



March 15, 2018

Commission Secretary
Suite 410, 900 Howe Street
Vancouver, BC
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**RE: BCUC Project No. 1598941
Evidence in the Matter of the Utilities Commission Act, RSBC 1996, Chapter 473, and British Columbia Utilities Commission: An Inquiry into the Regulation of Electric Vehicle Charging Services, Order Number G-19-18**

Tesla Motors Canada ULC (Tesla) of Tesla Inc., appreciates the opportunity to participate in the British Columbia Utilities Commission's (BCUC) Inquiry into the Regulation of Electric Vehicle Charging Service. Tesla's mission is to accelerate the adoption of sustainable energy. Tesla is a developer and manufacturer of the world's most advanced electric vehicles, and electric vehicle charging stations, among other clean energy products and services. To support the accelerated adoption of electric vehicles, we have established a worldwide presence of sales centres, service stations and charging stations.

Tesla currently operates multiple retail stores and a regional sales centre in the Province of British Columbia. Tesla develops Supercharger stations which contain multiple DC-fast chargers capable of delivering approximately 270 km of driving range in 30 minutes. As of February, 28 2018, Tesla operates 78 Supercharger connectors at 10 sites in the province. In addition, Tesla has partnered in the installation of 190 public "Destination Chargers" (Level-2) at over 100 sites in British Columbia.

Tesla is planning significant additional investment in Canadian charging infrastructure during 2018 to better support drivers in urban centres and to support long-distance travel. This includes the planned completion of the Supercharger network across the entirety of the Trans-Canada highway from Victoria to Halifax.

Tesla's experience operating in almost all North American provinces and states, combined with the company's broader experience provides us with a unique opportunity to contribute to this BCUC inquiry. Tesla is pleased to offer the following responses and evidence to the questions posed in the BCUC's January 12, 2018 letter establishing the inquiry.



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Responses to questions posed by the British Columbia Utilities Commission:

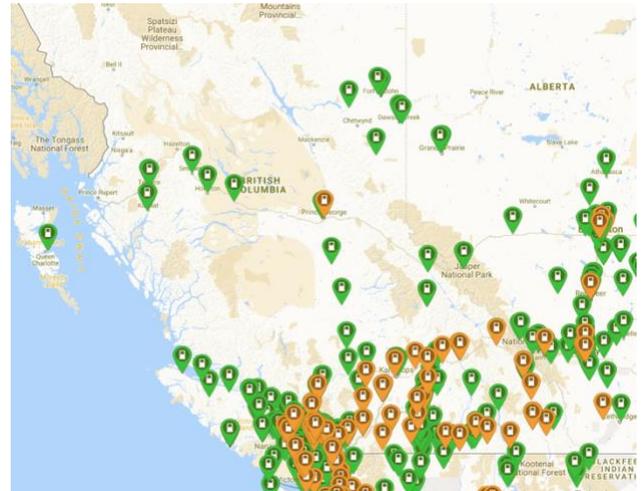
SCOPE “A”

1. Do EV charging stations operate in a competitive environment in BC or are they a natural monopoly service?

Electric Vehicle (EV) charging stations in British Columbia operate through a variety of business models and within in a highly competitive environment consisting of several business models. EV charging stations in British Columbia operate as end-use services, providing customers with a place to park, sophisticated equipment to enable charging, data services, and in most cases other amenities and services including maintenance, lighting and even snow clearing. Unlike gasoline stations, consumer choice is further elevated with EV charging because most consumers can charge their vehicle at home and can rely less on public charging stations, with some exceptions referenced below.¹

According to BC Hydro, there are well over 1,000 public-access charging stations in the province of British Columbia.² The online EV mapping service Plugshare best demonstrates the geographic distribution of these charging stations. While most are concentrated in urban centres, along major commuting corridors and the Trans-Canada highway, stations are located as far north as Charlie Lake and as far west as Haida Gwaii.

