



City of Port Moody

Report/Recommendation to Council

Date: April 1, 2020
Submitted by: Planning and Development Department – Policy Planning Division
Subject: Public Electric Vehicle Charging Station Usage and Long-Term Fee Management

Purpose

To present an update on electric vehicle charging station usage and a long-term fee management structure for Council consideration.

Recommended Resolution(s)

THAT City of Port Moody Fees Bylaw, 2019, No. 3213, Amendment Bylaw No. 3, 2020, No. 3257 be read a first, second, and third time as presented in the report dated April 1, 2020 from the Planning and Development Department – Policy Planning Division regarding Public Electric Vehicle Charging Station Usage and Long-Term Fee Management;

AND THAT as permitted by section 12 of Ministerial Order No. MO 139/2020, City of Port Moody Fees Bylaw, 2019, No. 3213, Amendment Bylaw No. 3, 2020, No. 3257 be now adopted;

AND THAT staff be directed to implement the short-term user fee reductions as presented in the report dated April 1, 2020 from the Planning and Development Department – Policy Planning Division regarding Public Electric Vehicle Charging Station Usage and Long-Term Fee Management.

Executive Summary

Prior to 2020, the City provided free use of City-operated electric vehicle charging stations that are publicly accessible. Offering free charging was an effective approach to encouraging early EV adoption by providing low-barrier access to necessary infrastructure; however, data collected from the stations and comments received from users indicated that the stations were not being used efficiently due to a lack of turnover. In January 2020, Port Moody implemented user fees at all publicly-available networked electric vehicle (EV) charging stations.

Imposing a user fee for EV charging is a mechanism used by many communities to ensure more efficient use of the stations in order to maximize the number of EV drivers accessing the stations. This report discusses the first quarter of station data collected since fee implementation in Port Moody and the impact on user behaviour. This report also presents

recommendations to implement a data-driven mechanism for the fair and consistent adjustment of electric vehicle charging user fees over time.

This report addresses the following topics:

1. electric vehicle charging stations in Port Moody;
2. regional EV charging user fees;
3. kWh-based fee structure;
4. Port Moody EV Station Q1 2020 Data Results;
5. recommended approach; and
6. proposed short-term fee reductions.

Background

At the October 8, 2019 Regular Council meeting, the following resolution was passed:

RC19/433

THAT the electric vehicle charging fees be incorporated in the 2020 Fees Bylaw as recommended in the report dated September 17, 2019 from the Planning and Development Department – Policy Planning Division regarding electric vehicle charging fees.

At the November 26, 2019 Regular Council meeting, Council adopted City of Port Moody Fees Bylaw, 2019, No. 3213, which included user fees for City-owned electric vehicle charging stations.

On January 1, 2020, user fees were introduced at the City's networked electric vehicle charging stations to ease station congestion and incentivize more efficient use of charging infrastructure. The City plans to monitor usage and this report provides the first update to evaluate the effectiveness of the new fees.

Discussion

Electric Vehicle Charging Stations in Port Moody

The City owns and operates eight electric vehicle (EV) charging stations that can accommodate a total of 13 vehicles. There are six networked and one non-networked Level 2 charging stations, and one DC Fast Charging station (**Attachment 1**).

EV stations in Port Moody are intended to provide additional capacity to the growing network of chargers in BC and throughout Canada. The charging stations are not intended to replace home charging, but instead to provide increased opportunities for those who do not have access to home charging and provide additional top ups to battery capacity when on the go.

Two of the eight stations owned by the City utilize power sharing, where when two vehicles are plugged in, the power supply is divided between them. For example, if two vehicles are plugged in, the power supply will be evenly split until one vehicle reaches a full charge on its battery. Once a battery is at full capacity, the power supply will return to 100% for the non-fully-charged vehicle and cut-off the energy to the fully-charged vehicle. This means that the km range vehicles receive when using these stations will vary based on power-sharing or dedicated power, and the rate of charging may be slower when sharing power. These stations are located

at Kyle Centre and underneath City Hall. The City Hall power sharing station is utilized by the City's Bylaws electric vehicle.

