BRITISH COLUMBIA UTILITIES COMMISSION
INQUIRY INTO THE REGULATION OF ELECTRIC VEHICLE CHARGING SERVICES

ChargePoint Inc. ("ChargePoint") Response to IR No. 1 from British Columbia Utilities Commission ("BCUC")

June 6, 2018

1.0 Reference: Exhibit C25-2, pp. 7–9
Competitiveness

On pages 7 to 9 of Exhibit C25-2, ChargePoint states:

> The Commission Panel in the "Inquiry Into the Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives" (the "AES Inquiry") recognized that the "literal interpretation…. The Commission confirmed that its interpretation and application of the UCA should take into account the market context, specifically the "degree to which natural monopoly characteristics are present and whether the consumer requires protection." ChargePoint concurs, and submits that the Commission should come to the same conclusions in these circumstances
> …
> The relationship between EVCS owner/operator and EV driver is fully competitive.
> …
> According to Natural Resources Canada's Electric Charging and Alternative Fuelling Stations Locator, there are 1,237 public charging ports in BC provided by a wide range of EVCS owners and operators.

1.1 In the view of ChargePoint, does 1,237 charging points in BC constitute a "fully competitive" market? Are there any gaps where the market is not fully competitive, either by location or for a particular service type/group?

On page 9 of Exhibit C25-2, ChargePoint states:

> 1.1.1 Please elaborate on the features that allow EVCS owners/operators compete against others.

Response:

1.1 In ChargePoint's view a "fully competitive" market is one in which EV drivers have multiple choices in charging services, and in which site hosts have multiple choices in charging products to purchase or host. The total number of chargers in the Province is not necessarily reflective of a competitive market. For example, it would not be a fully competitive market if drivers and sites hosts were dominated by a single offering for charging services, even if there was a large number of these chargers installed. In ChargePoint's view, EV drivers in BC have options in both private (home or workplace) and public charging locations, and these EVCS are provided by a diversity of owners and operators. While there may be areas that are underserved by EVCS, we do not perceive this as the result of a market that is not "fully competitive" – and is certainly far from one that has failed, per some submissions – but rather one that could benefit from additional investment and government support.

1.1.1 EVCS owners/operators can compete to attract drivers with the following features:

- Price to driver (or by offering free charging)
- Location of parking spots
- Ease of access to charging locations (i.e., proximity to highway exit)
- Mobile apps created by network operators that allow EV drivers to easily find and navigate to a charging station, have visibility into charging station availability/operation, and seamlessly start, pay for and end a charge (consider the success this tool has given Uber)
- Multiple methods of payment, including RFID card, mobile app, credit card and Apple/Android pay
- Maintenance of stations and station uptime
- Quality of hardware, including cord/cable management
- Peer-to-peer driver communication
- 24/7 EV driver support with 1-800 number
- Station wait-lists and reservations
- Indirect benefits of site, i.e., attracting drivers because of shopping, employment, perks of living there, etc.

2.0 Reference: Exhibit C25-2, p. 10
Other jurisdictions

On page 10 of Exhibit C25-2, ChargePoint states:

> Currently, 20 states and the District of Columbia have determined, through statutory amendment or regulatory clarification, that charging services provided by nonutility third party EVCS owners and operators are outside of regulatory commission jurisdiction.

2.1 From the analysis undertaken by ChargePoint, please discuss the other US states in which statutory amendments or regulatory clarifications were not made. Please clarify whether EV charging service provided by site hosts/third-parties are considered a regulated activity, or whether those US states have not made a determination.

Response:

2.1 While only 20 states and the District of Columbia have made a determination through statutory amendments or regulatory clarifications on jurisdiction over EVCS, it does not necessarily mean that the other 30 states have explicitly determined that charging services are a regulated activity. Of those states that have not made a determination, at least two have ruled that individual utilities must allow third parties to offer tariffs for charging services (Michigan, Missouri) but have not yet made a determination that applies statewide. Some states have determined that legislation is necessary to codify that EVCS owners and operators are outside of regulatory commission jurisdiction. For example, Delaware is currently considering legislation on the issue, which will be voted on later in June: https://legis.delaware.gov/BillDetail/26585. Other states have simply not considered the issue at all.

3.0 **Reference: Exhibit C24-2, pp. 12, 32**
BCUC Thermal Energy System Guidelines (TES Guidelines), p. 7
Class exemption

On page 32 of Exhibit C24-2, ChargePoint states:

> If the Commission determines that EVCS owners and operators are captured by the definition of "public utility" under the UCA, then the Commission should exempt EVCS owners and operators from regulation. The Commission has previously taken a similar approach for thermal energy service ("TES") installations, specifically the "Micro TES" and "Strata TES" categories under the TES Guidelines attached as Appendix A to Order G-27-15. The current circumstances justify the use of exemptions to exclude EVCS from regulation even more strongly, because none of the indicia suggesting the need for regulation, as previously identified by the Commission, are present here. For that reason, no conditions or threshold, capital cost or otherwise, should apply to an EVCS exemption.

On May 19, 2016 by Order G-71-16, BCUC granted Bakerview EcoDairy an exemption from Part 3 of the *Utilities Commission Act* (UCA), except sections 25, 38, 42, 43, 44 and 49.[1]

3.1 In ChargePoint's view, if BCUC were to recommend a class of cases exemption to government in relation to EV charging service, what factors should be considered in developing the classes? Further, what sections of the UCA, in ChargePoint's view, should EV charging service be exempt from?

3.2 Does ChargePoint have a view on what the classes could be (e.g. based on different levels of EV charging equipment, charging station geographic locations, type of dwelling, owner/operator structure, some combination of the above, or others)? If yes, please describe.

On Page 12 Exhibit C25-2, ChargePoint states:

> The Commission has previously taken a similar approach for thermal energy service ("TES") installations, specifically the "Micro TES" and "Strata TES" categories under the TES Guidelines attached as Appendix A to Order G-27-15.

The TES Guidelines includes an outline of the BCUC's role with regards to the TES complaint process

3.3 Please discuss whether ChargePoint believes that the BCUC should have a role in EV charging with regards to complaints that is similar to TES as outlined in the TES Guidelines.

3.4 Please summarize the nature of customer complaints with regards to EV charging stations in BC and other jurisdictions that ChargePoint is active in. Please outline the accountable entities, and how such complaints are resolved.

[1] http://www.bcuc.com/Documents/Proceedings/2016/DOC_46352_05-19-2016_Bakerview-Exemption-Approved_G-71-16.pdf

On page 7 of the BCUC's Thermal Energy System Guidelines (TES guidelines), it states:

> Strata Corporation TES[2]: A TES owned or operated by a Strata Corporation, or the Strata Corporation's lessee, trustee, receiver or liquidator, that supplies the Strata Corporation's owners, is exempt from Part 3 of the UCA other than sections 42, 43 and 44.

3.5 Hypothetically in ChargePoint's view, should an exemption similar to the Strata Corporation exemption in the TES Guidelines be considered for Strata Corporations if EV charging service were to be regulated by the BCUC? Please discuss.

