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May 17, 2021

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

RE: Project No. 1599190
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Public Electric Vehicle Fast Charging Rate Application

BC Hydro writes in compliance with Commission Order No. G-89-21 to provide its responses to Round 1 information requests as follows:

Exhibit B-4	Responses to Commission IRs (Public Version)
Exhibit B-4-1	Responses to Commission IRs (Confidential Version)
Exhibit B-5	Responses to Interveners IRs
Exhibit B-5-1	Responses to Interveners IRs (Confidential Version)
Exhibit B-1-1	Erratum No. 1 to the Application filed on March 5, 2021

BC Hydro is filing a number of IR responses and/or attachments to responses confidentially with the Commission. BC Hydro confirms that in each instance, an explanation for the request for confidential treatment is provided in the public version of the IR response. BC Hydro seeks this confidential treatment pursuant to section 42 of the *Administrative Tribunals Act* and Part 4 of the Commission's Rules of Practice and Procedure.

In addition, BC Hydro has discovered a typographic error on page 32 of the Application. The enclosed Erratum No. 1 outlines the correction to the Application.

For further information, please contact Anthea Jubb at 604-623-3545 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

Chris Sandve
Chief Regulatory Officer

ms/tl

Enclosure

1.0 Reference: Exhibit B-1, pages 2 and 10-11
BCH F2022 RRA, page 2-20 and Appendix C, page 4

The Application states: "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021)".

1.1.1 Please provide a schedule that sets out BC Hydro's eligible fast charging station sites as of March 31, 2021 and for each site provide; i) the number of 25 kW, 50 kW and 100 kW charging stations at the site, ii) the total number of charging ports, iii) the maximum number of vehicles that can charge at any one point in time, and iv) the total demand (kW) at the site assuming the maximum number of vehicles were charging simultaneously at the same time.

RESPONSE:

Please see Attachment 1 to this response that has been updated with BC Hydro public fast charging stations and sites as of April 1, 2021, plus additional attribute columns to reflect the information requested in this information request as well as BCOAPO IRs 1.1.2, 1.2.1, 1.2.2, 1.7.1, 1.15.1 and 1.17.1, BCSEA VEVA IRs 1.1.8, 1.3.2 and 1.4.1, CEC IRs 1.7.1 and 1.7.2, STRATAPLANVR2673 IR 1.2.1.8 and SUNCOR IR 1.5.2.

The file has two pages:

1. **Station (charger) based table – F2022 RRA format (updated and additional columns added); and**
2. **Site (location) based table.**

The information is provided up to April 1, 2021, instead of March 31, 2021, to reflect the following:

- **Closure of original Powertech Labs, Surrey demonstration station on March 31, 2021; and,**
- **Additional fast charging station at Kerrisdale site in Vancouver that went into service on April 1, 2021.**

Appendix C-1 - Information on BC Hydro Fast Charging Stations (Charger and construction phase based view) - as of April 1, 2021

