# Summary Notes

## Public Electric Vehicle (EV) Fast Charging Rate engagement session

## December 7, 2020

## WebEx / BC Hydro

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| **Type of Meeting** | Public Electric Vehicle Fast Charing Rate Workshop – Customers and Interveners | |
| **Agenda** | • Opening Remarks<br>• BC Hydro EV Public Charging Program<br>• Public Charging Rates<br>• Closing Remarks | |
| **Abbreviations** | BCUC British Columbia Utilities Commission<br>EV Electric Vehicle<br>RS Rate Schedule | |

**Link to Presentation**

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**Actions or Tasks following workshop:**

- Participants feedback, December 2020
- BC Hydro application, March 2021

**Key Definitions**

- Charging Station or Station – Electric Vehicle Supply Equipment. In this context, generally power levels of 25 kW, 50 kW and 100 kW.
- Connector – Plugs available on the charging station. In this context, Combined Changing System (CCS) and CHAdeMO connectors.
- Plug or Port – Same as Connector.
- Site – A continuous area with one or more charging stations are located as well as associated dedicated parking stalls and ancillary electrical equipment.
- Charger – Same as Charging Station in this summary note.

## Questions and Answers:

### 1. Charging Station Connectors

a) What are your intentions to support the CHAdeMO connector going forward?

BC Hydro intends to continue supporting the CHAdeMO connector for the foreseeable future given there are many legacy vehicles that use this connector and it is currently the only available adapter for Tesla vehicles. Also, it is currently a requirement for Natural Resources Canada and CleanBC funding.

b) Have you looked at separating the charging connectors/ stations, since CHAdeMo is now a legacy format, 25kw may be more suitable for LEAF, and CCS plugs may be better with 100kw?

For now, charging stations used by BC Hydro will have both the CHAdeMO and CCS connector, but this may change in the future depending on government program requirements and industry trends.

c) You said that you do not support tesla plugs. Why not negotiate to include this plug outlet to increase the utilization rate at the charge stations. This would benefit all EV users and BC Hydro?

Fast charging stations which include Tesla connectors are currently not available since Tesla is currently not making their connectors available for non-Tesla charging stations. Tesla owners can use BC Hydro fast charging stations through the CHAdeMo adapter available from Tesla.

### 2. Charging Service Stations - Accessibility and Maintenance

a) Will EV maintenance and repair become a priority since it's becoming critical infrastructure? What is the procedure to report broken/failed chargers and expected response times?

Maintenance of BC Hydro's EV stations remain a high priority for BC Hydro.

BC Hydro has an industry leading 4-Tier EV operations model:

- Tier 1 – 24/7 call centre support: BC Hydro's agents are available to provide phone support;
- Tier 2 – EV Operations and inspections: BC Hydro internal staff with expertise will evaluate issues, conduct remote diagnosis, send local BC Hydro staff to investigate and dispatch repair crews if required;
- Tier 3 – Electrician dispatch: BC Hydro will dispatch the closest qualified electrician to attend to the station for repairs;
- Tier 4 – Engineering and advanced diagnosis: If on-site repairs cannot be made, the charging station will be replaced and sent to BC Hydro's repair facility in Surrey.

Regarding expected response time, BC Hydro strives to take calls from EV drivers within minutes, attend to sites within hours and resolve most issues by the next day.

b) Has vandalism been a problem for charging stations? Have you considered surveillance cameras for security and usage monitoring?

## 2. Charging Service Stations - Accessibility and Maintenance

Yes, BC Hydro has experienced vandalism at some sites. Some sites currently have discrete surveillance cameras and BC Hydro is further exploring the installation of surveillance cameras at the remaining sites.

c) Has any thought been giving to reducing light pollution from charging stations? Light pollution has negative effects on animals and people. Some baffles on the lights at the charging station would reduce the glare with no negative effects on users of the charging station.

BC Hydro has engaged lighting engineers to design station lighting, which have included considerations for potential impact of light pollution on animals and people.

We currently use 3LB and 3HB luminaires. 3LB light has a low backlight distribution pattern, which is appropriate for installation in front of residential buildings where light distribution towards the building is not desirable. 3HB light has a high backlight distribution pattern, which is appropriate for darker parking lots where light distribution is required over a wider area.

Luminaire dimmers may be incorporated at some sites where practical.

d) Will BCH commit to its DCFC stations being accessible to EV drivers with disabilities?

BC Hydro has "EV Fast Charging Design and Operational Guidelines", which can be reviewed at: https://www.bchydro.com/powersmart/electric-vehicles/industry/fast-charging.html. The Guidelines were developed in consultation with stakeholders from the Vancouver EV Association, and include accessibility recommendations.

BC Hydro will incorporate the accessibility components into new sites where possible and practical or if required by funding requirements. Older sites will receive retrofits over time as they are upgraded.

## 3. Charging Service Location – Current and Future

a) Vancouver Island: What's happening north of the Malahat in terms of expanding the service? Nanaimo, Oceanside etc.? The map had something above Barkley Sound; just curious what / why?

At this time, BC Hydro is planning for a new station in Duncan in 2021. Other potential sites for stations in the region are being explored, but not confirmed at this time.

b) Northern: If this is a province wide network, why is it that neither Highway 16 W nor Highway 37 nor Highway 97 North nor Highway 20 have operational chargers? Those on Highway 16 West were announced for 2019 and are still not operational. Why does it take so long to enable chargers that are ready to go? Been waiting 3 weeks here in Prince George for 3 sites west of here.