Response:

3.1 ChargePoint would recommend that an exemption for EVCS be based on the absence of natural monopoly characteristics, using the factors considered by the Commission Panel in the "Inquiry Into the Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives" (the "AES Inquiry"), specifically the "degree to which natural monopoly characteristics are present and whether the consumer requires protection."

In this regard, ChargePoint would recommend that a Part 3 exemption for EV charging services go beyond the exemptions specified in the Bakerview EcoDairy in two ways. First, by omitting the obligation to comply with sections 25 (improved service) and 38 (duty to provide service). In BC, these obligations are unnecessary: see ChargePoint's responses to IRs 1.1 and CEC 1.4.1. While ChargePoint supports obligations to obey orders, retain records and provide information upon request (assuming regulation is required by the Act, which ChargePoint does not agree with), those obligations should not rise to the level of annual reporting. Again, the circumstances in most of BC are such that the consumer is protected from potential natural monopoly abuse, and the regulatory burden of regulation should be minimized as much as possible.

3.2 Assuming that the Commission (i) rejects the view that charging is a specialized service (per New York, Massachusetts, Missouri, and reflected by the current practice of charging based on time), and (ii) finds an element of natural monopoly harm to customers, then ChargePoint's view would be that all EVCS should be in a single class and that an exemption should apply to all EVCS owners/operators according to the factors noted in 3.1. It would be confusing to EV drivers and EVCS owners/operators if charging services were regulated differently based on technology type, location, or application. For example, on page 10 of Exhibit C19-2, the MEMPR indicates that some form of class exemption may be warranted for Level 1 and Level 2 charging services but some form of regulation may be warranted for DCFC services. A situation such as the one proposed by the MEMPR could cause confusion for EVCS owners/operators and potentially be perceived as a barrier to investment as Level 2 stations are often co-located with DCFC stations. In that case, the EV charging services provided by the owner/operator would be regulated by two separate processes, which would likely dissuade a customer from installing charging stations at all.

It is very important to understand that the professional fees, staff time and risk associated with navigating the legal and regulatory framework, and assessing and managing exemption compliance and reporting obligations, are a material disincentive to investment. In addition, consideration should also be given to the utility and Commission staff time required to

[2] As defined by the *Strata Property Act* [SBC 1998].

administer such a regulatory structure, which represent costs ultimately paid for by customers of one rate class or another.

3.3 ChargePoint believes that the BCUC should not have a role in EV charging services with regards to complaints that are similar to TES as outlined in the TES Guidelines. As EV charging services do not possess natural monopoly characteristics, EV drivers can go elsewhere if services or prices are deficient.

3.4 ChargePoint's business model recognizes the importance of a positive charging experience to EV drivers and EV uptake in general. Therefore ChargePoint offers customer support on the phone 24 hours a day, 7 days a week for EV drivers. Customer support includes the ability to troubleshoot and remote start each station. We also offer support for charging station site hosts. In addition to customer support, ChargePoint offers maintenance services to EVCS owners/operators to ensure stations uptimes are preserved, with pro-active station monitoring and dispatch, 98% station uptime guarantees, and 1 business day response time for station failures.

These services are often a requirement of grant funding or site host agreements when stations are owned, operated or installed by different parties. For example, eligibility requirements under the California Energy Commission's grant entitled, *Alternative and Renewable Fuel and Vehicle Technology Program for DC Fast Chargers for California's Interregional Corridors*, includes a number of eligibility requirements that address driver support and access, station operation and maintenance, and uptime guarantees. Another example is illustrated in Exhibit 34-2 of this Inquiry where service levels agreements were developed with FortisBC and BC Hydro as part of the Accelerate Kootenays infrastructure deployments.

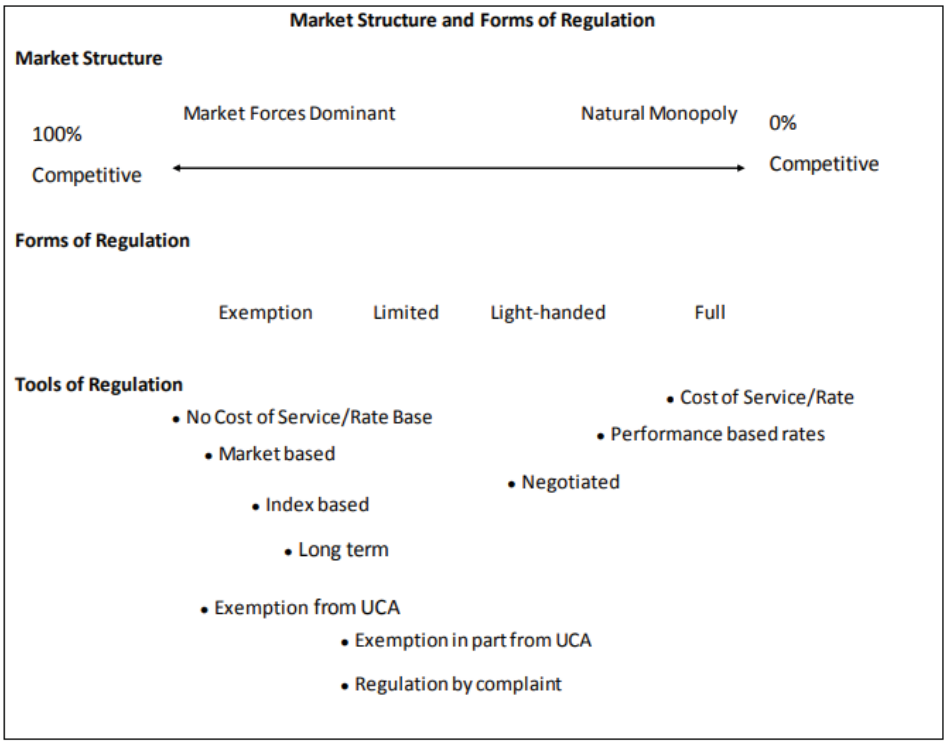
Much like other products and services offered in BC, customer complaints not addressed directly by the company can be addressed through Consumer Protection BC or local Better Business Bureaus. Customer complaints in other jurisdictions are addressed by equivalent consumer protection organizations in those regions.

Ultimately, a company with poor customer services will be punished by the market as its products and services would be avoided, and preference given to its competitors. This is a powerful incentive for EVCS providers and site hosts to provide high quality charging equipment and services.

3.5 Please see ChargePoint's response to 3.1. Given the BC market circumstances and risk of customer and site owner confusion, all EVCS locations and applications, including stratas, should receive the same level/type of BCUC oversight. ChargePoint understands that the TES strata exemption arises in general recognition of the fact that a strata council exists to deal with potential consumer complaints relating to TES pricing or service, where the TES service within the strata represents a natural monopoly. That is not the case for EVCS, in that while some EV drivers may regularly use strata-based EVCS, they are still able to obtain EVCS elsewhere.

4.0 Reference: BCUC Inquiry into FortisBC Energy Inc.'s Offering of Products and Services in Alternative Energy Solutions (AES) and Other New Initiatives proceeding, Order G-231-13A with reasons for decision, pp. 23–24
Proposed regulatory framework and guide for thermal Energy Service Utilities

On pages 23 and 24 of the Reasons for Decision attached to Order G-231-13A, the BCUC states: The [AES][3] Inquiry found that the form of regulation should be determined by the market structure. The Panel agrees with this assessment. The figure below illustrates the Panel's view of the relationship between market structure and the various tools of regulation.