The Plugshare service also demonstrates that there are several types of charging service providers already operating in the province of British Columbia. These include ChargePoint, Greenlots, and AddEnergie, a Canadian-based EV equipment manufacturer and charging network operator. In addition to charging network operators, several site hosts can also provide independent charging services. There are two basic models for the EV charging services. The first is a pay-for-use basis, such as paying a time based fee, a flat



Map: B.C. Charging Infrastructure. Green = Level-2; Orange = DC Fast
Source: Plugshare.com

¹ Plug n' Drive, an Ontario based EV education group, determined through surveys that between 80 and 90 per cent of charging takes place in the home. See Plug 'n Drive, 2017, "Accelerating the Deployment of Electric Vehicles in Canada and Ontario" at:

http://www.plugndrive.ca/wp-content/uploads/2017/07/160159_ElectricVehicleReport_R001.pdf

² BC Hydro, "Finding Electric Vehicle Charging Stations" at:

<https://www.bchydro.com/powersmart/electric-vehicles/charging/charging-stations.html>



price, a price per kWh consumed, or a combination of these fees. The second model is free charging, which is ultimately paid for by the site host or another party, in order to attract clientele, help educate consumers about EVs or to support a site host's own environmental objectives. Additionally, some automotive retailers see value in directly offering charging services to their customers. Plugshare demonstrates that several automotive retailers offer charging services in British Columbia.

Automaker-funded charging networks are growing increasingly common around the world, including in Europe and the United States. Automakers may play a growing role in developing additional charging services in British Columbia over time. To support the accelerated adoption of EVs and to provide an excellent customer experience for drivers on long-distance trips, Tesla has developed a global network of over 8,400 Superchargers – Tesla's DC Fast charging solution. As of December 31, 2017, Tesla had developed more than 68 Supercharging (DC-Fast) connectors in the Province of British Columbia at 9 Supercharger Stations that provide complete coverage for our drivers between Nanaimo and Canmore, and Whistler and Richmond. Superchargers provide approximately 270 kilometers of range in 30 minutes.

Tesla is planning significant investment in additional EV charging infrastructure in the province during 2018 and beyond.³ Tesla Supercharger sites are selected and developed to provide a complete end-use service, including proximity to desirable amenities, proximity to other Superchargers, redundant and reliable charging connectors and equipment, well maintained and signed parking stalls, 24-hour customer service, and other amenities that often include lighting, snow clearing and other site maintenance. At present, Tesla's B.C. Supercharger stations tend to have between four and twelve DC fast charging stalls.

Currently, the majority of Tesla customers have complimentary use of the Supercharger network and the electricity is paid for by Tesla or site hosts. New Model S and X Tesla customers get complimentary supercharging if they were referred by another Tesla customer when they purchase their vehicle. For customers without a referral code, they get 400 kWh of complimentary Supercharger credits a year. For use above that amount, and for all Model 3 owners, customers are charged \$0.20 per minute of charge when the connector is operating at or below 60 kilowatts, and \$0.40 per minute of charge when it is operating above 60 kilowatts.⁴

³ See Appendix 1 or Tesla Inc., "Find Us" online map at: <https://www.tesla.com/findus#/bounds/60.0001489,-114.05422099999998,48.224556,-139.0570702,d?search=supercharger,destination%20charger,&name=British%20Columbia>

⁴ Tesla Inc., "Support: Supercharging" at: https://www.tesla.com/en_CA/support/supercharging





In addition to the Supercharger network, Tesla has co-developed a “Destination Charging” network with more than 100 site hosts and 180 Level-2 (240v) charging connectors in the province.⁵ Destination chargers are typically located at hotels, resorts and restaurants. Typically, electricity for the EV owner is complimentary on the Destination Charger network and is paid for by the site host.

Tesla customers are not captive to using Tesla chargers and may use a wide variety of charging services -- whether from Tesla or third parties. Each Tesla includes with a mobile connector set which includes adapters for use at J1772 standard stations, NEMA 5-15 outlets (standard household outlet), and 240 volt receptacles. Tesla also makes available other adaptors, including adapters for use at CHAdeMO-standard DC Fast stations.

Based on the number of stations, their geographic distribution, the number of charging operators and the wide range of business models EV charging is demonstrated to be operating in a competitive marketplace that offers consumers freedom and choice.

2. Are the customers of EV charging stations captive or do they have a choice?

As noted above, in urban areas of the province, and along major corridors, there is strong competition for EV charging end-use services exists and consumers have a great deal of choice. Furthermore, unlike fueling a fossil-fuel powered vehicle, 80% of charging activity typically happens in the home and the vast majority of trips require no public fueling infrastructure.