As of December 17, 2020, the charging stations in Prince George, Burns Lake and Prince Rupert are now operational. The other sites/stations along Highway 16 are delayed due to various local/municipal or COVID-19 related circumstances that are outside of BC Hydro's control. Stations along other highway corridors, including north of Prince George are also in the planning stages.

## 3. Charging Service Location – Current and Future

The Prince George station construction was delayed due to the requirement to use directional drilling under the highway which added significant time to the project. The Burns Lake and Prince Rupert sites were constructed within the timeframe of fall 2020.

In general, once the charging stations are installed at a site, there are still number of steps to complete before the station is operational. Here is the usual sequence of events:

1. Upon completion of construction and electrical work, the electrician submits request for inspection to Technical Safety BC (TSBC). Response time ranges from a couple of days to a couple weeks, depending on the area of the province and inspector workload or travel restrictions.
2. Electrical Inspector from TSBC attends the site to inspect the equipment and installation. If TSBC has some questions or additional requirements, it can take up to several weeks if the special parts are needed.
3. Approved inspection report are provided to BC Hydro to request energization of the site.
4. BC Hydro schedules a line crew to energize the site. This schedule is prioritized according to other work in the queue and may be affected by storm response work or customer outage restrictions. Typical scheduling for station energization is 2-4 weeks.
5. BC Hydro line crew energizes the site.
6. Electrician/technician turns on the charging stations and tests them before the charging station is available to the public for use.
7. BC Hydro completes final commissioning and testing of the charging stations, does final public safety check and tests charging with BC Hydro owned EV's as well as ensuring our support team is ready to support the new site 24/7.

Steps 5-7 take place within a few days or more as each role attempts to be efficient by bunding the tasks with other activities en-route.

8. PlugShare and ChargeHub are updated with description, activation details, and photos, and real-time status is activated.
9. The station is then opened to the public.

It usually takes several weeks to complete all of these steps and could be longer if there are delays scheduling a line crew due to storm responses or local outage restrictions if the station is fed from a feeder with other customers on it.

c) Southern Interior: Any timeframe to add a 2nd DC Fast charger to Vernon, BC - currently only one. What has happened to highway three through Osoyoos to trail?

Upgrading the station in Vernon is on BC Hydro's plan for calendar 2021 and will be coordinated with local street work that is being done by the City of Vernon. The site agreement is in place to re-locate and twin the station on the other side of the existing site.

Highway No. 3 between Osoyoos and Trail is with the service territory of FortisBC Inc.

d) Lower Mainland: What happened to Surrey City Hall? I'm surprised there's basically nothing on the entire west side of Surrey unless you cross the bridge or go to Guildford. The lab as you mentioned isn't 24/7 so I don't count that. Where is the Cloverdale location? It is not on app nor on BC hydro location map.

BC Hydro and the City of Surrey have agreed to discontinue the fast charging station at the Surrey City Hall as it no longer met operational and availability requirements.

## 3. Charging Service Location – Current and Future

BC Hydro is working on a plan to provide a station available to the public for use 24 hours a day at a site near the current Powertech Labs site.

The Cloverdale station is at a site on 176A Street and did not appear in the BC Hydro EV app as it was formally a BC Hydro station on the Greenlots network. It is currently on the PlugShare map. The site is currently being upgraded with two new 50 kW fast charging stations and is expected to be operational in late February 2021.

e) Urban and rural/highway locations seem to be conflated in your outreach. Can you divide some of your questions with respect to urban locations versus the need of long-distance highway travelers to "charge and go"?

Thank you for your feedback. BC Hydro acknowledges the differences between urban and rural/highway stations and will work to make our data and feedback collection more distinctly reflect this difference.

f) Do chargers serve the number of vehicles that would actually be using the service? How are you deciding where to put the stations?

For planning purposes, there are two types of station locations: (i) those along highway corridors that facilitate inter-city travel with an electric vehicle, and (ii) those in urban and suburban areas that provide charging opportunities to individuals without access to charging at home or at work and in instances where the duty cycle of the vehicle precludes Level 2 charging.

- For stations along highway corridors, the planning process begins with an analysis of the specific travel corridor and the placement of a station after consideration of topography, distance between stations, and nearby amenities.
- For urban and suburban locations, station locations are selected based on an assessment of population density, distance from other DC fast charging stations, and proximity to traffic corridors (i.e., to minimize the travel distance to stations).

Once a general location for a station has been determined, specific sites potentially suitable for the station will be comparatively assessed based on a number of factors, including future expandability of the location, proximity to travel corridors and amenities, ease of access, safety, and access to BC Hydro's distribution infrastructure. To help BC Hydro decide a suitable site, BC Hydro provides a site selection matrix to municipalities, regional districts, or other community representatives, who may provide information to BC Hydro for further evaluation.

g) Is BC hydro looking into installing more chargers at commercial developments? Public / private partnerships with grocery stores, big box stores, and malls that have massive parking lots? Has there been any talks with merchants like Superstore to subsidize the cost in order to keep charging free? Any thought to charge for hosting chargers as they drive consumers to a location?

BC Hydro currently has fast charging stations at 14 Loblaws/Real Canadian Superstore sites across the Province. BC Hydro also has many stations on municipal property, including community centres. BC Hydro will continue to pursue sites that meet our criteria for accessibility, amenities, safety, and expansion.