Municipality/Location	Station Name	Physical Address	Region	In-Service Date	Status	Expansion* of Existing Site	Limited Municipality	Population (Stats Canada)	Site Limit (Population / 9,000)	# of BC Hydro Sites	# of Stations	Charging Capacity (kW)	# of Charging Ports	Maximum # of Vehicles Charge at a Time	Notes	Actual or Expected Capital Cost ($) (including Construction Work in Progress)	Third-Party Contributions ($)	Federal Contributions ($)	Provincial Contributions ($)	Other ($)
Surrey	Surrey - Powertech Labs	12388 88 Ave. Surrey, BC	Metro Vancouver	13-Jul-2013	Decommissioned	No	Yes	584,526	65	0	0	50	2	1	Not Publicly Accessible on April 1, 2021	109,087	99,615	58,553	21,356	19,705
Nanaimo	Nanaimo - Conference Centre	101 Gordon St, Nanaimo, BC	Vancouver Island	23-Aug-2013	Complete	No	Yes	99,856	11	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Duncan	Duncan - Island Savings Centre	2687 James St, Duncan, BC	Vancouver Island	19-Oct-2013	Complete	No	No	5,342	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Kamloops	Kamloops - Hillside Stadium	910 McGill Rd Kamloops, BC	Southern Interior	27-Jan-2014	Complete	No	Yes	100,046	11	1	1	50	2	1		189,475	162,140	95,305	34,761	32,074
North Vancouver, City of	North Vancouver - 1st & Lonsdale	140 1st St E North Vancouver, BC	Metro Vancouver	23-Sep-2014	Complete	No	Yes	57,325	6	1	1	50	2	1		189,475	162,140	95,305	34,761	32,074
Sechelt District Municipality	Sechelt - Trail Bay Mall	5755 Cowrie Street, Sechelt, BC	Non-Metro / Fraser Valley	15-Dec-2014	Complete	No	Yes	10,809	1	1	1	50	2	1		189,475	162,140	95,305	34,761	32,074
Saanich	Saanich Uptown	3440 Saanich Road, Victoria, BC	Vancouver Island	9-Jan-2015	Decommissioned	No	Yes	122,173	14	0	0				Decommissioned on March 20, 2020	109,087	99,615	58,553	21,356	19,705
Abbotsford	Abbotsford - EcoDairy	1356 Sumas Way Abbotsford, BC	Non-Metro / Fraser Valley	5-Mar-2015	Complete	No	Yes	158,457	18	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Revelstoke	Revelstoke	301 Victoria Rd, Revelstoke, BC	Southern Interior	15-Mar-2015	Complete	No	No	8,259	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Langley, District Municipality	Langley Events Centre	7888 200 Street Langley, BC	Non-Metro / Fraser Valley	2-Apr-2015	Complete	No	Yes	130,924	15	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Merritt	Merritt Visitor Information Centre	2202 Voght St Merritt, BC	Southern Interior	1-May-2015	Complete	No	No	7,722	n/a	1	1	50	2	1		189,475	162,140	95,305	34,761	32,074
Penticton	Penticton	234 Main St Penticton, BC	Southern Interior	7-Jul-2015	Decommissioned	No	Yes	36,425	4	0	0				Decommissioned on October 1, 2020	109,087	99,615	58,553	21,356	19,705
Hope	Hope	839 4 Ave, Hope, BC	Non-Metro / Fraser Valley	30-Oct-2015	Complete	No	No	6,667	n/a	1	1	25	2	1		189,475	162,140	95,305	34,761	32,074
Keremeos	Keremeos	702 4 St, Keremeos, BC	Southern Interior	9-Nov-2015	Complete	No	No	1,692	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Salmon Arm	Salmon Arm	381 Ross St Salmon Arm, BC	Southern Interior	18-Nov-2015	Complete	No	No	19,115	2	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Colwood	Colwood - Park and Ride	1830 Old Island Hwy, Colwood, BC	Vancouver Island	16-Dec-2015	Complete	No	Yes	18,867	2	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Boston Bar	Boston Bar - Canyon Lanes	47585 Trans Canada Hwy,, Boston Bar, BC	Southern Interior	1-Jan-2016	Complete	No	No	190	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Whistler	Whistler	4010 Whistler Way, Whistler, BC	Non-Metro / Fraser Valley	12-Jan-2016	Complete	No	Yes	13,763	1	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Spences Bridge	Spences Bridge	3633 Station St, Spences Bridge, BC	Southern Interior	9-Feb-2016	Decommissioned	No	No	99	n/a	0	0	50	2	1	Decommissioned on March 25, 2021	109,087	99,615	58,553	21,356	19,705
West Kelowna	West Kelowna	3678 Brown Rd, West Kelowna'BC'	Southern Interior	1-Jun-2016	Complete	No	Yes	35,818	4	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Chase	Chase	400 Shuswap Ave, Chase'BC'	Southern Interior	10-Jun-2016	Complete	No	No	2,478	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Princeton	Princeton	114 Tapton Ave, Princeton, BC	Southern Interior	30-Jun-2016	Complete	No	No	2,988	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Chilliwack	Chilliwack	45950 Cheam Ave, Chilliwack, BC	Non-Metro / Fraser Valley	1-Jul-2016	Complete	No	Yes	94,534	11	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Manning Park	Manning Park	7500 BC-3, Manning Park, BC	Southern Interior	31-Jul-2016	Complete	No	No	n/a	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Vernon	Vernon	3004 32nd Ave, Vernon'BC	Southern Interior	1-Sep-2016	Complete	No	Yes	43,315	5	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Surrey	Surrey Central City Hall	13450 104 Avenue, Surrey, BC	Metro Vancouver	25-Oct-2016	Decommissioned	No	Yes	584,526	65	0	0				Decommissioned on Sept 30, 2020	189,475	162,140	95,305	34,761	32,074
Malakwa	Malakwa Supermarket	4270 Oxbow Frontage Rd, Malakwa, BC	Southern Interior	31-Oct-2016	Complete	No	No	559	n/a	1	1	50	2	1		109,087	99,615	58,553	21,356	19,705
Squamish	Squamish	37950 2nd Ave. Squamish BC	Non-Metro / Fraser Valley	1-Nov-2016	Complete	No	Yes	20,404	2	1	1	25	2	1		109,087	99,615	58,553	21,356	19,705
Cranbrook	Cranbrook	38 Cranbrook St N, Cranbrook, BC	Kootenays	6-Apr-2017	Complete	No	Yes	21,247	2	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Canal Flats	Canal Flats - Columbia Discovery Centre	4925 Burns Ave, Canal Flats, BC	Kootenays	11-Dec-2017	Complete	No	No	723	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Radium Hot Springs	Radium Community Centre	4863 Stanley St, Radium Hot Springs, BC	Kootenays	11-Dec-2017	Complete	No	No	811	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Jaffray	Jaffray Pump & Pantry	7311 Bertrand Rd., Jaffray, BC	Kootenays	25-Jan-2018	Complete	No	No	554	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Ucluelet	Ucluelet - Pacific Rim Visitor's Centre	2791 Pacific Rim Hwy, Ucluelet, BC	Vancouver Island	9-Apr-2018	Complete	No	No	1,842	n/a	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Port Alberni	Port Alberni - No Frills	3455 Johnston Road, Port Alberni, BC	Vancouver Island	16-Apr-2018	Complete	No	Yes	18,751	2	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Nanaimo	Nanaimo - Superstore	6435 Metral Drive, Nanaimo, BC	Vancouver Island	17-Apr-2018	Complete	No	Yes	99,856	11	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Richmond	Richmond - Superstore	4651 No. 3 Road, Richmond, BC	Metro Vancouver	18-Apr-2018	Complete	No	Yes	212,276	24	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Surrey	Surrey - South Superstore	2332 160 St., Surrey, BC	Metro Vancouver	18-Apr-2018	Complete	No	Yes	584,526	65	