The Panel in Order G-231-13A also agreed with the basic regulatory concepts outlined in the AES Inquiry Report whereby regulation should be the option of last resort and competition should always be preferred over regulation.

4.1 Please discuss whether the BCUC in this EV Inquiry should consider the relationship between market structure and forms of regulation, as shown above in the diagram. If not, why not?

4.2 Suppose the BCUC uses the above diagram as a guide to determine the appropriate form of regulation. Given the market structure noted in ChargePoint's submission, what would be the corresponding form of regulation and tool of regulation? If any different, please explain in terms of the ChargePoint's view of the current market structure and the expected market structure in the next 3-5 years.

[3] Inquiry into FortisBC Energy Inc.'s Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives

Response:

4.1 Yes, but a pre-condition for applying the diagram, i.e., whether the Commission has jurisdiction to regulate, are findings that (i) charging electric vehicles is reselling electricity under the UCA, unlike the "Massachusetts and New York" model of treating charging as a service (see pp. 10-12 of ex. 25-2), despite the current practice in BC of selling units of time and (ii) natural monopoly circumstances exist, as in the AES Inquiry. As discussed in its response to IR 3.1, ChargePoint submits that the provision of EV charging services and EVCS, both Level 2 and DCFC, does not display the characteristics of natural monopolies, barriers to entry, and captive markets. EVCS and charging services are provided in a competitive market, which both protects consumers and offers them innovation and choice

4.2 ChargePoint's view is that EV charging services operate in a competitive market in BC. Put another way, there are no instances of natural monopoly EV charging services (see response to IR 1.1). Therefore EV charging services should be excluded or exempt from utility regulation. However, an exemption from the UCA should not preclude utilities from "rate basing" investments in charging infrastructure provided that competition and customer choice are preserved.

An exemption/exclusion for EV charging services will aid in bolstering the competitive market, and support the development of a robust market with increased investment from both public and private entities. Over the next 3-5 years, ChargePoint anticipates continued growth in the market and an increase in the offerings available to EV drivers and site hosts.

B. INVESTMENT DECISION

5.0 Reference: Exhibit C20-2, p. 6
exhibit C15-2, p. 2
FC - third-party investment

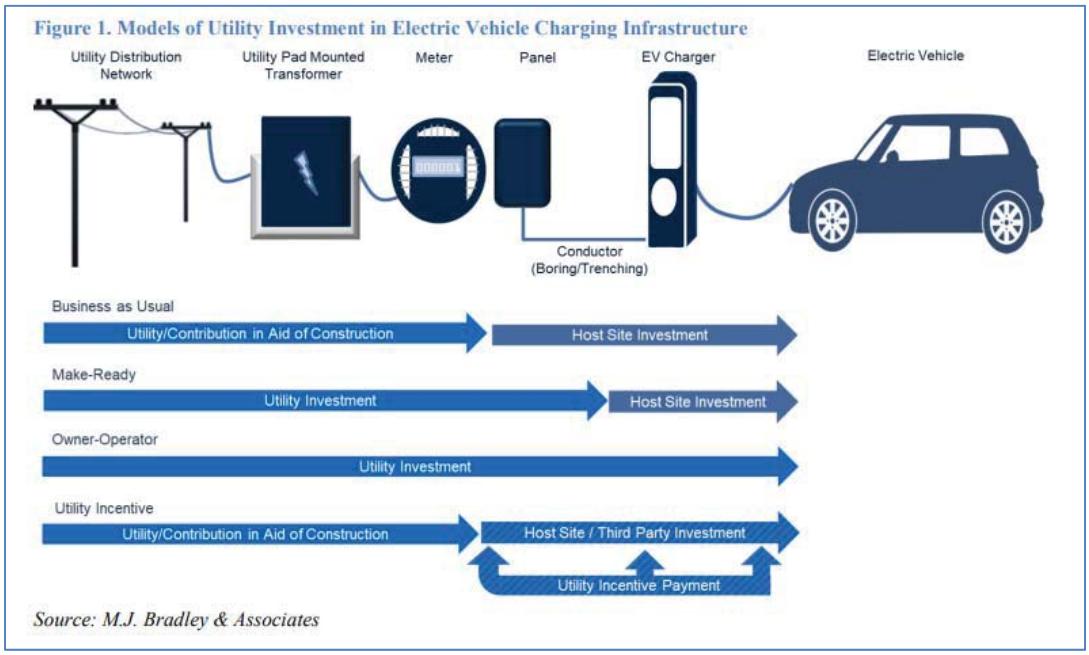
On page 6 of Exhibit C20-2, AddÉnergie Technologies Inc. (AddÉnergie) states:

> That the major barrier to EV charging station competitiveness is that British Columbia lacks a comprehensive network of charging stations and that one is unlikely to be developed by [third-party] investment alone.

On page 2 of Exhibit C15-2, Greenlots states:

> [Unfortunately] a sustainable, competitive market is aspirational, and is unlikely to arise prior to the adoption of a critical mass of electric vehicles. This is primarily on account of a lack of a business model for the ownership and operation of public charging stations based on sustainable revenues from charging activities, and this has thus far resulted in a fundamentally inadequate amount of [third-party] investment in such charging infrastructure.

In a report authored Georgetown Climate Center and by M.J. Bradley & Associates, titled "Utility Investment in the Electric Vehicle Charging Grid: Key Regulatory Considerations" dated November 2017[4] (GCC-MJBA Report), on page 9, Figure 1 provides the models of utility investment in EV charging infrastructure: (i) business as usual, (ii) make-ready, (iii) owner-operator, and (iv) utility incentive.



5.1 Please discuss the pros and cons of the four business models that are noted in the GCC-MJBA Report. Include considerations such as market growth, business sustainability, customer impacts, public

[4] http://www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf

interest, competition, and appropriate level of utility regulation.

Response:

5.1 ChargePoint strongly supports utility investment in electric vehicle charging infrastructure. From ChargePoint's experience deploying more than 50,000 charging ports over the past ten years, we have observed a number of models for utility investment, including the four noted above. While there is no single investment solution for all use cases (each EVCS segment has unique circumstances, e.g. MURB, workplace, public) and each has its pros and cons, it is ultimately the manner in which utility investments are structured that can either complement, or compromise, the competitive market and ongoing innovation. Investments that maintain site host choice of equipment, services and pricing to driver (if applicable) are often more sustainable and create a larger impact on deployment of EV charging equipment. Maintaining site host ability to select the best charging solutions to meet the needs of the individual use case ensures a competitive process and will foster ongoing innovation in the market. In addition, site hosts should be able to manage the driver experience and optimize utilization of the station through the ability to manage driver fees and access control.