Some site hosts have contributed to the capital cost of building stations.

| 3. Charging Service Location – Current and Future | |
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| | It is at the discretion of merchants whether or not they choose to reimburse their customers for expenses incurred by the customers while they are shopping at their facilities and establishments. |
| h) | Is BC Hydro open to the idea of partnering with property owners to operate chargers on these properties where BC Hydro owns and operates the chargers but the land is provided by the property owner? Will BC Hydro consider setting up DCFCs and partner with retailers such as petrol stations so there's more nearby amenities (i.e., washrooms, restaurants, convenient stores, etc.) while charging? Has BC hydro thought of installing charge stations at existing gas stations, utilize existing infrastructure?<br><br>This is currently BC Hydro's EV charging station installation model. Almost all BC Hydro's owned and operated charging stations are located on private property, municipal property, parks or highway right-of-way, pursuant to site agreements.<br><br>BC Hydro currently has fast charging stations located at gas stations, such as at Tynehead Esso in Surrey and Petro-Canada in Blue River. BC Hydro is exploring additional sites that are located alongside gas stations. |
| i) | Is BC Hydro considering building chargers at hospitals and airports in rural areas? People are often driven there and their drivers need to charge for the return trip. Is there any thought to have charging stations at new housing development and RV Parks?<br><br>BC Hydro has built stations in new housing developments/communities. An example is installation of charging stations at the Wesbrook Village near UBC.<br><br>BC Hydro is open to looking at sites that meet our site criteria, local demand and budget considerations. |

## 4. Charging Service Network Planning

a) There is a theme of people wanting to know why BCH is providing this network? Is it business or sustainability commitment and does the Provincial govt contribute? Is BCH intending to stay in the EV charger retail business - or let the private sector take it on after an initial period?

BC Hydro is supporting the Province's CleanBC plan to reduce greenhouse gas emissions. Development of a network of EV fast charging stations in the Province is key to the decarbonization of the transportation sector. BC Hydro's fast charging stations (if certain requirements are met) are "prescribed undertakings" under the *Clean Energy Act*, which means that they are "for the purposes of reducing greenhouse gas emissions in British Columbia".

Both the federal and provincial governments contribute to the capital cost of building fast charging stations through their respective infrastructure funding programs, and BC Hydro has applied, and will continue to apply, for government funding where available and applicable.

b) What is BC Hydro Electrification Plan in the near future. Will there be EV charging hubs like the ones in Europe? Will BC Hydro looking at large charging sites with 10 to 20 chargers like Tesla does instead of just 2?

For the short term (to mid 2023), BC Hydro's plan is to deploy the electric vehicle charging stations identified as "incomplete" at 51 sites. For the medium term (to December 31, 2025), BC Hydro will continue to work with the Ministry of Energy, Mines and Low Carbon Innovation to develop a deployment plan. BC Hydro will also work with the Ministry of Transportation and Infrastructure, FortisBC Inc. and other applicable parties when developing the plan. BC Hydro will develop a long term deployment plan (beyond December 31, 2025), when more information becomes available on the electric vehicle environment (e.g., market dynamics and technology).

c) In Jun 2019 EMPR estimated BCH DCFC numbers at 92 and that there would be 149 by end 2020 - what happened to the roll out if we are at 70 today? Given that Quebec has 75% more people than BC, their 250 sites means BC should have at least 100+ sites in service Now - why are we so far behind?

BC Hydro interprets the "Jun 2019 EMPR" reference as the Ministry of Energy, Mines and Petroleum Resource's news release on May 29, 2019, which can be found at https://archive.news.gov.bc.ca/releases/news_releases_2017-2021/2019EMPR0018-001077.htm. The statistic in the news release refers to "public charging stations throughout B.C." and does not refer to stats specific to BC Hydro. By the end of BC Hydro's fiscal 2021 (i.e., March 31, 2021), BC Hydro expects to have 98 DCFC charging stations in operation. By the end of BC Hydro's fiscal 2022 (i.e., March 31, 2022), BC Hydro plans to have approximately 155 charging stations in operation.

d) Does the number of BC hydro stations planned match the expected demand as the electric vehicle fleet increases? When, by your estimation, the amount of chargers will reach the proportion of the regular gas stations?

BC Hydro does not expect the number of EV fast charging stations for public use to reach the same level/number of existing gasoline filling stations since a significant proportion of EV charging occurs at home, and this is expected to continue in the future.

| 4. Charging Service Network Planning | |
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| e) | Can we prioritize more public chargers over home chargers - ever light stand that now has an LED light should include a 240v charger. Some sites have received an additional charger from 1 unit to 2 - Is there plans on putting in even more? i.e., maybe a 25kW and/or 100kW when there's already 2 50kW or is the focus more on new sites? For new sites are there plans on putting in more than 2 units?<br><br>BC Hydro's core public EV charging service will be a fixed device capable of charging an electric vehicle using a direct current.<br><br>Sites with more than 2 charging stations may occur in the future, but it is beyond the current fiscal 2022 plan. |
| f) | Have you thought of having battery storage at charging to stations to be able to buy power when the rates are lower? Could we book a time to charge?<br><br>BC Hydro may explore battery storage at charging stations in future.<br>Currently EV drivers cannot book a time to charge. |

| 5. Charging Service Station Occupancy | |
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| a) | How will you ensure EV's don't take up a charging spot past 80% charge?<br><br>BC Hydro anticipates that a rate will improve etiquette at stations. EV drivers will likely buy what they need, then move on. |
| b) | Is there anything BC Hydro can do to stop ICE cars blocking charging stations? Any laws to stop ICE cars from blocking EV chargers? How big a problem is ICE cars blocking chargers?<br><br>Parking rules are unique to each site, whether it is privately owned or municipally owned. Enforcement of parking rules are left to the owners of the site as BC Hydro is not in the position to enforce parking rules. |