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Vancouver	Vancouver - Grandview Hwy Superstore	3185 Grandview Highway, Vancouver, BC	Metro Vancouver	18-Apr-2018	Complete	No	Yes	685,885	76	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Qualicum Beach	Qualicum - Quality Foods	133 West Fern, Qualicum, BC	Vancouver Island	19-Apr-2018	Complete	No	Yes	9,166	1	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Coquitlam	Coquitlam - Superstore West	1301 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	20-Apr-2018	Complete	No	Yes	149,894	17	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Vancouver	UBC - Wesbrook Place	6163 University Blvd, Vancouver, BC	Metro Vancouver	23-Apr-2018	Complete	No	Yes	685,885	76	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Campbell River	Campbell River - Community Centre	401 11 Ave, Campbell River, BC	Vancouver Island	1-May-2018	Complete	No	Yes	35,849	4	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Courtenay	Courtenay - Superstore	757 Ryan Road, Courtenay, BC	Vancouver Island	1-May-2018	Complete	No	Yes	28,216	3	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Coquitlam	Coquitlam - Superstore East	3000 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	11-May-2018	Complete	No	Yes	149,894	17	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Sidney	Sidney	2330 Bevan Avenue, Sidney, BC	Vancouver Island	25-May-2018	Complete	No	Yes	12,235	1	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Vancouver	Vancouver - Homer St	561 Homer Street, Vancouver, BC	Metro Vancouver	25-May-2018	Complete	No	Yes	685,885	76	1	2	50	4	2		365,459	192,863	103,481	65,648	23,733
West Vancouver	West Vancouver - Horseshoe Bay	6400 Bruce Street, District of West Vancouver, BC	Metro Vancouver	25-May-2018	Complete	No	Yes	43,945	5	1	1	25	2	1		182,730	96,431	51,741	32,824	11,867
Mission	Mission Superstore	32136 Lougheed Highway, Mission, BC	Non-Metro / Fraser Valley	29-May-2018	Complete	No	Yes	43,202	5	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Sparwood	Sparwood	100 Centennial St, Sparwood, BC	Kootenays	5-Jun-2018	Complete	No	No	4,032	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Britton Creek	Britton Creek Rest Area	Exit 228 at Coquihalla Lakes Rd, BC	Southern Interior	13-Jun-2018	Complete	No	No	n/a	n/a	1	2	50	4	2		365,459	192,863	103,481	65,648	23,733
Golden	Golden	820 9 Ave South, Golden, BC	Kootenays	30-Jun-2018	Complete	No	No	4,057	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Surrey	Surrey Tynehead Gas Station	16815 - 96th Ave, Surrey, BC	Metro Vancouver	17-Jul-2018	Complete	No	Yes	584,526	65	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Vancouver	Vancouver - Kerrisdale	5356 West Boulevard, Vancouver, BC	Metro Vancouver	11-Aug-2018	Complete	No	Yes	685,885	76	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Rogers Pass	Rogers Pass Discovery Centre	9520 Trans Canada Hwy, Rogers Pass, BC	Kootenays	18-Dec-2018	Complete	No	No	n/a	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Vancouver	Vancouver - SE Marine Drive Superstore	350 South East Marine Drive, Vancouver, BC	Metro Vancouver	31-Dec-2018	Complete	No	Yes	685,885	76	1	1	50	2	1		182,730	96,431	51,741	32,824	11,867
Field	Field - Yoho National Park	Field, BC - Yoho National Park Visitors Centre	Kootenays	15-Jan-2019	Complete	No	No	230	n/a	1	1	50	2	1		Unknown	Unknown	Unknown	Unknown	Unknown
Surrey	Surrey - Cloverdale	5771 176A St, Surrey BC	Metro Vancouver	31-Jan-2019	Complete	No	Yes	584,526	65	1	1	50	2	1		80,591	65,618	35,208	22,335	8,075
Vancouver	Vancouver - SE Marine Superstore (Expansion)*	350 South East Marine Drive, Vancouver, BC	Metro Vancouver	2-Jul-2019	Complete	Yes	Yes	685,885	76	0	1	50	2	1		197,890	76,705	50,000	25,000	1,705
70 Mile House	70 Mile House	1597 BC-97, 70 Mile House, BC	Southern Interior	19-Jul-2019	Complete	No	No	1,075	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Cache Creek	Cache Creek	1270 Stage Rd, Cache Creek, BC	Southern Interior	19-Jul-2019	Complete	No	No	1,052	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Clinton	Clinton	1423 BC-97, Clinton, BC	Southern Interior	19-Jul-2019	Complete	No	No	659	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Coquitlam	Coquitlam - Superstore East (Expansion)	3000 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	21-Aug-2019	Complete	Yes	Yes	149,894	17	0	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Richmond	Richmond - Superstore (Expansion)	4651 No. 3 Road, Richmond, BC	Metro Vancouver	17-Sep-2019	Complete	Yes	Yes	212,276	24	0	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Surrey	Surrey - South Superstore (Expansion)	2332 160 St., Surrey, BC	Metro Vancouver	30-Sep-2019	Complete	Yes	Yes	584,526	65	0	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Saanich	Saanich	3544 Blanshard Street, Victoria, BC	Vancouver Island	9-Oct-2019	Complete	No	Yes	122,173	14	1	2	50	4	2		395,779	76,705	50,000	25,000	1,705
Port Hardy	Port Hardy	7360 Columbia Street, Port Hardy, BC	Vancouver Island	10-Oct-2019	Complete	No	No	4,315	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Blue River	Blue River	Blue River V0E 1J0	Northern Interior	16-Oct-2019	Complete	No	No	157	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Valemount	Valemount	735 Cranberry Lake Road, Valemount, BC	Northern Interior	17-Oct-2019	Complete	No	No	1,128	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
McBride	McBride	100 Robson Centre, McBride, BC	Northern Interior	18-Oct-2019	Complete	No	No	666	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Sechelt District Municipality	Madeira Park	12808 Madeira Park Rd, Madeira Park, BC	Non-Metro / Fraser Valley	31-Oct-2019	Complete	Yes	Yes	10,809	1	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Colwood	Colwood (Expansion)	1830 Old Island Hwy, Colwood, BC	Vancouver Island	1-Nov-2019	Complete	Yes	Yes	18,867	2	0	1	50	2	1		197,890	76,705	50,000	25,000	1,705
North Vancouver, City of	North Vancouver (Expansion)	140 1st St E North Vancouver, BC	Metro Vancouver	6-Nov-2019	Complete	Yes	Yes	57,325	6	0	1	50	2	1		395,779	76,705	50,000	25,000	1,705
Hope	Hope (Expansion)	839 4 Ave, Hope, BC	Non-Metro / Fraser Valley	9-Nov-2019	Complete	Yes	No	6,667	n/a	0	1	25	2	1		65,000	0	N/A	N/A	N/A
Delta	South Delta/Tsawwassen	1406 Tsawwassen Dr S, Tsawwassen, BC	Metro Vancouver	22-Nov-2019	Complete	No	Yes	109,490	12	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Powell River	Powell River	5001 Joyce Avenue, Powell River, BC	Non-Metro / Fraser Valley	5-Dec-2019	Complete	No	Yes	13,829	1	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Quesnel	Quesnel	2335 Maple Dr, Quesnel, BC	Northern Interior	15-Jan-2020	Complete	No	Yes	10,382	1	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Hixon	Hixon	367 Von Lienen Road, Hixon, BC	Northern Interior	15-Jan-2020	Complete	No	No	277	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Williams Lake	Williams Lake	450 Mart Street, Williams Lake, BC	Northern Interior	30-Jan-2020	Complete	No	Yes	11,359	1	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Nanaimo	Nanaimo (Expansion)	6435 Metral Drive, Nanaimo, BC	Vancouver Island	20-Mar-2020	Complete	Yes	Yes	99,856	11	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Sidney	Sidney (Expansion)	2330 Bevan Avenue, Sidney, BC	Vancouver Island	20-Mar-2020	Complete	Yes	Yes	12,235	1	0	1	50	2	1		236,612	75,000	50,000	25,000	0