As noted above, there are both pros and cons to the four models outlines in the GCC-MJBA Report which impact barriers to infrastructure deployment, competition, business sustainability, and customer or site host choice. It is important to review utility investments holistically to determine impacts on competition, ratepayer costs and benefits (if the utility is seeking cost recovery) and market growth, as well as support for underserved areas, and overall alignment with other policy goals including support for expanding transportation electrification.

a) Business-as-Usual: Maintaining business-as-usual poses little risk to the competitive market for charging equipment and services; however, this scenario may prevent utilities from enabling EV charging development in underserved markets or expediting market growth by providing incentives that lower costs to site hosts for installing EVCS.

b) Make-Ready: Make-ready refers to utilities supporting the installation of charging stations, i.e. everything that is needed to "make a parking space ready" up to but not including the charging station hardware and network services. Make-ready investments can lower the cost of installing EVCS since, in most cases, installation costs make up almost half of the total cost of a charging station. Make-ready programs also promote site host choice, "skin in the game" (i.e. site host paying for a portion of a charging station) and control of charging equipment, which can promote innovation and competition as third parties compete to be the choice of the site hosts. Southern California Edison has deployed a successful make-ready pilot in California.

c) Owner-Operate: Owner-Operate programs exist when utilities own and operate charging stations on third party property. This may be an appropriate role for utilities where there is a lack of private capital available for third party investments or where a site host is unable or unwilling to operate a charging station themselves. In some cases, Owner-Operate programs could threaten the growth of the market by crowding out private investment and forcing non-utilities to attempt to sell charging stations to site hosts that could be eligible to receive a free or highly-subsidized station of the utility's choice instead. It is important to design Owner-Operate programs that enable customer choice and competition, including multiple vendors as offerings in the program. One successful example of this model is San Diego Gas and Electric's Power Your Drive program in California.

d) Utility incentive or rebate: ChargePoint believes that this model is best for promoting a competitive market. Rebates can lower barriers for EV charging deployment and maintain site host choice and

control. Rebates can also stretch utility investment further to deploy more stations since only a portion of the cost of the station or installation would be covered (private capital is leveraged to provide remaining funds). Rebate programs also tend to have less administrative burden on utilities, which can lead to fast deployment. Rocky Mountain Power in Utah has an EV charging rebate program.

6.0 Reference: Exhibit C25-2, pp. 5, 9; Exhibit C20-2, pp.3–4; Exhibit C34-2, pp. 5, 9 DCFC – business model and economics

On page 5 of Exhibit C25-2, ChargePoint states:

> ChargePoint has more than 7,000 customers (businesses, cities, governments, MURBs), with more than 45,000 independently owned public and semipublic charging spots, including over 600 public charging ports in BC.

6.1 Please provide a breakdown by level or charger type served by ChargePoint in BC.

6.2 What is the useful life of ChargePoint's current generation of Level 2 and DCFC systems?

On page 9 of Exhibit C25-2, ChargePoint states:

> Explicit recognition that EVCS site hosts and EV charging services are excluded from the definition of "public utility" would be consistent with the current state of competitive EV charging markets elsewhere that ChargePoint participates in. Those markets, in turn, are driving innovation, customer choice, and [third-party] investment.

6.3 Please list the jurisdictions where there has been an increase in third-party investment in DCFC stations in which EVCS site hosts and EV charging services are excluded from the definition of "public utility"? Please state any differences that may affect comparability to BC.

6.3.1 How does ChargePoint measure or verify the relationship between the level of regulation vs. market growth? Please identify the key indicators and/or metrics.

On pages 3 to 4 of Exhibit C20-2, AddÉnergie states:

> AddÉnergie has provided a Generic DCFC Financial Model (the Generic Model, attached as Appendix A) based on BC Hydro's and FortisBC's respective commercial rates to illustrate how a standard DCFC is likely to perform under different charging scenarios. There are relatively limited scenarios in which a station is likely to recover costs within a decade under the current BC Hydro general service business rate or Fortis BC commercial rates even assuming a $20/hour cost of charging, which is double the rate used in Québec's Electric Circuit, Canada's most advanced EV charging network, and assuming no cost of capital (i.e., that projects are financed at 0% interest).

The Generic Model contains a number of charging station operation assumptions and charging station usage assumptions.

6.4 Please comment on the assumptions of AddÉnergie's model and if the model is a reasonable depiction of DCFC station ownership and operation.

6.5 In ChargePoint's view, please discuss which component of AddÉnergie's model will be sensitive to material changes in the next five years given the developments in the EV market. Please explain.

On page 5 of Exhibit C34-2, Community Energy Association (CEA) provides an illustrative example of a Level 3 Charging Station Business Model. Further, CEA submits that the model is known to be incomplete regarding differences in utility vs non-utility ownership and operation.

On page 9 of Exhibit C34-2, CEA submits that "Non-utility DCFC owner/operators currently have high

demand charges for DCFC equipment (typically 50kWh systems) that utilities do not appear to account for in their internal costs for DCFC."

6.6 Please comment on the assumptions of CEA's model and if the model is a reasonable depiction of DCFC station ownership and operation.

6.7 In ChargePoint's view, please discuss which component of CEA's model will be sensitive to material changes in the next five years given the developments in the EV market. Please explain.

6.8 Please discuss ChargePoint's experience with the EV charging station business between metropolitan areas vs. small communities.

6.8.1 From ChargePoint's perspective, is there a concern small communities may be underserved if the EV charging station business in small communities tends to be uneconomical or unprofitable relative to metropolitan areas? Please discuss.

Response:

6.1 In BC, 98% of our public chargers are Level 2, while 2% are DCFC.

6.2 The useful life of any charging technology will depend on a number of factors, including future vehicle and charging technology innovation, and is thus hard to predict. However, the vehicles on the road today typically have useful lives of 10-15 years and could theoretically be using the infrastructure in place for the next decade or more. The operational life of charging technology, on the other hand, is a little more straightforward to estimate. The operational life of ChargePoint's current Level 2 and DCFC charging products is greater than 10 years under normal operating conditions with routine maintenance. However, it is recognized that asset life may be affected by technological advances, and as a result, some assets may become obsolete.

6.3 ChargePoint cannot verify that this exclusion specifically increased a DCFC market because there are other simultaneous market factors at play. These include the significant fact that vehicles capable of receiving DCFC only became available at local dealerships in many markets a few years ago, in many cases, long after states in the US made the exclusion to the definition of a "public utility." (Not all models of cars are available at dealerships in every state in the US.) Other factors, such as level of demand charges, or a lack of competitive market due to a single monopoly player, may have also impacted market growth. One significant difference for BC is that many automakers are actually selling vehicles that can receive DCFC in the province, which should lead to increased demand for DCFC.

6.3.1 ChargePoint believes there are regulations that can have either a positive or negative impact on market growth. In the case of EV charging services, ChargePoint supports regulatory clarification and believes that clarifying that there is no regulatory oversight from the BCUC will remove a key regulatory barrier to charger deployment and support the sector's ability to deploy more charging stations in BC. However, there are many other factors that could impact the market including the existence of public funding, cost of electricity (and demand charges), municipal permitting issues, and other local or provincial policies. ChargePoint does not directly measure or verify the relationship between the level of regulation and market growth. However, key indicators that could be used in such an analysis could include EV registrations, number of EVCS market participants (i.e. network providers), and attach rate (the number of cars per charging port). ChargePoint would welcome feedback from the BCUC and other policymakers as to how policies in BC are measured and verified.