| 6. Charging Service Station Activation and Payment | |
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| a) | What is happening with greenlots? Why are there BC Hydro stations that are Greenlots billed as most confusing, don't work with BC Hydro RFID cards and don't want to register with a US billing system.<br><br>BC Hydro is discontinuing the use of Greenlots. Greenlots was the early network management systems (NMS) used during the pilot phases of EV charging station deployment. BC Hydro now has its own EV charging network platform which allows for more station control and ensures that customer data storage meets B.C. privacy and security requirements. EV drivers can activate charging stations with the BC Hydro EV app, BC Hydro EV RFID card, or one-time activation via QR code on the charging station sticker.<br><br>EV drivers can purchase the BC Hydro EV RFID card via the BC Hydro EV app or ev.bchydro.com for $15 plus tax.<br><br>BC Hydro also has roaming in place with the FLO (app or RFID card) and ChargePoint (currently app only) networks to give EV drivers additional activation options to activate charging stations on other providers' networks. |
| b) | You mentioned a card required at charger stations, how do I get it? Is your RFID card by Greenlots? Does the same RFID card work with Fortis locations? Do i need an RFID card if i have a BC Hydro card? At one point ChargePoint was able to activate the locations. Have they been removed, I ask as it looks like their logo has been covered on your sites that I have seen.<br><br>Please see the answer to question 6a. |
| c) | Are All BC Hydro charging stations activated by the phone app? Will BC Hydro be working with FLO & ChargePoint etc. to establish one common billing platform? Will charging be consistent if one connects via Flo and Chargepoint as with BC Hydro app? Anyone know why my iPhone 8 app does not activate a BC Hydro charging stations?<br><br>Please see the answer to question 6a. You can also call BC Hydro EV support at 1 866-338-3369 if you need help activate a charging station. |

| 6. Charging Service Station Activation and Payment | |
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| d) | Will BC Hydro introduce credit-card payment instead of RFID cards? Are the RFID cards less expensive for BC Hydro than using a credit card reader?<br><br>Currently, mobile apps and RFID cards are the most economical option for payment at fast charging stations because physical credit card readers will add additional operating costs for BC Hydro. |
| e) | Will payment once implemented go on BC Hydro app? Or Greenfleets? Or depends? Can we have our BC Hydro Level 3 Charging expenses be charged back to our Household BC Hydro Account. This way we can have 1 Monthly Bill.<br><br>Payment is already implemented on the BC Hydro EV app. EV drivers can pre-load an account balance on their BC Hydro EV account now. When an EV driver uses a non-BC Hydro FLO or ChargePoint station with a fee, they can already use BC Hydro EV app to pay and the revenue will be collected by the FLO or ChargePoint station owner.<br><br>Currently the BC Hydro EV account is not connected to a BC Hydro customer residential or business account and thus public EV charging cannot be put on a standard BC Hydro monthly bill at this time. |
| f) | Can BCH simply charge back to the house hold account at a predetermined KWH rate? BCH should link EV charging to household account for simplicity and transparency.<br><br>Currently DC charging stations cannot be billed by kWh. In terms of connecting the BC Hydro EV account to BC Hydro home or business accounts, this may be explored in the future. Currently it is not feasible to directly associate the BC Hydro EV account and home or business electricity account.<br><br>See the answer to Question 14a for further details. |

| 7. Charging Service Station Power Levels | |
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| a) | Why is BC Hydro considering 25 kW DCFC? When will 150+ kW DCFC become the norm for installation of Infrastructure? Is their any thought being given to support newer models coming on stream that can handle ultra rapid charging i.e., 350 kW DC?<br><br>25 kW DC charging stations are being deployed where there isn't enough electrical capacity to support 50 kW or higher level charging stations. Over time BC Hydro will consider purchasing charging stations of increasing power level as provincial and federal funding programs allow (currently only up to 100 kW). |
| b) | Could BC Hydro consider adding some level 2 chargers that a driver who really wants to fill up could move to once they have the 80% on the fast charger. Would BC Hydro consider pushing 240v as a shared public asset over individual home connections? (utilization of a home charger will never equal a public chargers)<br><br>BC Hydro currently has some existing Level 2 charging stations and does not plan to install more |

## 7. Charging Service Station Power Levels

Level 2 public charging stations since these costs to recover associated with operating Level 2 charging stations are not guaranteed under the *Clean Energy Act*. The lowest power level of public charging that BC Hydro expects to offer going forward is 25 kW DC.

## 8. Charging Service Rate Design - Background

a) Why are you wanting to go to a pay model? How does charging for transport electrification support its use? Would that not be a deterrent?

BC Hydro's rates are regulated by the BC Utilities Commission, which has encouraged BC Hydro to introduce a rate as soon as possible.

Introducing a rate will contribute to the electricity portion of station operating costs. This will reduce the costs that have to be recovered from non-participants (i.e., those ratepayers without electric vehicles). A rate will also dissuade customers with alternate charging options (e.g., home charging) from using the station solely because there is no charge for so doing.

b) Let's get back to the policy underlying this - Is your goal to promote EV use/charging, or recoup costs? Fee recovery for charging infrastructure - what is bc hydro's policy for greenhouse gas emission reduction? Notwithstanding the Greenhouse Gas Reduction Regulation, has BC Hydro been instructed to start charging now, even though we should be encouraging EV use and reducing GHG emissions?

BC Hydro's goal is to facilitate the growth of EVs in BC. In BC Hydro's view, EV fast charging infrastructure is necessary for the continued growth of the EV market and ultimately the attainment of the province's GHG reduction targets. These stations make intercity travel in an EV possible and provide EV charging opportunities to those without access to home and/or workplace charging.

