable of providing both cumulative and interval level data for the electricity dispensed to an EV. This data is easily accessible to utilities, secure, and reliable. In terms of accuracy, ChargePoint meets or exceeds the requirements set forth in the electricity-as-motor-fuel sections of NIST Handbooks 44. In utility terms, our charging stations meet the accuracy requirements of ANSI C12.1-2008 (1% class) as applied to embedded EVSE metering.

Other jurisdictions have already begun to explore the capabilities of end-use metering devices like "smart" EVSE. The Minnesota Public Utilities Commission cited the need to overcome barriers to EV TOU rate adoption when it approved a pilot proposal by Xcel Energy to reduce the upfront cost burden for customers looking to opt into EV tariffs by implementing the tariff directly with networked EVSE. *See* Minnesota Docket No. 17-817: Petition for Approval of a Residential EV Service Pilot Program. In Vermont, ChargePoint is currently providing a networked charging solution for Green Mountain Power's managed home charging program. This program includes both demand response and an off-peak charging plan that leverages embedded metering within the EVSE to then compare against total premise metered data from the utility meter.

E. One-way vs. two-way load management

Two-way communication between EVs and the grid can be incorporated into a variety of different applications. From a communications standpoint, ChargePoint's stations already have the capability of communicating through standardized communication protocols, such as OpenADR2.0b. Advanced vehicle-to-grid ("V2G") applications are also being explored through the utilization of other protocols, such as ISO 15118. California's Vehicle Grid Integration Working Group identified more than 70 different V2G applications that were possible through the use of ISO 15118.

One of the more commonly discussed "two-way" V2G functions is the ability of the EV to export energy back onto the grid for the purposes of providing frequency regulation or other ancillary services. The technology and standards around this particular use case is less developed than other more commercial applications discussed in the previous response. There

are several challenges to the mass deployment of this type of functionality, including: vehicle battery warranty concerns, vehicle technological capabilities, metering and telemetry requirements, interconnection rules to ensure safe grid operations, comprehensive control algorithms, and contractual requirements that would provide sufficient value to all parties. Each of these challenges would likely require multiple policy actions, some which may include necessary action by PJM to address the ability of EVs to export energy onto the grid.

While V2G promises interesting capabilities in the future, "one-way" energy flow management of EV charging already exists. This currently-available load management can provide a vast majority of the potential grid benefits associated with transportation electrification.

F. Certificate generation

In terms of certificate generation structures, ChargePoint recommends considering credit structures that have successfully been applied in California's Low Carbon Fuel Standard (LCFS) and Oregon's Clean Fuels Program (CFP). These structures were designed to reduce the risk of double-counting and of multiple entities claiming right to the same credit/activity. To ensure that all credits are captured, we recommend a structure that allows credit generating entities to assign credit rights to other registered system participants. We would be happy to provide additional comments on this subject at the appropriate time.

3. Conclusion

Thank you for the opportunity to provide comments. We look forward to continue working with the Department and other stakeholders on the Clean Peak Standard to achieve the Commonwealth's energy, environmental, and transportation electrification goals.