6.4 ChargePoint has reviewed AddÉnergie's model and provides the following feedback on the assumptions used:

a) **Station Installation Cost Assumptions:** $75,000 for first station plus $40,000 for the second is reasonable for two 50kW stations provided there is not a desire for significant upgrades to the site in the future. Depending on the physical layout of the site, the proximity of the stations to electrical panel and the proximity of the electrical panel to utility transformer, costs can vary drastically. The numbers quoted in AddÉnergie's model could be considered at the lower end of mid-range depending on the site configurations. Although not included in AddÉnergie's assessment of installation costs, it may also be important to consider future upgrade costs. A little more money up front can save a lot of money in the future for upgrades. Site upgrades may include adding more chargers or adding more power per charger. Most of the battery electric vehicles (BEV) available in the market today can only take up to 50kW of power. Many BEV's will be able to take 100kW, 150kW or even more in the future. Future proofing charging equipment and sites is important to ensuring the best driver experience and ensuring that DCFC services remain competitive. Future proofing sites includes upsizing panels and switchboards to handle higher current and more breakers, allowing extra area near the chargers for more power conversion, running additional conduit to accommodate future power upgrades or more chargers, and installing charging equipment that can handle higher current for upgrades.

b) **Operating Expense Assumptions:** The assumed operating expenses, which include networking fees at $2,000, may be low for publicly available DCFC with uptime goals of 98% or better. If anything fails on a station, it needs to be addressed quickly. This will involve paying for a truck roll, costs of labor for one or two people and any parts needed for a repair. Extended equipment warranties are recommended, but most warranties do not cover repairs resulting from accidental damage, normal wear or vandalism. Other outside environmental issues may result in a need for more maintenance to the stations. This may include addressing dust, pollen, tree sap or other matters beyond the control of the station owner/operator or equipment supplier. Snow and leaf removal must also be considered on leased sites or sites in public areas. In that regard, this number should not only include networking and routine maintenance, it should also include costs for extended warranties, protection from other damage and other environmental maintenance. This may be several thousand dollars more per year.

c) **User fees:** The user fee of $20 per hour for charging is a fair assumption. $20 per hour is only about 2/3 the cost of gas, which is on the low side of what we see across North America for charging fees. Most drivers will not have an issue with this pricing at a DCFC.

d) **Energy per charge:** The assumed energy per charge rate of 13.33kWh is consistent with ChargePoint's experience of 50kW stations today and the current vehicle fleet. However, we expect this rate to go up significantly as vehicles with bigger batteries that can charge faster are introduced into the market. Our data already shows that the average Chevy Bolt driver consumes about 18kWh compared to the majority of vehicles on the road today with smaller batteries that consume about 14kWh. We have also seen evidence that suggests that Tesla Model's S, X and 3 are consuming 30 – 40kWh per charge at Tesla Super Charger sites. As the larger numbers of vehicles have higher battery capacity, we will see average consumption per charge go up.

e) **Charging session duration:** 20 minutes per charging session is slightly low compared to the data set from our network, which indicates that 27 – 30 minutes is more typical. This may be due to

charge levels tapering in some vehicles when its battery gets hot, or for drivers that are just topping off their batteries.

f) **Site upgrades:** The need to upgrade sites once they average 10 sessions a day will depend on the goals of the station owner/operator and what types of vehicles are using the stations (i.e. total time charging). Some station owners/operators may have a slightly higher tolerance during peak times.

In addition to the assumptions reviewed above, credit revenues from participation in BC's Low Carbon Fuel Standard program should also be considered in these models. Based on current credit prices (~$160 and $0.13 kWh), revenue from the sale of credits generated from the electricity dispensed by charging stations to vehicles could help offset overall project costs. From a site host perspective, the additional revenue that Low Carbon Fuel Standard credits represents is important in helping support EVCS investments. Changes to the Low Carbon Fuel Standard that would provide site hosts and non-utility operators of charging stations access to such credit revenues would greatly support the electrification of BC's transportation system and DCFC deployment across the province.

6.5 The biggest material changes will be related to vehicle technology, including increasing battery sizes and range, which could increase demand for higher power infrastructure. Upsizing charging equipment and sites to meet this demand will require additional expenditures. Future proofing sites should be budgeted with any new DCFC installations. Please see the response to IR 6.2: some proportion of inventory will become obsolete due to these technological changes, in a way that cannot be precisely predicted, but is a cost of doing business and is a cost that private industry plans for at a high level. The EV market could also be impacted by availability of charging stations and competition for customer choice, which could be helped or hurt, depending on program design, with entrance of utilities into the market, increased government funding, or other new investments.

6.6 ChargePoint has reviewed CEA's model and provides the following feedback on the assumptions used:

a) **Network and monitoring fees:** Network and monitoring fees are relatively low. Typical costs for solutions that offer a comprehensive suite of site host and driver services (e.g. skilled support and service staff offering 24/7 assistance in multiple languages with little to no wait times) as well as maintenance services (e.g. proactive monitoring and uptime guarantees) tend to be higher. Please also see ChargePoint's response to IR 6.4.

b) **Maintenance costs:** Maintenance costs appear to be low for similar reasons discussed in ChargePoint's response to IR 6.4.

c) **Asset Renewal Fund:** The Asset Renewal Fund covers the cost of a station swap, with a new station that is of equal or slightly higher power. More funds should be budgeted for the equipment and service upgrades needed to accommodate a greater number of vehicles that will take much more power (150kW and greater) and likely demand higher power chargers. These upgrade costs should include the cost of charging equipment as well as the cost of any utility or other infrastructure upgrades at the site.

d) **Repair and Vandalism costs:** Costs for other repairs and vandalism are listed as "TBD" but should not be ignored. These costs could be a significant part of operating cost over time.

e) **Energy per charge:** The assumed energy per charge event rate of 6kWh is very low. ChargePoint would expect something in the range of 14kWh for today's vehicles. However, we expect this rate to go up significantly as cars with bigger batteries that can charge faster are introduced into the market, as indicated in 6.4. The underlying data set used to derive the energy per charge rate of 6kWh may need to reviewed for abnormalities or outliers, and charging context. For example, new EV drivers start a session on a fast charger but do not have fast charging capability on their car. Once they realize the connector does not fit their car, they abort the session with no energy dispensed. If the dataset used to inform this model included a lot of zero energy sessions, it is likely the cause of the low average energy rate. Low averages can also be due to unreliable charging hardware.

f) **User fees:** The assumed user fee of $0.35 per kWh is low. It may be difficult for station owners to recover costs at this price.

As noted above in the responses to IR 6.4, credit revenues from participation in BC's Low Carbon Fuel Standard program could be an important source of funding to help offset overall project costs and should therefore also be considered in these models.

6.7 Please see the response to 6.5.

6.8 We see a very large difference in utilization between metro areas and small, remote communities. Remote small communities can often see less than one DCFC session per day where metro areas may have 10 – 15 sessions per station per day. A variety of factors contribute to this difference; however, the most commonly cited factor is higher population density. Metro regions typically have more drivers, higher rates of EV adoption, and thus more EV drivers per land-area, resulting in greater demand for charging services. Another factor is that the majority of EV charging occurs within 15-30 kilometers of an EV driver's homes (i.e. within the metro centre). Only a small portion an EV driver's charging occurs on long distance travel (typically less than 10% of a driver's needs), so small, remote communities with low EV adoption tend to have low utilization because of limited use from EV drivers within in the community as well as those outside it .