It is recognized that a network of EV fast charging stations within the BC Hydro service territory will not initially recover all station maintenance and capital related costs. Revenues from public fast charging will reduce the costs that have to be recovered from non-participants (i.e., those BC Hydro customers without an EV) and promote the efficient use of fast charging infrastructure by: a) deterring customers with alternate charging options (i.e., those with access to home charging) from using the stations because they are free; b) reducing the incidence of charging the battery when it is at or above 80 percent full; and c) reducing the incidences where the users of the station leave the vehicle unattended while it is plugged into the charging station after its fully charged.

c) Why isn't carbon tax used to pay for ev stations instead of ratepayers? Can carbon pricing of "avoided pollution" etc be recognized in electric fuel pricing?

The collection of the Carbon Tax and the distribution of revenues are the responsibility of the Provincial Government. Note that the provincial government has contributed to the construction cost of almost every EV fast charging station deployed by BC Hydro.

d) When will BCH apply to the BCUC for approval of rates for DCFC service? Summer 2021 is basically the target for the start of billing correct? is it your expectation that the Interim rate will

| 8. Charging Service Rate Design - Background | |
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| | be the same as the final rate?<br><br>BC Hydro expects to apply for a rate in March 2021. In the application, BC Hydro will apply for an interim rate effective May 1, 2021. The BCUC will decide if the final rate is the same as the interim rate. |
| e) | Stations that were pay stations operated by Municipal partners, and have moved to BC Hydro operated stations and changed to free, this has created much more demand and line ups ... why did that change before you applied for the tariff?<br><br>BC Hydro needed to harmonize all the site agreements to give BC Hydro ability to set the rate based on what the BCUC approves. For the handful of legacy sites where the municipalities had charged a fee, the fee needed to change to zero when BC Hydro operates the stations because BC Hydro does not have an approved rate for EV fast charging service. |

| 9. Charging Service Rate Design – Rate Design and Structure | |
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| a) | Are you going to charge by time or by power use? Why does your charging station in Merritt have a cost per kwh? I seem to recall being charged by kWh at stations in the US when down there in 2019, does that not mean the technology is there to charge by kWh?<br><br>The rate application will be for a time-based rate. The original price for the Merritt station was set by the municipality and kWh was used during the pilot phase. Different from some US jurisdictions, kWh-based pricing cannot be implemented because currently there is no Measurement Canada approved DC measurement standard in Canada. |
| b) | How can you advocate a time type charge when there are so many variables? Charging per KWH means you are being charged for a measurable amount of energy such as purchasing a litre of gasoline. Please comment.<br><br>See answer above. |
| c) | BC Hydro/Powerex has a monopoly on the sale of electricity by kW-h. If fees are charged by energy (kW-h) rather than as a service (by "time/parking") it means that the BCH monopoly is violated. Do Greenlots, Chargepoint Flo actually sell energy/kW-h or are they just offering a service/parking?<br><br>The BCUC EV Inquiry (conducted in 2018-2019) has clarified the role of utilities with respect to providing public EV charging service. BC Hydro's EV charging service is consistent with these principles, and BC Hydro's rate for EV fast charging service will be subject to BCUC approval.<br><br>As BC Hydro understands, Greenlots, ChargePoint and FLO are EV service (IT) networks and do not own the stations or sites.<br><br>See response above with respect to the reasons for time-based rate. |
| d) | Why can't you have many pricing tiers for the charge power accepted by the car? For example, have |

| 9. Charging Service Rate Design – Rate Design and Structure | |
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| | a lower per minute rate if car accepts less than 40 kwi, 30 kw or 20 kw? This will make it closer to kwh pricing. Why not allow the user setup their max charge level (based on their car) - and then when they plug in - they get charged at that rate. So if your car can only draw - 25KW - you pay that price at any 25 / 50 / 75/ 100 station?<br><br>Given this will be BC Hydro's first implemented rate for fast charging service and current metering constraints, BC Hydro is proposing a time-based rate that will only vary by the nameplate power level of the charging station. Currently, BC Hydro is unable to administer a rate where the power level is set by the vehicle. BC Hydro is proposing evaluation and potential re-pricing in three years based on utilization and price response data. |
| e) | Is it feasible to offer kWh-based rates with a time-use charge that would after a set period of time (e.g. a time-use charge each minute after 20 minutes of charging)? [How about] Step rates based on % charge of car?<br><br>This may be feasible in the future, but it is currently not feasible. |

| 10. Charging Service Rate Design – Cost of Service | |
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| a) | Surely, the BCH customer price should be based on the cost to provide the service. What is the cost of providing 1 KwH to a typical station? This should be the starting point to develop customer pricing. The prices you compared to are all over the place, for the same product!<br><br>The rates shown in Jurisdictional scan vary depending on the level of cost recovery set by the provider of the service. Cost recovery generally will increase as usage increases. Full cost recovery requires recovery of electricity supply (energy and demand), station maintenance and capital related costs. The rate BC Hydro will be proposing will initially recover only the electricity supply cost (energy and demand). |
| b) | If you charge a fee, will it be cost recovery, ie revenue neutral or for profit? In the first 3 years what % of the total cost of service is covered by other rate payers? What is the target revenue per year if charging for charging?<br><br>The proposed rate will be based on recovery of electricity supply costs. Full cost recovery requires recovery of electricity supply (energy and demand), station maintenance and capital related costs. The rate BC Hydro will be proposing initially will recover only the electricity supply cost (energy and demand). |
| c) | Are you able to disclose the cost of the DCFC unit alone? I'm curious if it's feasible for private businesses to install one given they meet the power requirements. Will full cost recovery include demand charges and new connection fees equal to what non-Hydro providers are charged?<br><br>The retail cost of a single 50 kW DCFC unit is in the order of $50,000, excluding all kiosk, civil, and electrical construction costs. The average gross cost for a dual station site including infrastructure, engineering, design, civil, transformer, lighting, signage, setup and commissioning is approximately $235,000, assuming nearby overhead 3-phase service (no significant underground work required). Full cost recovery requires recovery of electricity supply (energy and demand), station maintenance and capital costs of the stations. The rate BC Hydro will be proposing initially will recover only the electricity supply cost (energy and demand). |