Port Moody stations have recorded approximately 2,000 unique visitors using the stations since introduction in late 2018. According to the Insurance Corporation of BC, in 2017, there were 110 electric and 390 hybrid vehicles registered in Port Moody. From this data it can be inferred that approximately 25% of the station users are potentially Port Moody residents.

Sample of Regional EV Charging User Fees

There are two approaches to user fees:

Structure	Advantage	Disadvantage
Price per kWh	<ul style="list-style-type: none"> • Consistent • Fair pricing for energy dispensed 	<ul style="list-style-type: none"> • Doesn't encourage turnover • Requires certified metering and verification procedures • EV drivers with full batteries may take up the space without incurring a fee for energy dispensed • Currently not permitted by Measurement Canada
Price per time	<ul style="list-style-type: none"> • Encourages turnover, maximizing availability for drivers • Consistent with other "parking" fees 	<ul style="list-style-type: none"> • Fees paid have no relation to amount of electricity received, which some users have objected to.

Current fees imposed are time-based and vary between communities and station owners. A hybrid approach with a fee that includes both time and energy components may be optimal, but is not permitted at this time and needs to be balanced against ease of use and comprehension amongst EV drivers. During staff's research and analysis of fees, closer attention was paid to fees imposed by municipalities rather than private station owners for consistency and clarity. City of Vancouver and City of North Vancouver's pricing models are considered by staff to be best practice due to having fees implemented for a longer period of time. Most municipalities have implemented similar fees.

Municipality	Fees
City of Vancouver ¹	Level 2 – \$2/hour
	DC Fast Charger – \$16/hour
City of North Vancouver ²	Level 2 – \$2/hour
	Level 2 Power sharing – \$1/hour
	DC Fast Charger – \$16/hour
City of Burnaby ³	Level 2 – \$2/hour 6am-10pm \$1/hour 10pm-6am

¹ City of Vancouver EV Charging Fees: <https://vancouver.ca/streets-transportation/electric-vehicles.aspx>

² City of North Vancouver EV Charging Fees: <https://www.cnv.org/city-services/streets-and-transportation/sustainable-transportation/electric-vehicles/where-to-charge-your-electric-vehicle>

³ City of Burnaby EV Charging Fees: https://www.burnaby.ca/About-Burnaby/News-and-Media/Newsroom/City-of-Burnaby-charges-ahead-on-electric-vehicle-infrastructure_s2_p7262.html

City of Coquitlam ⁴	Level 2 – \$1/hour for the first 2 hours \$5/hour thereafter
City of Richmond ⁵	Level 2 – \$2/hour for the first 2 hours \$5/hour thereafter
	DC Fast Charger – \$8/hour (25kW) \$16/hour (50kW)

**Prices at stations may vary based on usage and periodic fee adjustments.*

Typical Level 2 charging rates vary from \$1-\$2 per hour, or about \$0.15-\$0.30 per kWh at a 6.6kW charging rate. If an EV is plugged in to a Level 2 station for the parking limit of four hours seen in most City-owned parking lots, the maximum a user would be charged is \$8 at the current rate. To encourage turnover and maintain a simple user experience, industry experts recommend an hourly usage charge for all public charging stations, resulting in public charging fees being higher than the cost of charging at home. This ensures better access to the infrastructure so that it can be used by more people and those who need a battery charge the most, while still providing EV drivers with the opportunity to receive a sufficient top-up charge when needed.

KWh-Based Fee Structure

In accordance with the Utilities Commission Act⁶, a municipality owning and operating services within its municipal boundaries, such as EV charging services, is excluded from the definition of a public utility and is not within the BC Utilities Commission’s (BCUC) jurisdiction. This means that municipalities may charge fees for EV charging services in any method they choose.