Port Alberni	Port Alberni (Expansion)	3455 Johnston Road, Port Alberni, BC	Vancouver Island	30-Apr-2020	Complete	Yes	Yes	18,751	2	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Chilliwack	Chilliwack (Expansion)	45950 Cheam Ave, Chilliwack, BC	Non-Metro / Fraser Valley	8-Jun-2020	Complete	Yes	Yes	94,534	11	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Campbell River	Campbell River (Expansion)	401 11 Ave, Campbell River, BC	Vancouver Island	12-Jun-2020	Complete	Yes	Yes	35,849	4	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Courtenay	Courtenay (Expansion)	757 Ryan Road, Courtenay, BC	Vancouver Island	12-Jun-2020	Complete	Yes	Yes	28,216	3	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Port McNeill	Port McNeill	1594 Beach Drive, Port McNeill, BC	Vancouver Island	12-Jul-2020	Complete	No	No	2,395	n/a	1	1	50	2	1		197,890	76,705	50,000	25,000	1,705
Coquitlam	Coquitlam - Superstore West (Expansion)	1301 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	17-Sep-2020	Complete	Yes	Yes	149,894	17	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Vancouver	Grandview Hwy - Superstore (Expansion)	3185 Grandview Hwy, Vancouver, BC	Metro Vancouver	21-Sep-2020	Complete	Yes	Yes	685,885	76	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Prince George	Prince George	2155 Ferry Avenue, Prince George, BC	Northern Interior	14-Dec-2020	Complete	No	Yes	81,345	9	1	2	50	4	2		395,779	151,705	100,000	50,000	1,705
Burns Lake	Burns Lake	Site 1 - 313 Highway 16 W , Burns Lake, BC	Northern Interior	11-Dec-2020	Complete	No	No	1,871	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Victoria	Victoria	1420 Store St. Victoria, BC	Vancouver Island	23-Mar-2021	Complete	No	Yes	94,005	10	1	2	50	4	2		241,542	150,000	100,000	50,000	0
Sechelt District Municipality	Sechelt (Expansion)	5755 Cowrie Street, Sechelt, BC	Vancouver Island	22-Feb-2021	Complete	Yes	Yes	10,809	1	0	1	50	2	1		236,612	75,000	50,000	25,000	0
Surrey	Surrey - Cloverdale (Expansion)	5771 176A St, Surrey BC	Metro Vancouver	2-Feb-2021	Complete	Yes	Yes	584,526	65	0	1	50	2	1		236,612	75,000	50,000	25,000	0
Prince Rupert	Prince Rupert	101 1 Ave E, Prince Rupert, BC	Northern Interior	15-Dec-2020	Complete	No	Yes	13,054	1	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Vancouver	UBC - Wesbrook Place (Expansion)	6163 University Blvd, Vancouver, BC	Metro Vancouver	18-Dec-2020	Complete	Yes	Yes	685,885	76	0	1	50	2	1		236,612	75,000	50,000	25,000	0
Vancouver	Vancouver - Kerrisdale (Expansion)	5356 West Boulevard, Vancouver, BC	Metro Vancouver	31-Mar-2021	Complete	Yes	Yes	685,885	76	0	1	50	2	1		123,236	75,000	50,000	25,000	0
West Vancouver	West Vancouver (Expansion)	6400 Bruce Street, District of West Vancouver, BC	Metro Vancouver	31-Mar-2022	Incomplete	Yes	Yes	43,945	5	0	1	50	2	1		236,612	75,000	50,000	25,000	0
Whistler	Whistler (Expansion)	4010 Whistler Way, Whistler, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	Yes	Yes	13,763	1	0	1	50	2	1		123,236	75,000	50,000	25,000	0
Harrison Hot Springs	Seabird Island	77 Lougheed Highway, Sqewqel Gas Bar and Convenience	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	No	No	1,632	n/a	1	2	50	4	2		TBD	TBD	TBD	TBD	TBD
Fraser Lake	Fraser Lake	TBC - 30 Carrier Crescent, Fraser Lake, BC	Northern Interior	31-Mar-2022	Incomplete	No	No	973	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Gold River	Gold River	TBC - 375 Nimpkish Dr, Gold River, BC	Vancouver Island	31-Mar-2022	Incomplete	No	No	1,299	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Houston	Houston	TBC - 3289 Highway 16, Houston, BC	Northern Interior	31-Mar-2022	Incomplete	No	No	3,106	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Kitimat	Kitimat	TBC - 276 City Centre, Kitimat, BC	Northern Interior	31-Mar-2022	Incomplete	No	No	8,200	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Lillooet	Lillooet	TBC - 615 Main Street, Lillooet, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	No	No	2,249	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Maple Ridge	Maple Ridge	TBC - 22441 Dewdney Trunk Rd #102, Maple Ridge, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	No	Yes	91,222	10	1	2	50	4	2		236,612	150,000	100,000	50,000	0
McLeod Lake	McLeod Lake	TBC - 1 Carp Lake Rd, McLeod Lake, BC	Northern Interior	31-Mar-2022	Incomplete	No	No	87	n/a	1	2	25	4	2		236,612	75,000	50,000	25,000	0
New Hazelton	New Hazelton	TBC - 4633 10th Ave, New Hazelton, BC	Northern Interior	31-Mar-2022	Incomplete	No	No	604	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Burnaby	North Burnaby	TBC - 490 Sperling Avenue, North Burnaby, BC	Metro Vancouver	31-Mar-2022	Incomplete	No	Yes	253,007	28	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Pemberton	Pemberton	TBC - 7452 Frontier Street, Pemberton, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	No	No	2,951	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Smithers	Smithers	TBC - 3743 Second Avenue, Smithers, BC	Northern Interior	31-Mar-2022	Incomplete	No	No	5,670	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Vanderhoof	Vanderhoof	TBC - Ryley Lane, Vanderhoof	Northern Interior	31-Mar-2022	Incomplete	No	No	4,668	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Sooke	Sooke	TBC - 6660 Sooke Rd, Sooke, BC V9Z 0A5	Vancouver Island	31-Mar-2022	Incomplete	No	Yes	9,269	1	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Duncan	Duncan	TBC - 291 Cowichan Way, Duncan, BC	Vancouver Island	31-Mar-2022	Incomplete	No	No	5,342	n/a	1	2	50	4	2		236,612	150,000	100,000	50,000	0
Powell River	Powell River (Expansion)	5001 Joyce Avenue, Powell River, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	Yes	Yes	13,829	1	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Langley, District Municipality	Langley Events Centre (Expansion)	7888 200 Street Langley, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete	Yes	Yes	130,924	15	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Ucluelet	Ucluelet - Pacific Rim Visitor's Centre (Expansion)	2791 Pacific Rim Hwy, Ucluelet, BC	Vancouver Island	31-Mar-2022	Incomplete	Yes	Yes	1,842	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Vernon	Vernon (Expansion)	3004 32nd Ave, Vernon'BC	Southern Interior	31-Mar-2023	Incomplete	Yes	Yes	43,315	5	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD

Municipality/Location	Station Name	Physical Address	Region	In-Service Date	Status	Expansion* of Existing Site	Limited Municipality	Population (Stats Canada)	Site Limit (Population / 9,000)	# of BC Hydro Sites	# of Stations	Charging Capacity (kW)	# of Charging Ports	Maximum # of Vehicles Charge at a Time	Notes	Actual or Expected Capital Cost ($) (Including Construction Work in Progress)	Third-Party Contributions ($)	Federal Contributions ($)	Provincial Contributions ($)	Other ($)
Terrace	Terrace	TBC - 14309 BC-16, Terrace, BC	Northern Interior	31-Mar-2023	Incomplete	No	Yes	12,594	1	1	2	50	4	2		TBD	TBD	TBD	TBD	TBD
Blue Sky Country	Canyon Hwy Station	TBC - Canyon Highway, BC	Southern Interior	31-Mar-2023	Incomplete	No	No	n/a	n/a	1	2	50	4	2		TBD	TBD	TBD	TBD	TBD
Cranbrook	Cranbrook (Expansion)	38 Cranbrook St N, Cranbrook, BC	Kootenays	31-Mar-2023	Incomplete	Yes	Yes	21,247	2	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Nanaimo	Nanaimo - Conference Centre (Expansion)	101 Gordon St, Nanaimo, BC	Vancouver Island	31-Mar-2023	Incomplete	Yes	Yes	99,856	11	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Merritt	Merritt Visitor Information Centre (Expansion)	2202 Voght St Merritt, BC	Southern Interior	31-Mar-2023	Incomplete	Yes	No	7,722	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Manning Park	Manning Park (Expansion)	7500 BC-3, Manning Park, BC	Southern Interior	31-Mar-2023	Incomplete	Yes	No	n/a	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
West Kelowna	West Kelowna (Expansion)	3678 Brown Rd, West Kelowna BC	Southern Interior	31-Mar-2023	Incomplete	Yes	Yes	35,818	4	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Salmon Arm	Salmon Arm (Expansion)	381 Ross St Salmon Arm, BC	Southern Interior	31-Mar-2023	Incomplete	Yes	Yes	19,115	2	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
70 Mile House	70 Mile House (Expansion)	1597 BC-97, 70 Mile House, BC	Southern Interior	31-Mar-2023	Incomplete	Yes	No	1,075	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Blue River	Blue River (Expansion)	Blue River V0E 1J0	Northern Interior	31-Mar-2023	Incomplete	Yes	No	157	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Cache Creek	Cache Creek (Expansion)	1270 Stage Rd, Cache Creek, BC	Southern Interior	31-Mar-2023	Incomplete	Yes	No	1,052	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Kamloops	Kamloops - Hillside Stadium (Expansion)	910 McGill Rd Kamloops, BC	Southern Interior	31-Mar-2023	Incomplete	Yes	Yes	100,046	11	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Sechelt District Municipality	Madeira Park (Expansion)	12808 Madeira Park Rd, Madeira Park, BC	Non-Metro / Fraser Valley	31-Mar-2023	Incomplete	Yes	Yes	10,809	1	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
McBride	McBride (Expansion)	100 Robson Centre, McBride, BC	Northern Interior	31-Mar-2023	Incomplete	Yes	No	666	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Port Hardy	Port Hardy (Expansion)	7360 Columbia Street, Port Hardy, BC	Vancouver Island	31-Mar-2023	Incomplete	Yes	No	4,315	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Port McNeill	Port McNeill (Expansion)	1594 Beach Drive, Port McNeill, BC	Vancouver Island	31-Mar-2023	Incomplete	Yes	No	2,395	n/a	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Quesnel	Quesnel (Expansion)	2335 Maple Dr, Quesnel, BC	Northern Interior	31-Mar-2023	Incomplete	Yes	Yes	10,392	1	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Delta	South Delta/Tsawwassen (Expansion)	1406 Tsawwassen Dr S, Tsawwassen, BC	Metro Vancouver	31-Mar-2023	Incomplete	Yes	Yes	109,490	12	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Mission	Mission Superstore (Expansion)	32136 Lougheed Highway, Mission, BC	Non-Metro / Fraser Valley	31-Mar-2023	Incomplete	Yes	Yes	43,202	5	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Williams Lake	Williams Lake (Expansion)	450 Mart Street, Williams Lake, BC	Northern Interior	31-Mar-2023	Incomplete	Yes	Yes	11,359	1	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Prince George	Prince George (Expansion)	2155 Ferry Avenue, Prince George, BC	Northern Interior	31-Mar-2023	Incomplete	Yes	No	81,345	9	1	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Surrey	Surrey Tynehead Gas Station (Expansion)	16815 - 96th Ave, Surrey, BC	Metro Vancouver	31-Mar-2023	Incomplete	Yes	Yes	584,526	65	0	1	50	2	1		TBD	TBD	TBD	TBD	TBD
Surrey	Surrey - Powertech Labs (new site)	12388 88 Ave. Surrey, BC	Metro Vancouver	31-Mar-2023	Incomplete	Yes	Yes	584,526	65	1	3	50	6	2	New demo station (3x50kW + additional TBD)	TBD	TBD	TBD	TBD	TBD
Phase 1 - Other	None	None	None	NA	Complete	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Other EV Activities associated with Phase 1 & replacement chargers	3,338,583	2,317,043	1,361,950	496,744	458,349
Phase 2 - Other	Various	Various	Various	Various	Complete	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Replacement chargers related to Phase 2	227,796	25,107	13,471	8,546	3,090
Grand Total																**22,535,543**	**12,981,126**			