There are, however, areas in the province where there is less competition to supply charging infrastructure and areas where consumers may have less choice and access to charging solutions. Consumers in multi-unit buildings or renters of homes, often feel captive by their homeowners association or landlords when they request EV charging and are denied due to electrical system upgrade costs. Additionally, consumers in remote areas of the province have seen less privately funded charging infrastructure developed.

3. Should the Commission regulate the services provided by EV charging stations? What are benefits and detriments to such regulation?

The Commission should not regulate competitive, end-use services such as EV charging. While effective consumer protections and safety standards must apply, the provision of EV

⁵ Tesla Inc., “Find Us” online map at:

<https://www.tesla.com/findus#/bounds/60.0001489,-114.05422099999998,48.224556,-139.0570702,d?search=supercharger,destination%20charger,&name=British%20Columbia>





charging services is not a monopoly service and does not represent distribution or retail of electricity. EV charging is a comprehensive end-use service that requires substantial planning and coordination with site hosts and permitting authorities in condensed periods of time to keep pace with growing EV adoption and to provide a good EV driver experience.

Ontario's utility commission, the Ontario Energy Board (OEB), issued a staff guidance bulletin on July 7, 2016, related to EV charging services and the role of the energy regulator in that province. The bulletin concludes the following⁶:

- Ownership or operation of an EV charging station, and the selling of EV charging services from that facility, do not constitute distribution or retailing of electricity;
- The OEB does not regulate the end uses of electricity;
- The OEB's codes, rules and other regulatory requirements do not apply;
- Owning and operating EV charging stations is an inherently competitive activity; and
- Many different entities could (and do) offer this service and, given that a wide variety of possible business models exists, consumers will likely have adequate choice when it comes to charging their EVs.

Attempts to specify the price of an end-use charging service through a utility model could stifle business innovations that would otherwise help provide lower-cost charging solutions to B.C. residents. Tesla, for example, is already committed to not making the Supercharger network a profit center.⁷

For example, in addition to service charges, Tesla also levies idle-fees under certain operating conditions at Superchargers. Idle-fees apply to any car occupying a Supercharger if the station is at least 50% full once the charge session is complete.⁸ If the car is moved within five minutes of the charge session completion, the fee is waived. If a Supercharger station is not busy, Tesla does not levy such a fee. Idle-fees are not levied to generate revenue – they are levied to encourage drivers to depart busy Superchargers once charged. Tesla's idle fee policy is intended to increase customer satisfaction by ensuring space is available to charge when it is needed. Any attempt to regulate charging activities through the utility commission could undermine these types of business innovations, reduce consumer choice, reduce charging station accessibility and reduce the EV driver experience.

⁶ Ontario Energy Board Staff Bulletin, July 7, 2016, "Re: EV Charging" at: https://www.oeb.ca/oeb/_Documents/Documents/OEB_Bulletin_EV_Charging_20160707.pdf

⁷ Tesla Inc., "Support: Supercharging" at: <https://www.tesla.com/support/supercharging>

⁸ Ibid.



Moreover, as EV adoption rates accelerate, charging operators will need to move with speed to select and develop charging sites. Requiring commission approval for each location or investment, in addition to existing permitting requirements with utilities and municipalities, would delay the deployment of infrastructure when it is needed most.

Although third parties are developing charging networks, regulated utilities also play an important role in the deployment of EV chargers and the EV marketplace. Utilities provide electrical service to new stations, send price signals through rate designs, and can help increase customer education and awareness of EVs and charging stations. In those few situations where the competitive market is not providing an adequate supply of EV charging infrastructure (such as in remote communities and multi-unit dwellings) it may be appropriate for regulated utilities to participate more actively in the EV charging market. Unlike competitive charging companies which do not use ratepayer funds, a regulated utility that participates in the EV charging market with ratepayer funds should have their activities overseen by the Commission. Currently the three major California investor-owned utilities have active "make-ready" infrastructure programs in which the utilities own infrastructure beyond the customer's meter, including the electrical panel and conduit. These programs are in place to deploy more level-2 charging infrastructure and require the review and approval of the California Public Utilities Commission⁹ prior to deployment.