## 11. Charging Service Rate Design – Utilization Rate

a) What exactly is the utilization rate - hours in 24 hours? What are the trends in utilization? median? cluster of stations?

The utilization rate is the amount of time a charging station is actively used within a specified period (day, month, year). In BC Hydro's illustrative rate modelling, utilization rate represents the average amount of time a charging station in BC Hydro's network will be active on monthly and annual basis.

The current station utilization rate across the BC Hydro EV network varies significantly, with the highest station utilization occurring at stations located in urban/suburban areas. The utilization rate will likely drop when a rate is introduced, and the magnitude of this drop is unknown at this time. Balancing this initial drop will be the expected increase in demand for fast charging stations as the number of EVs increases over time.

b) At 25 cents per minute at 20% utilization this covers full costs - is this just today or is inflation rolled into this price over time?

The illustrative rates presented in the slides are based on BC Hydro's assessment based on information available at this time. BC Hydro is proposing a re-evaluation and potential re-pricing in three years based on utilization and price response data.

## 12. Charging Service Rate Design – Pricing

a) Can BCH remove Demand Charges associated with Public DCFC? Can you discuss Time Of Use Pricing to reduce demand? Is BC Hydro considering alternative demand charge rates for public and private DCFC charging, as it has introduced alternative demand charge rates for fleet charging.

BC Hydro's illustrative rates for BC Hydro operated DC fast charging is based on conversion of the applicable General Service rates to time-based rates. The same General Service rates are available to all BC Hydro customers (who meet the service requirements for such service), and BC Hydro currently has no plans to introduce alternative demand charge rates for DC fast charging.

b) Has BCH considered to make EV charging available at low/no-cost in remote areas, om highways? Has there been any serious consideration to having a lower fee for BC Hydro customers as it is a crown corporation? Can B.C. Residents be charged a reduced rate vis-a-vis those from out of province?

Given this will be BC Hydro's first implemented rate for fast charging service and current metering constraints, BC Hydro is proposing a time-based rate that will only vary by the nameplate power level of the charging station. BC Hydro is proposing evaluation and potential re-pricing in three years based on utilization and price response data.

BC Hydro has previously received feedback regarding associating the BC Hydro EV account with customers home or business electricity accounts, and this will be explored in the future. Currently it is not feasible to directly associate the BC Hydro EV account and home or business electricity account.

c) Have you considered charging less for people without home charging (apartment / condo) to increase equity? How about an annual service credit for people who have their own home chargers.

| 12. Charging Service Rate Design – Pricing | |
|---|---|
| | BC Hydro has not considered these proposals but may do so in future. Home electricity rates for EV charging are out of scope of this particular rate application. |
| d) | Does BC Hydro export power (or import it?) If exporting power, does that mean BC Hydro essentially has surplus power that could result in lower FC fees?<br><br>BC Hydro imports and exports energy. Energy is only one component of the cost of fast charging service, there are also costs associated with the station capital, maintenance and peak demand.<br>The DC fast charging rate will be based on cost recovery. BC Hydro is proposing the rate initially to recover only the electricity supply cost, while full cost recovery requires recovery of electricity supply, station operation and capital costs of the stations. As with all of BC Hydro's rates, rate decrease (and increase) are subject to the Revenue Requirement Application process. |
| e) | Different EV's have different limits as to how high a charge they can take in. How is setting higher rates for larger chargers fair if a car cannot utilize the larger charger? FortisBC proposes rates for 100 kW charging twice that of the 50 kW rate - why shouldn't BC Hydro do the same?<br><br>Given this will be BC Hydro's first implemented rate for fast charging service and current metering constraints, BC Hydro is proposing a time-based rate that will only vary by the nameplate power level of the charging station. Currently, BC Hydro is unable to administer a rate where the power level is set by the vehicle. BC Hydro is proposing evaluation and potential re-pricing in three years based on utilization and price response data.<br><br>The rates between service providers vary, as shown in Jurisdictional scan table in the workshop presentation, depending on the level of cost recovery set the provider of the service. Cost recovery generally will increase as usage increases. Full cost recovery requires recovery of electricity supply (energy and demand), station operation and capital related costs. The rate BC Hydro will be proposing will initially recover only the electricity supply cost (energy and demand). |
| f) | Based on the kWh noted on the email that I get every time I use a BC Hydro charging station which shows a kWh amount and a time amount, a $0.20 per minute would be about twice what I would pay for the same KwH at home using level 2 rates. Is this your expectation.<br><br>Yes. Customers should expect that as power levels of fast charging stations increase, the costs for the charging will factor in the expense of the higher-power level charging equipment and operation costs in addition to the charge for the electricity (energy and demand). Presently charging at home is likely to be the most affordable option for BC Hydro customers. |

## 12. Charging Service Rate Design – Pricing

g) Based on current charger usage (time and kwh), can BC Hydro publish the average effective Kwh rate given 20 and 25 cents per minutes? What would the rates be at 50% utilization? Provide cents from gasoline to EV charging. Do you know why Hydro Quebec can charge less than BC Hydro?