Note
* Expansion refers to the addition of a station at an existing site.

ndix C-1.1 - Information on BC Hydro Fast Charging Stations (Site-based view) - as of April 1, 2021

					Station In-Service Dates					Current/Est. Future Station Capacities			4 93 0 Active Stations - Apr 1, 2021			1 34 1 Planned Stations - F2022			0 28 0 Planned Stations - Deferred to F2023			Current Site Accessibility Self-Assessment			
Site Name	Physical Address	Municipality/Location	Region	Notes	Station 1 In-Service Date	Station 2 In-Service Date	Station 3 In-Service Date	Last Upgrade Date	Future Construction In-Service Date (Fiscal)	Station 1 Charging Capacity (kW)	Station 2 Charging Capacity (kW)	Station 3 Charging Capacity (kW)	# of Active 25kW Stations	# of Active 50kW Stations	# of Active 100kW Stations	# of Planned 25kW Stations	# of Planned 50kW Stations	# of Planned 100kW Stations	# of Planned 25kW Stations	# of Planned 50kW Stations	# of Planned 100kW Stations	Concrete / Paved	Chargers at Grade (No Curb)	Overhead Lighting	Wide Stalls
Surrey - Powertech Labs	12388 88 Ave. Surrey, BC	Surrey	Metro Vancouver	Not Publicly Accessible on April 1, 2021	13-Jul-2013				31-Mar-2023	TBD	TBD	TBD							TBD	3	TBD	Yes	Yes	Yes	Yes
Nanaimo - Conference Centre	101 Gordon St, Nanaimo, BC	Nanaimo	Vancouver Island		23-Aug-2013				31-Mar-2023	50	50			1						1		Yes	Yes	Yes	Yes
Duncan	2687 James St, Duncan, BC	Duncan	Vancouver Island		19-Oct-2013			25-Feb-2021		50				1								Yes	No	No	No
Kamloops - Hillside Stadium	910 McGill Rd Kamloops, BC	Kamloops	Southern Interior		27-Jan-2014				31-Mar-2023	50	50			1						1		Yes	No	No	No
North Vancouver - 1st & Lonsdale	140 1st St E North Vancouver, BC	North Vancouver, City of	Metro Vancouver		23-Sep-2014	6-Nov-2019				50	50			2								Yes	No	No	Yes
Sechelt - Trail Bay Mall	5755 Cowrie Street, Sechelt, BC	Sechelt District Municipality	Non-Metro / Fraser Valley		15-Dec-2014	22-Feb-2021		22-Feb-2021		50	50			2								Yes	Yes	Yes	No
Saanich Uptown	3440 Saanich Road, Victoria, BC	Saanich	Vancouver Island	Decommissioned on March 20, 2020	9-Jan-2015																				
Abbotsford - EcoDairy	1356 Sumas Way Abbotsford, BC	Abbotsford	Non-Metro / Fraser Valley		5-Mar-2015			15-Dec-2020		50				1								Yes	No	No	Yes
Revelstoke	301 Victoria Rd, Revelstoke, BC	Revelstoke	Southern Interior		15-Mar-2015					50				1								Yes	No	No	No
Langley Events Centre	7888 200 Street Langley, BC	Langley, District Municipality	Non-Metro / Fraser Valley		2-Apr-2015				31-Mar-2022	50				1			1					Yes	No	No	Yes
Merritt Visitor Information Centre	2202 Voght St Merritt, BC	Merritt	Southern Interior		1-May-2015				31-Mar-2023	50	50			1						1		Yes	No	No	No
Penticton	234 Main St Penticton, BC	Penticton	Southern Interior	Decommissioned on October 1, 2020	7-Jul-2015																				
Hope	839 4 Ave, Hope, BC	Hope	Non-Metro / Fraser Valley		30-Oct-2015	9-Nov-2019		23-Feb-2021		25	25		2									Yes	No	No	Yes
Keremeos	702 4 St, Keremeos, BC	Keremeos	Southern Interior		9-Nov-2015					50				1								Yes	Yes	No	Yes
Salmon Arm	381 Ross St Salmon Arm, BC	Salmon Arm	Southern Interior		18-Nov-2015				31-Mar-2023	50	50			1						1		Yes	No	No	Yes
Colwood - Park and Ride	1830 Old Island Hwy, Colwood, BC	Colwood	Vancouver Island		16-Dec-2015	1-Nov-2019				50	50			2								Yes	No	Yes	No
Boston Bar - Canyon Lanes	47585 Trans Canada Hwy., Boston Bar, BC	Boston Bar	Southern Interior		1-Jan-2016					50				1								No	No	Yes	Yes
Whistler	4010 Whistler Way, Whistler, BC	Whistler	Non-Metro / Fraser Valley		12-Jan-2016				31-Mar-2022	50	50			1			1					Yes	Yes	Yes	Yes
Spences Bridge	3633 Station St, Spences Bridge, BC	Spences Bridge	Southern Interior	Decommissioned on March 25, 2021	9-Feb-2016					50															
West Kelowna	3678 Brown Rd, West Kelowna'BC'	West Kelowna	Southern Interior		1-Jun-2016				31-Mar-2023	50	50			1						1		Yes	No	No	No
Chase	400 Shuswap Ave, Chase'BC'	Chase	Southern Interior		10-Jun-2016					50				1								Yes	No	No	Yes
Princeton	114 Tapton Ave, Princeton, BC	Princeton	Southern Interior		30-Jun-2016					50				1								Yes	No	No	No
Chilliwack	45950 Cheam Ave, Chilliwack, BC	Chilliwack	Non-Metro / Fraser Valley		1-Jul-2016	8-Jun-2020				50	50			2								Yes	Yes & No	Yes	No
Manning Park	7500 BC-3, Manning Park, BC	Manning Park	Southern Interior		31-Jul-2016				31-Mar-2023	50	50			1						1		Yes	Yes	Yes	No
Vernon	3004 32nd Ave, Vernon'BC	VerNon	Southern Interior		1-Sep-2016				31-Mar-2023	50	50			1						1		Yes	No	No	Yes
Surrey Central City Hall	13450 104 Avenue, Surrey, BC	Surrey	Metro Vancouver	Decommissioned on Sept 30, 2020	25-Oct-2016																				
Malakwa Supermarket	4270 Oxbow Frontage Rd, Malakwa, BC	Malakwa	Southern Interior		31-Oct-2016					50				1								No	No	No	Yes
Squamish	37950 2nd Ave, Squamish BC	Squamish	Non-Metro / Fraser Valley		1-Nov-2016			24-Feb-2021		25			1									Yes	No	No	Yes
Cranbrook	38 Cranbrook St N, Cranbrook, BC	Cranbrook	Kootenays		6-Apr-2017				31-Mar-2023	50	50			1						1		Yes	No	No	No
Canal Flats - Columbia Discovery Centre	4925 Burns Ave, Canal Flats, BC	Canal Flats	Kootenays		11-Dec-2017					50				1								No	No	No	Yes
Radium Community Centre	4863 Stanley St, Radium Hot Springs, BC	Radium Hot Springs	Kootenays		11-Dec-2017					50				1								Yes	No	No	Yes
Jaffray Pump & Pantry	7311 Bertrand Rd., Jaffray, BC	Jaffray	Kootenays		25-Jan-2018					50				1								No	No	Yes	No
Ucluelet - Pacific Rim Visitor's Centre	2791 Pacific Rim Hwy, Ucluelet, BC	Ucluelet	Vancouver Island		9-Apr-2018				31-Mar-2022	50	50			1			1					Yes	No	Yes	Yes
Port Alberni - No Frills	3455 Johnston Road, Port Alberni, BC	Port Alberni	Vancouver Island		16-Apr-2018	30-Apr-2020				50	50			2								Yes	No	Yes	No
Nanaimo - Superstore	6435 Metral Drive, Nanaimo, BC	Nanaimo	Vancouver Island		17-Apr-2018	20-Mar-2020				50	50			2								Yes	No	Yes	Yes
Richmond - Superstore	4651 No. 3 Road, Richmond, BC	Richmond	Metro Vancouver		18-Apr-2018	17-Sep-2019				50	50			2								Yes	No	Yes	No
Surrey - South Superstore	2332 160 St., Surrey, BC	Surrey	Metro Vancouver		18-Apr-2018	30-Sep-2019				50	50			2								Yes	No	Yes	No
Vancouver - Grandview Hwy Superstore	3185 Grandview Highway, Vancouver, BC	Vancouver	Metro Vancouver		18-Apr-2018	21-Sep-2020				50	50			2								Yes	No	Yes	No
Qualicum - Quality Foods	133 West Fern, Qualicum, BC	Qualicum Beach	Vancouver Island		19-Apr-2018					50				1								Yes	No	Yes	No
Coquitlam - Superstore West	1301 Lougheed Hwy, Coquitlam, BC	Coquitlam	Metro Vancouver		20-Apr-2018	17-Sep-2020		17-Sep-2020		50	50			2								Yes	No	Yes	Yes
UBC - Wesbrook Place	6163 University Blvd, Vancouver, BC	Vancouver	Metro Vancouver		23-Apr-2018	18-Dec-2020		18-Dec-2020		50	50			2								Yes	No	Yes	Yes
Campbell River - Community Centre	401 11 Ave, Campbell River, BC	Campbell River	Vancouver Island		1-May-2018	12-Jun-2020				50	50			2								Yes	No	No	No
Courtenay - Superstore	757 Ryan Road, Courtenay, BC	Courtenay	Vancouver Island		1-May-2018	12-Jun-2020				50	50			2								Yes	Yes	Yes	No