6.8.1 Yes, outside of urban areas, for the reasons discussed above, there may be lower utilization for charging stations. These stations, however, are still vital to supporting EV adoption and creating a network that connects drivers from small towns to larger cities across the province. Government funding or utility support could help to increase investment in these underserved parts of the province. For example, NRCan's Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative aims to support the deployment of DCFC infrastructure across Canada, including smaller more remote communities, to facilitate long-distance travel across the country. As of March 2018, Phase 1 of the Initiative ($16.4million) had successfully supported the installation of over 100 public DCFC, and another $80 million has been allocated to additional deployment as part of Phase 2.[5]

[5] NRCan, 2018, Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative, http://www.nrcan.gc.ca/energy/alternative-fuels/fuel-facts/ecoenergy/18352

7.0 Reference: Exhibit C20-2, p. 2
Multi-Unit Residential Buildings (MURBs) & Curbside Parking

On page 2 of Exhibit C20-2, AddÉnergie states:

> Direct current fast charger (DCFC) and multi-unit residential building (MURB) home charging are unlikely to be widely and comprehensively deployed in British Columbia without public utility involvement because of the current economic barriers facing charging providers and still-emerging demand for EV charging in many parts of the province. Curbside public charging faces similar cost and also regulatory challenges that are likely to inhibit its widespread deployment.

7.1 What difficulties have ChargePoint observed regarding the installation and operation of charging infrastructure in MURBs and curbside charging? What products or services does ChargePoint offer for this market?

7.2 Please discuss which EV charging business model that is most suitable for MURBs (e.g. a public utility or third-party site host owned or operated).

7.3 Please discuss which EV charging business model that is most suitable for curbside public charging (e.g. a public utility or third-party site host owned or operated).

Response:

7.1 With over ten years of experience installing charging infrastructure, ChargePoint has observed four key barriers to charging installation in MURBs, which include:

- Ability to charge user fees (time, session or kWh) to EV drivers for use of common electrical capacity.
  - Excluding charging services from BCUC regulation would address this constraint.
- Ability to install a charger and run wires to and from common areas.
  - Right-to-charge legislation and/or policy for strata and tenants could address this constraint.
- The cost of upgrading electrical panels, should there be insufficient electrical capacity.
  - Smart charging stations with power management capabilities can address this to some extent by enabling a larger number of stations to be served with fixed electrical capacity via power sharing on a circuit or panel.
- The cost of connecting to electrical panels, especially when charging infrastructure is located far from the panel.
  - EV-Ready building bylaws such as those implemented in a number of municipalities in BC are addressing these cost constraints for new development.

ChargePoint has observed five key barriers to curbside charging installation, which include:

- Cost of connecting to electric capacity, which may not be available at or near a site.
  - This could be addressed with rebates for make-ready infrastructure, i.e. everything that is needed to "make a parking space ready" up to but not including the charging station hardware and network services.
- Siting and permitting of stations, including who owns the right of way where the station would be located.

    - This could be addressed through local policy action such as accelerated and streamlined permitting or access to city-owned right of ways.
- Physical location of the station and site characteristics that could complicate (and therefore increase the cost) of installation such as proximity to parking spot or curb, or obstacles like sidewalks or landscaping.
    - This could be addressed through careful site selections, choosing spots to minimize costs.
- Ability to allocate curb-side spots for EV only use which can be challenging to implement and enforce in many cases, leading to non-EV drivers using these spaces. Dedicated EV-only curb-side spots can also meet resistance from residence who oppose the allocation of curb-side spots for a small number of users.
    - This could be addressed through clear and bright signage and public education.
- Ability to charge user fees to EV drivers, by time, session or kWh, for charging services
    - This could be addressed by excluding charging services from BCUC regulation.

ChargePoint has solutions for both MURBs and curbside charging.

For MURB charging, ChargePoint offers two Level 2 solutions[6]:

a) The first is a Level 2 solution, which includes both hardware and network services for individual use charging in MURBs. This solution enables EV drivers to charge at their assigned parking spots, utilize power management, and pay charging user fees, which can be set by and remitted to stratas/landlords. This solution also allows station owners to respond to demand management and TOU events.
b) The second is a different Level 2 solution, which includes both hardware and network services for community charging where stations are shared by multiple EV drivers. This solution enables EV drivers to pay charging user fees, which can be set by and remitted to stratas/landlords and to access charging experience features like notifications of station availability and station waitlists. In addition, this solution allows the strata/landlord to control access to the stations (e.g. access for residents only), utilize power management and respond to demand management and TOU events.

For curbside charging, ChargePoint offers a Level 2 solution, which includes hardware and software solutions designed for public access and outdoor application. [7] This solution enables site hosts to easily set pricing policies, including ones that vary by user group or time of day, manage and control station access and provide drivers with features like 24/7 customer support and notifications of station availability and station waitlists. In addition, this solution allows site hosts to utilize power management and respond to demand management and TOU events.

In addition to curbside charging, which may support EV divers who do not have access to home charging or require charging on the go, public charging can also be provided in parking garages/lots, community centers, and in urban charging hubs with DCFC.

[6] ChargePoint MURB solutions brief: https://www.chargepoint.com/files/solutionbriefs/sb-mf-condos.pdf
[7] CT400 Family Commercial Charging Solution: https://www.chargepoint.com/products/commercial/ct4000/

7.2/7.3 In ChargePoint's experience, the best approach to any charging infrastructure investment is one where consumers or sites hosts have choice in charging equipment, network services and services to drivers, and where consumers or site hosts contribute to the cost of charging station installation. Customers and site hosts that make a financial contribution are far more likely to actively support the successful installation and ongoing preventive maintenance of the charging station because they have "skin in the game," i.e., are motivated to earn back their portion of the initial capital investment by supporting ongoing revenue, or are motivated to provide positive charging experiences as an amenity to attract customers or to retain/attract employees and tenants.

If ratepayer funds are used to support the installation of charging stations in MURBs and curbside, then investments that *also* leverage private funds and maintain site host choice of equipment and services, will be more sustainable and create a larger positive impact on deployment of EVCS. Maintaining site host ability to select the best charging solutions to meet the needs of their individual use case ensures a competitive process and will foster ongoing innovation in the market. In addition, site hosts must be able to manage the driver experience and optimize utilization of the station through the ability to manage driver fees and access control. Conversely, utility investment that proposes to procure stations, make decision on features and design on behalf of the site host, or suggest a one-size-fits-all driver pricing policy, would unnecessarily pick winners and losers in a competitive market, ignore customer choice, and lock in rapidly changing technology.

C. RATES

8.0 References: Exhibit C1-2, p. 13
Rate design – charging station to EV customer

On page 13 of Exhibit C1-2, British Columbia Hydro and Power Authority (BC Hydro) states: "It may be possible to differentiate time-based charges to vary based on vehicle capacity to address such fairness issues."