SCOPE "B"

- 4. Should the rate design of EV charging stations be established under a public utility's traditional cost of service model or some other model? And within that context, what are the customer pricing options (e.g. energy-based rate vs. time-based rate)?**

The commission should not regulate the price paid by the end user because charging service providers are not retailing electricity. As referenced above, charging station service providers are operating in a competitive environment.

Moreover, flexibility should be afforded to charging network operators to enable the levying of fees on a dollars-per-kilowatt-hour (\$/kWh) basis if they choose.

A gas station sells more than gasoline: they sell a service that includes fuel, use of pumps and equipment, lighting, snow clearing and other services. Gasoline stations sell an entire

⁹ California Public Utilities Commission, "Charging Infrastructure" at: <http://www.cpuc.ca.gov/zevChargingInfrastructure.aspx>



service but base the price on a single volumetric measure: cents per litre of gasoline. The price of gasoline does not only represent a commodity cost, but also the cost of the complete service being offered at retail. This pricing approach gives customers a better understanding of their purchase. If fees at a gasoline station were to be levied only on a time basis, rather than a volumetric basis, the speed of the pump, not the volume of fuel delivered to the customer, would determine price.

Likewise, the regulatory environment in British Columbia should not prohibit EV charging providers and site hosts the flexibility to levy fees on a volumetric basis (\$/kwh) for the all-in end-use service provided.¹⁰

5. Should the EV charging station service rate be based on a public utility's existing wholesale or commercial retail rate or some other rate?

While it is not appropriate for the Commission to regulate the price paid by the user of an end-use competitive service, the BCUC could have a direct role in helping to accelerate expansion of the competitive EV charging market by working with utilities and the charging industry to establish rates that encourage additional investments by charging operators.

For example, in some US jurisdictions utilities have proposed special rates that provide demand charge holidays for several years, reduce demand charges, or convert demand charges to volumetric rates.¹¹

Indeed, research from the Rocky Mountain Institute (RMI) found that demand charges can be an impediment to EV charging station development. RMI noted that with current market penetration of EVs, utilization rates of charging stations may be relatively low, which results in demand charges being responsible for 90% of a charging station's electricity costs.¹²

Addressing demand charges could be particularly effective in improving the business case to develop privately funded, competitive, charging infrastructure – particularly in seasonal or remote locations. Take, for example the following scenario:

¹⁰ Tesla recognizes that Measurement Canada regulates meters and that major regulatory improvements are need at the federal level to enable the use of kWh-based fees at Canadian charging stations.

¹¹ For example, SCE in California, Eversource in Connecticut, ConEd in New York.

¹² Chris Nelder and Garrett Fitzgerald, 2017, "EVgo Fleet and Tariff Analysis" at: https://www.rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf



- A hypothetical high-power DC fast charging location in a remote part of the province experiences only three charging sessions in a given month.
- Assume the total energy delivered to these three vehicles is 150kWh.
- Assume that two of these sessions take place at the same time resulting in a peak demand of over 200kW.
- The electrical energy consumed is valued at \$8.25 under the Large General Consumer rate class.¹³
- A demand charge of \$11.21/kW is levied against the 200+kW of demand, resulting in a bill of more than \$2,200 to deliver \$8.25 in energy.¹⁴ In this example, the site host effectively pays about \$15/kWh or over \$700 per charged vehicle. This is before accounting for other costs associated with running the end-use service referenced in other sections of this submission.

Establishing alternative rates for EV charging operators that reduces demand charges for a period of time, or eliminates demand charges in exchange for higher energy consumption charges, such as provided in the Small General Service rate, will create a more competitive marketplace, will help charging operators better plan their systems and pricing, and ultimately improve the business case for charging services across the entirety of British Columbia.

The Commission should also allow customers to combine host and charging loads for billing purposes, which would encourage more efficient use of existing capacity and prevent potential double-charging for use of the same utility infrastructure. Combining loads could also facilitate the use of onsite storage and generation to help the customer and utility meet some of the increased capacity demands.

6. Should public utilities include EV charging stations in their regulated rate base or through a separate non-regulated entity?