Coquitlam - Superstore East	3000 Lougheed Hwy, Coquitlam, BC	Coquitlam	Metro Vancouver		11-May-2018	21-Aug-2019				50	50			2								Yes	No	Yes	No
Sidney	2330 Bevan Avenue, Sidney, BC	Sidney	Vancouver Island		25-May-2018	20-Mar-2020				50	50			2								Yes	No	Yes	Yes
Vancouver - Homer St	561 Homer Street, Vancouver, BC	Vancouver	Metro Vancouver		25-May-2018					50				2								Yes	No	No	Yes
West Vancouver - Horseshoe Bay	6400 Bruce Street, District of West Vancouv	West Vancouver	Metro Vancouver		25-May-2018			25-Feb-2021	31-Mar-2022	25	50	50	1			-1	2					Yes	No	No	No
Mission Superstore	32136 Lougheed Highway, Mission, BC	Mission	Non-Metro / Fraser Valley		29-May-2018				31-Mar-2023	50	50			1						1		Yes	No	No	No
Sparwood	100 Centennial St, Sparwood, BC	Sparwood	Kootenays		5-Jun-2018					50				1								Yes	No	No	Yes
Britton Creek Rest Area	Exit 228 at Coquihalla Lakes Rd, BC	Britton Creek	Southern Interior		13-Jun-2018	13-Jun-2018				50	50			2								Yes	No	Yes	No
Golden	820 9 Ave South, Golden, BC	Golden	Kootenays		30-Jun-2018					50				1								Yes	No	No	Yes
Surrey Tynehead Gas Station	16815 - 96th Ave, Surrey, BC	Surrey	Metro Vancouver		17-Jul-2018				31-Mar-2023	50	50			1						1		Yes	No	No	Yes
Vancouver - Kerrisdale	5356 West Boulevard, Vancouver, BC	Vancouver	Metro Vancouver		11-Aug-2018	31-Mar-2021				50	50			2								Yes	Yes	Yes	Yes
Rogers Pass Discovery Centre	9520 Trans Canada Hwy, Rogers Pass, BC	Rogers Pass	Kootenays		18-Dec-2018					50				1								Yes	Yes	Yes	Yes
Vancouver - SE Marine Drive Superstore	350 South East Marine Drive, Vancouver, BC	Vancouver	Metro Vancouver		31-Dec-2018	2-Jul-2019				50	50			2								Yes	No	No	No
Field - Yoho National Park	Field, BC - Yoho National Park Visitors Centr	Field	Kootenays		15-Jan-2019					50				1								Yes	No	No	Yes
Surrey - Cloverdale	5771 176A St, Surrey BC	Surrey	Metro Vancouver		31-Jan-2019	2-Feb-2021		2-Feb-2021		50	50			2								Yes	Yes	Yes	Yes
70 Mile House	1597 BC-97, 70 Mile House, BC	70 Mile House	Southern Interior		19-Jul-2019				31-Mar-2023	50	50			1						1		No	No	Yes	Yes
Cache Creek	1270 Stage Rd, Cache Creek, BC	Cache Creek	Southern Interior		19-Jul-2019				31-Mar-2023	50	50			1						1		Yes	No	Yes	No
Clinton	1423 BC-97, Clinton, BC	Clinton	Southern Interior		19-Jul-2019					50				1								Yes	No	No	No
Saanich	3544 Blanshard Street, Victoria, BC	Saanich	Vancouver Island		9-Oct-2019	9-Oct-2019				50	50			2								Yes	No	Yes	No
Port Hardy	7360 Columbia Street, Port Hardy, BC	Port Hardy	Vancouver Island		10-Oct-2019				31-Mar-2023	50	50			1						1		Yes	No	Yes	No
Blue River	Blue River V0E 1J0	Blue River	Northern Interior		16-Oct-2019				31-Mar-2023	50	50			1						1		Yes	No	Yes	Yes
Valemount	735 Cranberry Lake Road, Valemount, BC	Valemount	Northern Interior		17-Oct-2019					50				1								No	Yes	Yes	Yes
McBride	100 Robson Centre, McBride, BC	McBride	Northern Interior		18-Oct-2019				31-Mar-2023	50	50			1						1		Yes	No	Yes	No
Madeira Park	12808 Maderira Park Rd, Maderira Park, BC	Sechelt District Municipality	Non-Metro / Fraser Valley		31-Oct-2019				31-Mar-2023	50	50			1						1		No	No	Yes	Yes
South Delta/Tsawwassen	1406 Tsawwassen Dr S, Tsawwassen, BC	Delta	Metro Vancouver		22-Nov-2019				31-Mar-2023	50	50			1						1		Yes	No	Yes	No
Powell River	5001 Joyce Avenue, Powell River, BC	Powell River	Non-Metro / Fraser Valley		5-Dec-2019				31-Mar-2022	50	50			1			1					Yes	Yes	Yes	Yes
Quesnel	2335 Maple Dr, Quesnel, BC	Quesnel	Northern Interior		15-Jan-2020				31-Mar-2023	50	50			1						1		Yes	No	Yes	No
Hixon	367 Von Lienen Road, Hixon, BC	Hixon	Northern Interior		15-Jan-2020					50				1								No	Yes	Yes	Yes
Williams Lake	450 Mart Street, Williams Lake, BC	Williams Lake	Northern Interior		30-Jan-2020				31-Mar-2023	50	50			1						1		Yes	No	Yes	No
Port McNeill	1594 Beach Drive, Port McNeill, BC	Port McNeill	Vancouver Island		12-Jul-2020				31-Mar-2023	50	50			1						1		Yes	Yes	Yes	Yes
Prince George	2155 Ferry Avenue, Prince George, BC	Prince George	Northern Interior		14-Dec-2020				31-Mar-2023	50	50			2						1		Yes	No	Yes	No
Burns Lake	Site 1 - 313 Highway 16 W., Burns Lake, BC	Burns Lake	Northern Interior		11-Dec-2020	11-Dec-2020				50	50			2								Yes	Yes	Yes	No
Prince Rupert	101 1 Ave E, Prince Rupert, BC	Prince Rupert	Northern Interior		15-Dec-2020	15-Dec-2020				50	50			2								Yes	Yes	Yes	Yes
Victoria	1420 Store St. Victoria, BC	Victoria	Vancouver Island		23-Mar-2021	23-Mar-2021				50	50			2								Yes	Yes	Yes	Yes
New sites:																									
Seabird Island	77 Lougheed Highway, Sqewqel Gas Bar an	Harrison Hot Springs	Non-Metro / Fraser Valley						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Fraser Lake	TBC - 30 Carrier Crescent, Fraser Lake, BC	Fraser Lake	Northern Interior						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Gold River	TBC - 375 Nimpkish Dr, Gold River, BC	Gold River	Vancouver Island						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Houston	TBC - 3289 Highway 16, Houston, BC	Houston	Northern Interior						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Kitimat	TBC - 276 City Centre, Kitimat, BC	Kitimat	Northern Interior						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Lillooet	TBC - 615 Main Street, Lillooet, BC	Lillooet	Non-Metro / Fraser Valley						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Maple Ridge	TBC - 22441 Dewdney Trunk Rd #102, Map	Maple Ridge	Non-Metro / Fraser Valley						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
McLeod Lake	TBC - 1 Carp Lake Rd, McLeod Lake, BC	McLeod Lake	Northern Interior						31-Mar-2022	25	25					2						Yes	Yes	Yes	Yes
New Hazelton	TBC - 4633 10th Ave, New Hazelton, BC	New Hazelton	Northern Interior						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
North Burnaby	TBC - 490 Sperling Avenue, North Burnaby,	Burnaby	Metro Vancouver						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Pemberton	TBC - 7452 Frontier Street, Pemberton, BC	Pemberton	Non-Metro / Fraser Valley						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Smithers	TBC - 3743 Second Avenue, Smithers, BC	Smithers	Northern Interior						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Vanderhoof	TBC - Ryley Lane, Vanderhoof	Vanderhoof	Northern Interior						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Sooke	TBC - 6660 Sooke Rd, Sooke, BC	Sooke	Vancouver Island						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Duncan	TBC - 291 Cowichan Way, Dunca, BC	Duncan	Vancouver Island						31-Mar-2022	50	50						2					Yes	Yes	Yes	Yes
Terrace	TBC - 14309 BC-16, Terrace, BC	Terrace	Northern Interior						31-Mar-2023	50	50									2		Yes	Yes	Yes	Yes
Canyon Hwy	TBC - Canyon Hwy, BC	Blue Sky Country	Southern Interior						31-Mar-2023	50	50									2		Yes	Yes	Yes	Yes
TBD 100kW	TBC location								31-Mar-2022	100								1				Yes	Yes	Yes	Yes
		Grand Total																							