Based on average charging session time of 28.3 minutes and average consumption per session of 12.7 kWh from BC Hydro's 50 kW charging station data from 2019, time-based rate of 20 and 25 cents per minute calculates to 44 and 55 cents per kilowatt-hour respectively:

| Time Based Price (Cents/Min) | Average Session Length (min) | Total charge based on average session length | Average Consumption per session (kWh) | kWh based price (Cents/kWh) |
|---|---|---|---|---|
| 20 | 28.3 | $ 5.65 | 12.7 | 44 |
| 25 | 28.3 | $ 7.07 | 12.7 | 55 |

Illustrative rate based on electricity supply cost recovery for 50 kW charging station at 50 per cent utilization is 6 cents per minute.

## 13. Charging Service Rate Design – Tax

a) Is BC Hydro considering adding "road use tax" into the fee that is being proposed or is the fee only for energy consumed?

No.

b) Will taxes be based on Energy tax rates, or service PST/GST?

GST will be applicable to the EV fast charging service.

| 14. Charging Service – Other Operators | |
|---|---|
| a) | How does BCH 'stay in this business' when it has an unfair advantage - sole provider? It's fundamentally unfair for a monopoly supplier to be allowed to compete with third party providers. What assurance do we customers have that BCH won't use its advantage to disadvantage other providers? And how are we assured that BCH doesn't use its other revenue sources (home owners) to subsidize EV rates, to the disadvantage of 3rd parties?<br><br>The BCUC EV Inquiry (conducted in 2018-2019) has clarified the role of public utilities with respect to providing public EV charging service and articulated certain findings. BC Hydro's EV charging service takes into consideration these principles and findings, and BC Hydro's rate for EV fast charging service will be subject to BCUC approval.<br><br>The proposed BC Hydro fast charging rate is initially based on the cost recovery of electricity supply only (energy and demand) by converting General Service rates to time-based rates. |
| b) | So it seems reasonable that your policy is at least partly driven by not appearing to price private providers out of the market...correct?<br><br>The rates proposed by BC Hydro take into consideration BCUC's recommendation from the Phase 2 of "An Inquiry into the Regulation of Electric Vehicle Charging Service" (EV Inquiry) to maintain a level playing field for fast charging service operators through pricing that is comparable to that of other operators. |

## 15. Charging Service - Metering

a) Can you explain what's happening with approval of DC metering and timing? Has BC Hydro or the provincial government lobbied or approached Measurement Canada (federal government) about bringing in an energy based rate, instead of a per minute rate? Other jurisdictions around the world utilize a kWh rate. If no, why not?

The American National Standards Institute (ANSI) metering working group is currently developing a DC metering standard (ANSI C12.32), which will establish acceptable performance criteria for revenue grade DC kWh energy and kW demand meters. BC Hydro has been monitoring the development of the new DC metering standard. The new standard is currently under review by various North American utilities and equipment manufactures for formal approval.

In addition to the standards development process, BC Hydro will also participate in the Measurement Canada initiated public consultation process that will start in early 2021. This process is expected to develop performance-based standards that would allow existing and new electric vehicle charging stations that meet established technical standards to charge based on kilowatt-hours (kWh) consumed. The expected timeline for this public consultation process is over the next 18 months.

b) Are charge stations certified for time billing? Why not to add certified a "smart meter" on all stations? Doesn't the federal government mandate, charging by time?

Unlike energy (kWh) based billing, time based charging only requires an internal time-device in the charging station control system hardware to monitor the duration of charging and do not require certified meters. The internal time keeping device in charging stations and EV network platform are deemed to be accurate and no certification is required.

A smart meter for the entire charging site will not accurately represent the energy dispensed to the vehicle as the site includes energy from ancillary load, such as heating, cooling fans, lighting, screen and networking equipment, that are not transferred to the vehicle. Further, the billing system is unable to differentiate and allocate energy dispensed to the vehicle from those to the ancillary load. This requires an imbedded DC meter in the charging station itself to only measure energy that is dispensed to the vehicle.

c) You have home meters that measure power draw - cannot be applied to FC? The email I get sent after a charging session show the KWH I used why can't you charge by that?

The kWh metering data from a DCFC charging session that is sent to the customer today is based on the metering device embedded in the DCFC that is not currently approved for kWh billing. See answer to question 14a and 14b above for more information.

d) With respect to not being able to use upstream AC metering to determine charging station kwh rates, why can hydro not split the AC metering (2 meters) btw the portion that goes for station support and the portion that goes to directly charging the vehicle and base the fee on kwh?

While it is technically possible to use 2 AC meters, one for measuring the EV charging station load and the other for measuring the charging station auxiliary load, this is a complex configuration that would require 2 points of metering at the charging station for allocating energy load between the station support load and the station charging load. In addition to complexity of configuring 2 point of metering for every charging station, it would require a complete redesign of the DCFC kiosk to accommodate two or three revenue meters would be required along with creating a billing system that can support this set up.

| 15. Charging Service - Metering |
| --- |
| Further, due to the metering complexity, kiosk redesign and billing system support, this approach increases the cost of metering EV charging stations which would introduce additional burdens for EV charging station operations. |

| 16. Charging Service – Net Metering |
| --- |
| a) Is BC Hydro concerned about capacity of the grid? Is there plans to have incentives to reduce the load on the grid via self power generations via solar panels?<br><br>BC Hydro expects to have adequate capacity to serve public fast charging load. |
| b) Any plans for Bidirectional chargers for grid stabilisation and a way for ev owners to make money from their vehicles?<br><br>BC Hydro does not have such plans at this time. |

## 17. Home Charging

a) Will BC Hydro consider an EV tier versus the Step 1 Step 2 model. What will the mechanism and timing be to discuss the penalization of EV users with the Step 2 electricity pricing? And can the fact that some communities have no gas supply for heating (and pay a lot more Step 2 kwh before even owning and EV) be integrated into that discussion?