Measurement Canada is a special operating agency of the Government of Canada responsible for ensuring accuracy in the selling of measured goods, developing and enforcing the laws related to measurement accuracy, approving and inspecting measuring devices, and investigating complaints of suspected inaccurate measurement. Operating fees under a kWh pricing model is not currently permitted under the *Electricity and Gas Inspection Act*⁷, which is federal legislation that ensures accuracy in the trade of electricity and gas bought and sold on the basis of measurement. Before any organization is permitted to operate a utility meter that involves the re-selling of electricity or natural gas based on units of energy, Measurement Canada must:

- receive an application for certification from manufacturers of these meters;
- undertake a “type approval” assessment;
- develop regulations for the device;
- verify and certify each meter through on-site installation to ensure that the meter used on site is the same as the type approved meter;
- ensure each meter is calibrated to standards; and

⁴ City of Coquitlam EV Charging Fees: https://www.coquitlam.ca/docs/default-source/council-agenda-documents/citydocs--3400763-v1-regularcouncil_2019_07_29_-_item_15.pdf?sfvrsn=2

⁵ City of Richmond EV Charging Fees: <https://www.richmond.ca/sustainability/energysrvs/electricvehiclecharge.htm>

⁶ Utilities Commission Act: http://www.bclaws.ca/civix/document/id/complete/statreg/96473_01

⁷ Electricity and Gas Inspection Act: <https://laws-lois.justice.gc.ca/eng/acts/e-4/index.html>

- obtain evidence from the site owner that there are measures in place to protect the meter against tampering.

Staff anticipate that if an approved meter were to be installed in any Port Moody station, the process above would require additional costs and staff time. At the time of writing this report, there have been no applications made by manufacturers to seek “type approval” for metering devices that would enable the re-sale of electricity by kWh. Once there is approval by Measurement Canada for these meters, staff may seek direction from Council to explore alternative fee structures for electric vehicle charging.

Port Moody EV Station Q1 2020 Data Results

Fee Structure and Revenue

On January 1, 2020, user fees were introduced at the City’s networked electric vehicle charging stations to ease station congestion and incentivize more efficient use of charging infrastructure. Following are Port Moody’s current EV user fees, prorated to the minute on all stations:

Station Type	Fee
Level 2	\$2/hr for the first 4 hrs \$5/hr after 4 hrs
DC Fast Charger	\$16/hr

Best practices learned from other municipalities indicate that usage-based fees have been effective in ensuring that stations are used fairly and efficiently, and that fees are clear. Due to the novelty of EV charging fees, the lack of long-term data, and the quickly changing market, it is expected that regular fee adjustments will take place until an equilibrium of fees and usage is reached at each station. As such, it is important that the City establish indicators to ensure that station data is being monitored consistently over time to inform data-driven decisions. A summary of the rationale behind the original fee structure implemented in January 2020 is provided in **Attachment 2**.

Revenue from user fees is received on a monthly basis from the station manufacturer, ChargePoint, who collects payment. ChargePoint administrative fees are deducted from the revenue the City receives. This revenue is used to recover installation costs, utility fees, network fees, and maintenance costs. Energy costs for the seven networked stations are included in the consolidated electricity bills for their associated buildings. **Attachment 3** contains an analysis of fee revenue for the first quarter of 2020.

Station Usage

Tracking station usage over time is necessary to optimize station management and inform policy. The following indicators are used to track behaviour at the electric vehicle charging stations

- **Average Daily Utilization:** The proportion of time that the EV charging station is occupied on a daily basis averaged over one quarter. Expressed as a percentage.
- **Average Proportion of time vehicles plugged in but not charging:** An average of the total duration vehicles are plugged into the station versus how long the vehicles are actively pulling energy for charging purposes. Expressed as a percentage.

- **Average Session Duration:** The average amount of time that vehicles are plugged into the electric vehicle charging station. Expressed in hours.

A summary of station usage and analysis can be found in **Attachment 4**.

Recommended Approach

Establishing Average Daily Usage

As mentioned above, it is expected that regular fee adjustments will take place until an equilibrium of fees and usage is reached at each station. As such, the recommended approach suggests a model where periodic adjustments to fees are defined based on station usage thresholds. This approach has been shown in other communities to allow for fee adjustments that optimize utilization of the stations and are clear and consistent to users.

Three usage-based ranges for each station have been recommended with a distinct fee for each range. Based on the City of Vancouver and City of North Vancouver fee model, 40% is the recommended low minimum usage threshold and 75% is the high usage threshold. Some Port Moody stations in the period observed did not reach at least 40% average daily usage, where the Q1 2019 usage rate for those stations, 30%, will be set as the low threshold for the time being. These thresholds may be adjusted over time to optimize station efficiency and will be revisited annually to ensure that they remain valid and consistent. These usage thresholds have proven to be effective due to the balance between availability of the stations, turnover, and cost recovery, based on experience in other communities.