As noted earlier, regulated utilities play important roles in the EV market. Increasing the deployment of electric vehicles and charging stations provides benefits for all ratepayers, and not just the EV owners or charging station site hosts. Therefore, it is appropriate for regulated utilities to recover their EV market expenses through their regulated rate base.

¹³ Ibid.

¹⁴ Based on rates listed by BC Hydro found at:

<https://www.bchydro.com/accounts-billing/rates-energy-use/electricity-rates/business-rates.html#gs>





The benefits of electric vehicles include reduced greenhouse gas emissions and reduced ozone forming nitrogen oxide emissions. There are also economic benefits for British Columbia associated with greater EV adoption. While a large portion of Canada's oil supply is domestic to Canada, by displacing oil consumption with clean electricity use, more fueling dollars will remain local, in the British Columbia economy. Finally, there are direct ratepayer benefits in the form of downward pressure on rates due to higher utility revenues associated with increasing electricity sales. The electricity system is comprised of significant fixed costs. Increasing the utilization of the fixed costs, especially during off-peak periods, reduces the per unit cost of the fixed assets. In the United States, RMI summarized several studies looking at the ratepayer benefit of electric vehicles and found a range of \$744 to \$9607 of total lifetime benefits per electric vehicle.¹⁵

While these studies investigate vehicles rather than charging stations, it is important to recognize the importance of charging station availability when it comes to EV adoption. The United States National Renewable Energy Laboratory conducted a survey about consumer perceptions of plug-in vehicles. Only 18% of the respondents were aware of charging stations along routes they frequented, and respondents that were aware of charging stations were more likely to consider purchasing plug-in vehicles.¹⁶

As such, utilities should be permitted to engage in make-ready projects or deploy charging infrastructure while generating a return. Make ready projects are more suited to recovery through the regulated rate base, while charging station installations may be more suited to non-regulated operations given that charging station operations are an end-use service and should not be deemed to be the retailing of electricity.

7. If public utilities provide EV charging services within their regulated business, is there a risk of cross subsidization from other rate classes to support this new service and if so, is the proposed rate design potentially unduly discriminatory?

As noted above, electric vehicles provide benefits to all ratepayers, including higher revenues for utilities that puts downward pressure on rates. In addition, unlike most fossil fuel consumption the charging of electric vehicles will generally keep "fueling" revenues in the provincial economy contributing significantly economic development. In addition, the construction of EV charging stations creates good jobs in the electrical and construction trades.

¹⁵ Chris Nelder and Garrett Fitzgerald, 2017, "Gas to Grid" at: <https://www.rmi.org/wp-content/uploads/2017/10/RMI-From-Gas-To-Grid.pdf>

¹⁶ Mark Singer, 2016, "Consumer Views on Plug-In Electric Vehicles – National Benchmark Report, United States National Renewable Energy Laboratory.



In addition, the International Institute for Sustainable Development has reported that local air pollution, much of which is caused by mobile emission sources such as cars, resulted in 7,700 premature deaths and as much as \$36-billion is lost productivity and health care expenditures in Canada in 2015 alone.¹⁷ The overall economic and public health benefits to all ratepayers of accelerated EV adoption will far exceed any costs associated with utility investment in charging infrastructure as EV adoption accelerates.

8. Any other matters that may assist in the effective and efficient review of the Inquiry.

Ontario's utility regulator released a guidance document on July 7, 2016, specifying that EV charging services represent end use and all-in service and do not constitute the retail or distribution of electricity.¹⁸ It is suggested that the BCUC review time-series data for DC fast charging station expansion in the province on Ontario both before and after the release of the 2016 guidance document.

Tesla welcomes the opportunity to continue making contributions to the BCUC inquiry in its role as an intervenor. Thank you for considering this material.