8.1 What is ChargePoint's view on alternative rate structures, such as BC Hydro's suggestion to differentiate time-based charges to vary based on vehicle capacity?

8.2 Would ChargePoint's systems be able to differentiate EV charging rates based on vehicle capacity?

Response:

8.1 ChargePoint's view is that site hosts should have the flexibility to set prices to drivers based on the individual needs of the site host and the charging circumstance. ChargePoint supports alternative rate structures but, at this time, L2 technology does not fully enable charging network providers (or utilities) to receive "state of charge" from all vehicle models to determine its capacity. Current DCFC technology can identify a vehicle's capacity and state of charge, but not in a manner that would easily facilitate a variable capacity-and-time-based rate. Furthermore, application of this rate could result in confusion for both site hosts and EV drivers. So, while a time-based fee that varies by capacity may be possible for DCFC, it may be an overly complex (for drivers and site hosts) alterative to energy-based pricing.

In any event, setting a rate in this manner, in the BC environment with a myriad of charging options available to EV drivers, should not be an issue for the Commission to address, but rather left to the site host. The Commission's role should not be to impose a top-down rate to individual drivers, but ensure that consumers are not abused by natural monopoly circumstances that inhibit innovation and choice.

The Commission can and should test and approve utility rate designs that send appropriate price signals to the individual site hosts in their role as utility customers.

The site hosts may or may not convert their electricity consumption into time-based charges, depending on the goals underlying the site host's investment in charging infrastructure. For example, an employer may prefer to avoid any distinctions between vehicles, or the time of day, to minimize employee complaints (valid or not). Conversely, a high traffic location may try to maximize revenues in ways that differ from the premises of a utility price signal, and a curbside meter may just flow charges through.

8.2 Please see the response to 8.1.

9.0 Reference: Exhibit C20-2, p. 7; Exhibit C1-2, p. 7
Measurement Canada

On page 7 of Exhibit C20-2, AddÉnergie submits "that as of March 6, 2018, Measurement Canada has not certified any commercially available DCFC device to bill on the basis of energy (kWh) or time-related demand (kW)."

On page 7 of Exhibit C1-2, BC Hydro states:

> The introduction of a new standard is expected to take some time, and in BC Hydro's view a Measurement Canada approved DC standard is several years away.

9.1 Has ChargePoint sought Measurement Canada certification for DCFC devices it manufactures or imports in order for owners or operators to bill an energy-based rate?

9.1.1 If so, please provide a status update on such processes.

9.1.2 If not, does ChargePoint have any plans to file a request in the future?

9.2 Please explain what difficulties exist in certifying DCFC billing devices for commercial use purposes. Is it unique to EV charging stations?

9.2.1 Are AC Level 2 chargers certified by Measurement Canada to charge by energy?

9.3 With respect to a rate design that differentiates time-based charges to vary based on vehicle capacity, would such rate design be possible without Measurement Canada's certification on an approved DC standard?

Response:

9.1 No, ChargePoint has not sought certification for the meters embedded in the DCFC it manufactures or imports in order for owners or operators to bill an energy-based rate.

9.1.2. ChargePoint does not have any immediate plans to file a request, but is committed to work with Measurement Canada and the EVCS industry to explore certification processes for embedded DCFC meters.

9.2 Unlike the utility industry metrology for AC power, the technology and practice of DC metering is not widespread. Rather, it is limited to special-purpose applications such as DC traction in the rail sector. Unfortunately, existing requirements, standards and solutions for these applications are not suitable for vehicle charging applications. Specific challenges exist around accuracy over a wide dynamic range; sensor drift; and physical design to cope with the very high currents that are present. ChargePoint is actively developing an embedded DC metering solution for our DCFC products, and is committed to supporting Measurement Canada and the EVCS industry in their efforts to establish the necessary metrology requirements and standards.

9.2.1 To our knowledge there are no Level 2 charging stations with embedded meters that have been certified by Measurement Canada. ChargePoint is committed to work with Measurement Canada and the EVCS industry to explore certification processes for the meters embedded in Level 2 charging stations and encourages Measurement Canada to convene a multi-stakeholder working group to develop a certification process for Level 2 meters, perhaps similar to the process organized in the US by the National Institute of Standards and Technology (NIST), which resulted in the development and publication of Section 3.40: Electric Vehicle Fueling Systems of

NIST's Handbook 44: Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.[8]

9.3 It is our understanding that time based fees do not require use of Measurement Canada approved meters. ChargePoint recommends that the Commission confirm the treatment of time-and-capacity-based fees with Measurement Canada.

[8] NIST, Section 3.40: Electric Vehicle Fueling Systems of NIST's Handbook 44: Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, https://www.nist.gov/sites/default/files/documents/pml/wmd/3XX-HB44-EVSE-DRAFT-CODE-ver-8-28-14-SEP2014-Web-Update.pdf

D. STORAGE AND GRID STABILITY

10.0 Reference: Exhibit C25-2, pp. 6, 15, 21
Rate design and grid optimization

On page 21 of Exhibit C25-2, ChargePoint states that "In the United States, some utilities have developed or piloted EV-specific time of use rates to promote the use of EVs or facilitate grid management."

10.1 Please identify the states and the utilities where they have developed or piloted EV-specific time of use rates to promote the use of EVs or facilitate grid management. What are the pros and cons of EV-specific time of use (TOU) rates? What observations/conclusions does ChargePoint make about customer behavior under TOU rates? Please discuss.

10.2 Please discuss the impacts to grid management as observed by these jurisdictions (provide references where available).

On Page 6 of Exhibit C25-2, ChargePoint states that "…we have designed the network to allow other parties, such as electric utilities, the ability to access charging data and conduct load management to enable the most efficient load integration with the grid."

On page 15 of Exhibit C25-2, ChargePoint states:

> Smart, networked charging provides new flexibility to enable more grid benefits than traditional load management, and valuable data can be collected to inform better utility planning decisions and help maintain reliability and affordability. Based on the data collected from smart charging stations, new processes can be created to better integrate EV charging utilization with available electrical capacity – helping balance loads and reduce the costs of providing clean energy.

10.3 Please provide in greater detail the information that can be shared with electric utilities through the ChargePoint network.

10.4 Please discuss whether ChargePoint have any data-sharing arrangements with regulated public utilities including BC Hydro and FortisBC Inc., or any other electric utilities in BC.

10.5 Please provide any analysis or report on instances where the collection of charging data has led to better load management.

Response:

10.1 Numerous states have developed or are developing EV-specific TOU rates. ChargePoint does not keep a comprehensive list of all the rates, but an illustrative list was developed in 2016 by FleetCarma and is shown below (Figure 1)[9]. Since then, many more rates have been approved. For example, on the residential side, each of the three large California Investor-Owned Utilities have whole house TOU rates and separately-metered TOU rates for EV drivers. San Diego Gas and Electric (SDG&E) even has a dynamic TOU rate for its EV drivers. On the commercial side, rates are currently being developed through the Senate Bill 350 process at the California Public Utilities Commission (CPUC). Some of the innovations considered in this process include demand charge "holidays" and phase-ins to lessen the burden of demand charges during the early, low-

[9] FleetCarma, 2016, Which Utilities Offer Time-Of-Use Rates For Electric Vehicles? https://www.fleetcarma.com/utility-time-of-use-plug-in-vehicles/

utilization years.