Establishing Average Usage Thresholds and Fees

Usage ranges are recommended to permit the increase or decrease of user fees based on each station's average usage. In general, higher user fees have been shown to increase turnover and reduce usage, while lower user fees have shown to increase station usage. This varying fee model will be used to optimize achieving a balance between usage and fees.

Recommended fees are broken into time intervals (the first four hours an EV is at the charging station and beyond the first four hours) and into whether the average usage is below, within, or above the usage threshold values. The time intervals reflect the parking limits in most City-owned parking lots and ensure that vehicles, particularly those that may be using power sharing, can spend the time needed at the station to receive a useful charge. No modification to the time range or fee is suggested for the escalated fee after first four hours as this fee appears to be encouraging turnover based on decreased session lengths observed.

The fees in the table below are prorated to the minute on all stations, but are shown in their approximate hourly rate. The usage thresholds allow for fee adjustments in the future based on each station's average usage for the previous quarter. The lower fee within the first four hours differs for Kyle Centre and the City Hall Dual station to reflect the slower rate of charging when these stations are engaged in power sharing. Being introduced in late 2019 and experiencing significant down time due to maintenance issues, there is not enough data to understand usage for the DC Fast Charger; the default usage threshold ranges are recommended to be applied until more station data can be collected. This station will continue to be monitored, where any updates will be developed in future amendments to the Fees Bylaw.

Staff recommend that the information in the table below replace the current fees information in the Sustainability section of the 2020 Fees Bylaw, as reflected in **Attachment 5**. The purpose of this information is to establish a data-driven mechanism for the fair and consistent adjustment of electric vehicle charging user fees over time. Under this recommended model, the fees may be adjusted to the stated fees as determined by the usage thresholds by analyzing quarterly station data. Fee adjustments could be made once per quarter at the end of the quarter, for a maximum of four adjustments in a calendar year. Through the annual Fees Bylaw update, staff and Council will also have an opportunity to review and adjust fees, time, and usage thresholds as necessary.

Electric Vehicle Charging Fees*			
EV Station	Time Intervals	Average Daily Usage Thresholds	Hourly Fee
DC Fast Charger	All times	Equal to or below 40%	\$12.00/hr
		Above 40% and below 75%	\$14.00/hr
		Equal to or above 75%	\$16.00/hr
Old Orchard Hall	First 4 hours	Equal to or below 30%	\$1.00/hr
		Above 30% and below 75%	\$2.00/hr
		Equal to or above 75%	\$3.00/hr
	After 4 hours		\$5.00/hr
Kyle Centre	First 4 hours	Equal to or below 40%	\$0.50/hr
		Above 40% and below 75%	\$1.00/hr
		Equal to or above 75%	\$2.00/hr
	After 4 hours		\$5.00/hr
City Hall Dual**	First 4 hours	Fees set to match Kyle Centre rates**	
	After 4 hours		\$5.00/hr
City Hall Single	First 4 hours	Equal to or below 30%	\$1.00/hr
		Above 30% and below 75%	\$2.00/hr
		Equal to or above 75%	\$3.00/hr
	After 4 hours		\$5.00/hr
Rec Centre	First 4 hours	Equal to or below 40%	\$1.00/hr
		Above 40% and below 75%	\$2.00/hr
		Equal to or above 75%	\$3.00/hr
	After 4 hours		\$5.00/hr
Rocky Point Park	First 4 hours	Equal to or below 40%	\$1.00/hr
		Above 40% and below 75%	\$2.00/hr
		Equal to or above 75%	\$3.00/hr
	After 4 hours		\$5.00/hr

*Electric Vehicle Charging Fees are set based on average usage levels over the previous quarter at each charging station unless otherwise specified above. Average usage levels are calculated using the proportion of time that the EV Charging Station is occupied on a daily basis, averaged over one quarter and expressed as a percentage.

**Electric Vehicle Charging Fees for the City Hall Dual EV Chargers are set to match the rates at the Kyle Centre EV Charger, the rate for which is determined based on usage levels of the Kyle Centre EV Charger over the previous quarter.