This question is out of scope of the current rate proposal for EV fast charging service provided through BC Hydro's stations for the general public use. The question may be considered when the residential rates are being reviewed.

b) Time-of-day charging for electricity at businesses/residences - Is this on the horizon? (Relates to home EV charging). While I've been involved in several BC Hydro home charger testing experiments, which included moving major EV charging to off-peak hours - When can we expect to see off-peak pricing? Or will we? The Stage 2 pricing for at-home charging is an issue.

This question is out of scope of the current rate proposal for EV fast charging service provided through BC Hydro's stations for the general public use. The question may be considered when the residential and general service rates are being reviewed.

c) Are you looking at matching subsidized rates for home chargers to be more fair? Is there an option for at-home, private and metered charging? Shared accommodations on the same electrical bill mean I can't charge at home (while I would love to) without guessing at my electricity usage.

This question is out of scope of the current rate proposal for EV fast charging service provided through BC Hydro's stations for the general public use. The question may be considered when the residential rates are being reviewed.

d) I couldn't install a level 2 charger at my house without upgrading my box. This would result in a total cost of roughly $5,000 for electrical work plus the cost of a charge unit. Is BC Hydro doing anything to incentivize customers like me to install a home charger?

BC Hydro works with the Government of B.C. and FortisBC to offer provincial rebates for the purchase and installation of electric vehicle (EV) chargers and infrastructure to get homes and workplaces across B.C. ready for EVs. New funding has been applied for and a decision is expected when the Government of B.C. announces the budget on April 20. If new funding is approved, we'll begin accepting applications. Check back for updates at https://electricvehicles.bchydro.com/incentives/charger-rebates.

e) Will extending the incentives for MURB charger installations be part of this plan? I currently have no home option and have been slowly working on my building.

Residential charger incentives are not in the scope of the EV fast charging rate application. BC Hydro works with the Government of B.C. and FortisBC to offer provincial rebates for the purchase and installation of electric vehicle (EV) chargers and infrastructure to get homes and workplaces across B.C. ready for EVs. New funding has been applied for and a decision is expected when the Government of B.C. announces the budget on April 20. If new funding is approved, we'll begin accepting applications. Check back for updates at https://electricvehicles.bchydro.com/incentives/charger-rebates.

| 18. Charging Service – Research Survey | |
|---|---|
| a) | How do I get to be part of the interview team - I mean a person who is interviewed? I would also like to be part of an in-depth individual interview if possible. Thanks!<br><br>In-depth interviews are now complete. Customers are encouraged to take part in the rate application process. |
| b) | Re: security & equity: most of your survey respondents were wealthy, older white males. Any efforts to reach out to everyone else, find out what they need? Particularly important if considering security at your sites.<br><br>The survey went out to the current BC Hydro EV membership list of 17,000+ members. The demographics are of the approximately 4000 people who responded to the survey. BC Hydro will continue to survey both EV network members and other customers in the coming years to build a more broad set of research. |

| 19. General / Comments Questions | |
|---|---|
| a) | Is there any possibility of standardized rate structure that is regulated by BCUC? There is a large price difference between FLO charger in the interior, Canadian Tire, and Petro-Can?<br><br>Based on the BCUC EV Inquiry, currently only the EV charging rates of BC Hydro and FortisBC Inc. are subject to regulation by the BCUC. All other providers are exempt from regulation. |
| b) | How does this help and involve those serviced by Fortis?<br><br>We interpret this question is referring to British Columbians who drive their vehicles in both BC Hydro and FortisBC service territory.<br><br>BC Hydro and FortisBC Inc. each have its own service territory. The rate for service provided by each entity is subject to the BCUC approval. The rate proposal for the EV fast charging service is limited to service provided by BC Hydro through stations within its own service territory. |
| c) | Why aren't DCFC considered a "loss leader" for BCH since the Public DCFC chargers encourage more at-home electricity use?<br><br>Please see answer to Question 10b. |
| d) | Isn't fast charging harder on the batteries though?<br><br>BC Hydro is not aware of any strong evidence to support this. Generally, battery life is dependent on many factors, including environmental factors such as temperature, starting/ending state of charge. Generally, battery life will degrade along with the other components of the vehicle. |

| 20. Workshop Questions | |
|---|---|
| a) | How many people have joined the call today?<br><br>There were 320 callers who joined the workshop. |
| b) | Will this phone number have long distances charges for people in Victoria?<br><br>A toll-free number was provided. |
| c) | Will we get a copy of the slides after? Where is the feedback form?<br><br>The slides have been posted on bchydro.com and the survey link was also posted on bchydro.com. |
| d) | Will BC Hydro be keeping a copy of this chat? If so will it be shared with participants in this session or the public?<br><br>All the questions noted by BC Hydro from the chat have been included in this Summary Notes document. |
| e) | How do we contact "BC Hydro Regulatory"? got an email address?<br><br>bchydroregulatorygroup@bchydro.com |