EV TOU rates can help encourage charging at off-peak times or during times of excess renewable energy generation. The pros and cons vary by market segment. For instance, a residential EV TOU rate may drive customers to charge during off-peak hours if the differential between the peak and off-peak is sufficient. In states with low energy prices and very small differentials, customers are not incentivized to charge off-peak. See Figure 2 below comparing ChargePoint home data from Puget Sound Energy and Pacific Gas & Electric.

In the workplace segment, where excessive renewable energy is an issue, TOU rates can incentivize drivers to charge during the day when renewable generation is high (e.g. solar in California). Site hosts that use networked chargers can also use load management to control charging during certain hours based on prices or electrical capacity limits.

With respect to DCFC, TOU rates do not always make sense. In convenience charging situations, such as along highway corridors, drivers need to charge and typically are not planning their long trips and charging around TOU rates. Another example is community charging in multi-unit residential buildings (MURBs). If the goal is to have high utilization rates on community chargers, a site host would want to encourage charging throughout the day. However, TOU prices could discourage use at certain times of the day. In these situations, TOU rates can be punitive. Therefore, each use case must be carefully considered when designing EV-specific TOU rates.

fleetcarma	State	Special EV Rates	TOU For All Customers	Pay for Smart Meter	Separate Meter Required For EV Rate	Higher Monthly Delivery Charges	Weekday Winter Off-Peak Hours	Weekday Summer Off-Peak Hours
ComEd	IL		✓				Hourly Pricing	Hourly Pricing
ConEd	NY	✓	✓		✓	✓	12am - 8am	12am - 8am
Dominion	VA	✓	✓		✓	✓	11pm - 5am / 11am - 5pm	10pm - 10am
DTE	MI	✓	✓		✓	✓	7pm - 11am	7pm - 11am
Duke	NC		✓			✓	12pm - 7am	7pm - 1pm
FP&L	FL		✓			✓	10pm - 6am / 10am - 6pm	9pm - 12pm
GA Power	GA	✓	✓				11pm - 7am	11pm - 7am
NES	TN						NA	NA
PG&E	CA	✓	✓	✓*	✓*		8pm - 5pm	9pm - 10am
Portland GE	OR		✓				10pm - 6am	10pm - 6am
PSE&G	NJ		✓			✓	9pm - 7am	9pm - 7am
SCE	CA	✓	✓	✓	✓		6pm - 12pm	6pm - 12pm
SCL	WA						NA	NA
TXU**	TX		✓			✓	10pm - 6am	10pm - 6am

* PG&E offers two EV rates, only one of which requires paying for a separate meter.
** TXU offers either free nights or free weekends.

Figure 1: Comparison of TOU plans by leading utilities in areas with high EV adoption[10]

[10] FleetCarma, 2016, Which Utilities Offer Time-Of-Use Rates For Electric Vehicles? https://www.fleetcarma.com/utility-time-of-use-plug-in-vehicles/

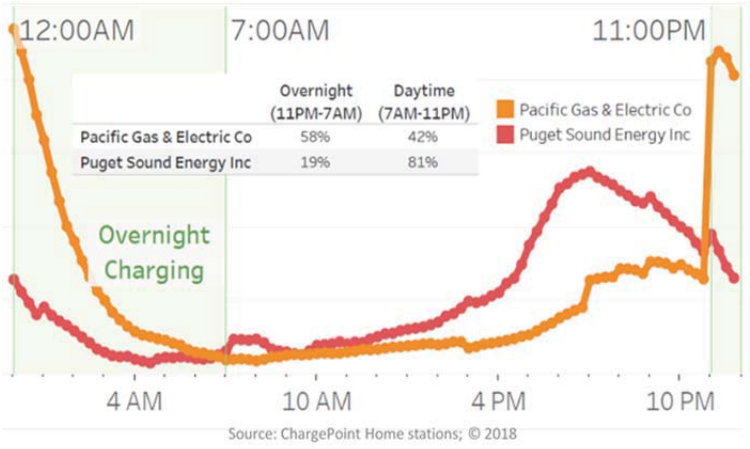


Figure 2: Comparison of ChargePoint home data from Puget Sound Energy and Pacific Gas & Electric

10.2 While ChargePoint does not track the benefits of TOU rates by utility, some utilities have provided reports after implementing TOU rates. For example, the two links below reflect data collected and reported by utilities in California:

- Pacific Gas And Electric Company Smart Grid Annual Report -2016 (October 2016), https://www.pge.com/pge_global/common/pdfs/safety/how-the-system-works/electric-systems/smart-grid/Annual-Report-2017.pdf

- Load Research Report Compliance Filing Of Southern California Edison Company (U 338-E), On Behalf Of Itself, Pacific Gas And Electric Company (U 39e), And San Diego Gas & Electric Company (U 902-M), Pursuant To Ordering Paragraph 2 Of D.16-06-011 http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M171/K806/171806139.PDF (see p. 18)

10.3 In addition to the capabilities noted on page 6 of ChargePoint's evidence, the ChargePoint network provides the following information and data to both utility and non-utility site hosts on all our networked stations:

- Energy consumption (kWh)
- Peak Load and Average Load (kW)
- GHG Avoidance and Gasoline Savings
- Station Utilization
- Number of Unique Drivers
- Peak Occupancy
- Session Length
- Detailed Transaction Data
- Real time station availability
- Peak Queuing and Queuing Depth
- Average Station Utilization
- Demand Response Capabilities

10.4 ChargePoint does not currently have any data sharing agreements with utilities in BC.

10.5 ChargePoint itself has not published any reports or analysis on the effects of charging data on load management. However, some utilities in the US are running pilots that utilize charging data for load management. For example, BMW and PG&E successfully ran a demand response

program that provided up to 100 kW of capacity per event from i3s that were charging from a stationary battery pack.[11]

[11] https://www.pge.com/pge_global/common/pdfs/safety/how-the-system-works/electric-systems/smart-grid/Annual-Report-2017.pdf

E. Hydrogen Fuel Cell Technology

11.0 Reference: Exhibit C25-2, p. 1; Exhibit C19-2, p. 2
Fuel Cell Electric Vehicle (FCEV)

On page 1 of Exhibit C25-2, ChargePoint states:

> ChargePoint is the leading EV charging network in the world, with charging solutions in every category EV drivers use to charge: home, work, around town and on the road. ChargePoint has more than 7,000 customers (businesses, cities, governments, MURBs), with more than 45,000 independently owned public and semipublic charging spots, including over 600 public charging ports in BC.

On page 2 of Exhibit C19-2, the Ministry of Energy, Mines and Petroleum Resources states that "The Province is active in promoting the uptake of zero emission vehicles (ZEVs), including battery-electric, plug-in hybrid, and fuel cell vehicles."

11.1 Please discuss whether ChargePoint has any involvement in FCEVs and FCEV fueling infrastructure.

Response:

11.1 ChargePoint does not have any involvement in FCEVs or FCEV fueling infrastructure.