Using other indicators such as average session length, in addition to usage thresholds noted above, staff will continue to analyze quarterly data on a station-by-station basis and make adjustments as necessary based on the stated fees in the table above. If data indicates usage has decreased below a threshold, the fee may be lowered to the stated low fee to encourage

more use. Similarly, if the data indicates that usage has increased beyond a threshold, the fee may be increased to the stated higher fee to encourage more turnover.

Proposed Short-Term Fee Adjustments

Q1 of 2020 is not considered by staff to be a representative period of data, considering maintenance issues resulted in intermittent powering down and unavailability of several stations, and the impact of the COVID-19 outbreak. Although the data for the first quarter of 2020 cannot be seen as the best to understand user behaviour, station utilization has decreased below thresholds due to the mentioned issues. For this reason, staff recommend decreasing the user fees on all stations to the fee listed for *average daily utilization equal to or below 40%*, or *30%* in some cases. Any potential future fee reductions beyond the lower end of the ranges may have limited to no impact on turnover and efficient use of the stations, as observed in other communities. Station utilization will be re-evaluated in the summer of 2020 in light of Quarter 2 station data analysis.

As many residents and businesses struggle with remaining financially stable during the unprecedented time of the COVID-19 outbreak and with a significant decline of conventional fuel prices, it is important that the transition to low-carbon mobility remain a viable option and priority, knowing that transportation emissions account for more than half of community emissions.

Other Option(s)

THAT staff be directed to present alternative usage thresholds and fees based on user data from another time period.

Financial Implications

There are no financial implications associated with the receipt of this report. Revenue from user fees will continue to be collected to recover the City's capital and operational station costs. Staff will continue to monitor the payback period and, once costs are fully recovered, staff will present alternative options for use of the revenue.

Should Council choose to reduce user fees as recommended in the short term, the City can expect to collect less revenue than currently experienced, impacting the City's ability to recover costs. Since the reduction in fees may have effects on behaviour and use of the stations, it is difficult for staff to determine the loss in revenue in the absence of actual data. Staff will continue to monitor revenue and costs over time and report back to Council as needed.

Communications and Civic Engagement Initiatives

Fee updates will continue to be communicated through digital messaging on each station screen, the City's dedicated electric vehicle webpage, and on the ChargePoint app. If a fee is altered, it will be updated on each of these platforms.

Council Strategic Plan Objectives

Implementing a long-term fee management strategy for EV charging is consistent with the strategic outcomes in the area of Environmental Leadership identified in the 2019-2022 Council Strategic Plan.

Attachment(s)

1. Summary of Port Moody EV Charging Stations.
2. Port Moody EV Charging Fee Rationale.
3. Q1 2020 EV Charging Fee Revenue Analysis.
4. Q1 2020 Station Usage Results.
5. Draft City of Port Moody Fees Bylaw, 2019, No. 3213, Amendment Bylaw No. 3, 2020, No. 3257.

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Report Approval Details

Document Title:	Electric Vehicle Charging Station Usage and Long-Term Fee Management.docx
Attachments:	<ul style="list-style-type: none">- Attachment 1 - Summary of Port Moody EV Charging Stations.pdf- Attachment 2 - Port Moody EV Charging Fee Rationale.pdf- Attachment 3 - Q1 2020 EV Charging Fee Revenue Analysis.pdf- Attachment 4 - Q1 2020 Station Usage Results.pdf- Attachment 5 - Draft City of Port Moody Fees Bylaw, 2019, No. 3213, Amendment Bylaw No. 3, 2020, No. 3257.pdf
Final Approval Date:	May 18, 2020

This report and all of its attachments were approved and signed as outlined below:

Dorothy Shermer, Corporate Officer - May 11, 2020 - 4:09 PM

Rosemary Lodge, Manager of Communications and Engagement - May 12, 2020 - 12:21 PM

Paul Rockwood, General Manager of Finance and Technology - May 12, 2020 - 1:41 PM

André Boel, General Manager of Planning and Development - May 13, 2020 - 4:24 PM

Tim Savoie, City Manager - May 18, 2020 - 2:43 PM