Yours Sincerely,

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¹⁷ International Institute for Sustainable Development, 2016, "Costs of Pollution in Canada: Measuring the impacts of pollution on families, business and governments" at:

<http://www.iisd.org/library/cost-pollution-canada>

¹⁸ Ontario Energy Board Staff Bulletin, July 7, 2016, "Re: Electric Vehicle Charging" at:

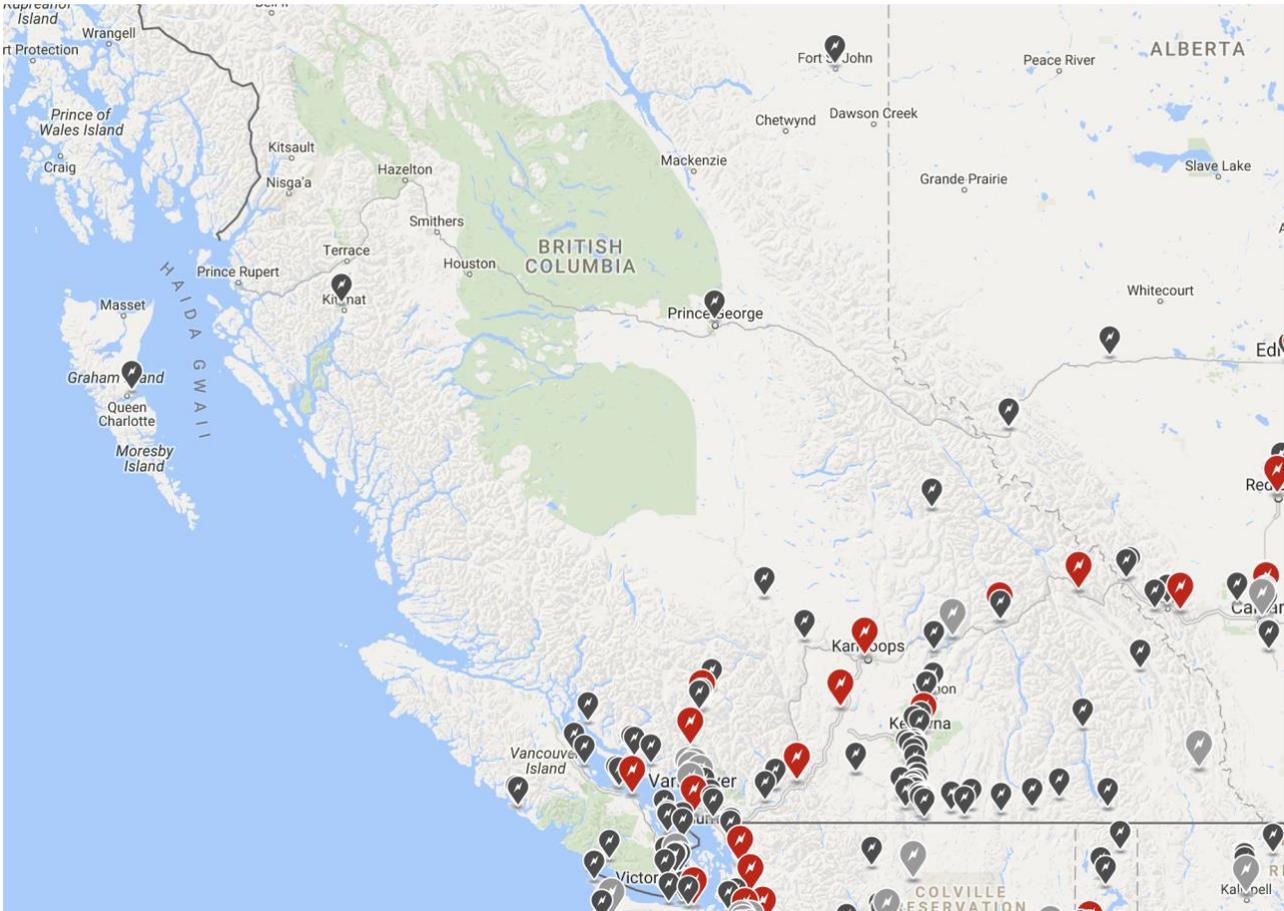
https://www.oeb.ca/oeb/Documents/Documents/OEB_Bulletin_EV_Charging_20160707.pdf



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Appendix: Tesla Charging Network in British Columbia



Source: Tesla.com/findus - As of March 12, 2018.

- Red = operating Supercharger station (multiple connectors per site)
- Grey = planned 2018 Tesla Supercharger locations
- Black = Tesla level-2 Destination Charging connector



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