Note
* Expansion refers to the addition of a station at an existing site.

1.0 Reference: Exhibit B-1, pages 2 and 10-11
BCH F2022 RRA, page 2-20 and Appendix C, page 4

The Application states: "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021)".

1.1.2 If the specific sites and station numbers provided in response to the preceding question differ from those provided in the F2022 RRA, Appendix C (totaling 98 stations with two non-eligible), please explain the difference.

RESPONSE:

The changes between the information provided in Appendix C to the Fiscal 2022 Revenue Requirements Application and the updated information provided in BC Hydro's response to BCOAPO IR 1.1.1 as of April 1, 2021 are as follows:

- **Two charging stations at the Prince Rupert site have been commissioned;**
- **Two charging stations at the Burns Lake site have been commissioned; and**
- **The station at Powertech Labs, Surrey was closed effective March 31, 2021.**

2.0 Reference: Exhibit B-1, pages 2 and 10-11
BCH F2022 RRA, page 2-21 and Appendix C, page 5

1.2.1 Please provide a schedule that sets out the station sites BC Hydro plans to construct and operate during F2022 and for each site provide: i) the number of 25 kW, 50 kW and 100 kW charging stations at the site, ii) the total number of charging ports, iii) the maximum number of vehicles that can charge at any one point in time, and iv) the total demand (kW) at the site assuming the maximum number of vehicles were charging simultaneously at the same time.

RESPONSE:

Please refer to Attachment 1 to BCOAPO IR 1.1.1 where we have included updated fiscal 2022 deployment plans for the first three requests.

For the last request, regarding total demand (kW) at the site, BC Hydro is unable to complete this analysis at this time as doing so would require new analysis and modelling of electricity use at numerous sites.

Extracting, cleaning, and modelling these data would take longer than is available for this current information request process.

2.0 Reference: Exhibit B-1, pages 2 and 10-11
BCH F2022 RRA, page 2-21 and Appendix C, page 5

1.2.2 If the specific sites and station numbers provided in response to the preceding question differ from those provided in the F2022 RRA, Appendix C (totaling 57 stations), please explain the difference.

RESPONSE:

Please refer BC Hydro's response to BCOAPO IR 1.1.1 for an updated list of stations and sites.

Please refer to BC Hydro's response to BCOAPO IR 1.1.2 for a discussion of changes.

3.0 Reference: Exhibit B-1, page 13

1.3.1 The Application states: "Most interviewees supported a 20 cents per minute rate, indicating a preference for the lowest rate. They stated that the 30 cents per minute rate was too high, which would influence their decision to not use the fast charging service."

RESPONSE:

BC Hydro is unable to identify a question.

3.0 Reference: Exhibit B-1, page 13

1.3.2 Given that the "interviewees" referred to were all electric vehicle owners is it not reasonable to expect that: i) the participants would prefer the lowest rate and ii) would suggest that higher rates would influence their decision to use the fast charging service?

RESPONSE:

This response also answers CEC IRs 1.10.1, 1.10.2, 1.10.3, and 1.10.4.

In general, a higher price will lead to a lower propensity to use a service. However, BC Hydro does not believe that it is always true that electric vehicle owners would prefer a lower rate over a higher rate. For instance, high station utilization as a result of low rate may lead to congestion and excessive queuing for charging. This was expressed informally to BC Hydro by EV user groups.

Prospective survey questions were tested on the initial nine interviewees to inform the design of the survey. BC Hydro deems nine interviewees as a sufficient sample group for pre-testing of the survey questions by individuals external to BC Hydro.

Please refer to Appendix D of the Application for the results of the full survey with a statistically significant sample size of 4,196 respondents.

4.0 Reference: Exhibit B-1, pages 14-17 and Appendix D

The referenced pages provide the quantitative results from a web-survey undertaken by BC Hydro.

1.4.1 Please confirm that the respondents to the survey were all users of BC Hydro's EV charging stations.

RESPONSE:

Not confirmed. The survey was intended for users of BC Hydro's fast charging stations, and we expect most respondents were users of BC Hydro's fast charging stations. However, based on the method of survey distribution, it is possible that some respondents were not BC Hydro fast charging station users.

Please also refer to BC Hydro's response to BCUC IR 1.4.1.

4.0 Reference: Exhibit B-1, pages 14-17 and Appendix D

The referenced pages provide the quantitative results from a web-survey undertaken by BC Hydro.

1.4.1 Please confirm that the respondents to the survey were all users of BC Hydro's EV charging stations.

1.4.1.1 If not, please segment the reported results as between those respondents who are EV users and those who are not.

RESPONSE:

The survey did not specifically ask respondents to identify whether they have an EV and BC Hydro did not request permission to link responses to BC Hydro's EV account information (if available). Thus, the reported results cannot be segmented as requested.

5.0 Reference: Exhibit B-1, pages 19-22 and Appendix F

The referenced pages provide the quantitative results from feedback received following a fast charging service rate design virtual workshop carried out through WebEx.

1.5.1 Were the respondents who provided feedback all EV owners?

RESPONSE:

The post-workshop survey did not specifically ask participants to identify whether they have an EV.

In general, while many participants were likely to be EV users, BC Hydro observed that participants from various organizations which are not EV-related also responded to the post-workshop survey, as shown on page 41 of Appendix F to the Application.

5.0 Reference: Exhibit B-1, pages 19-22 and Appendix F

The referenced pages provide the quantitative results from feedback received following a fast charging service rate design virtual workshop carried out through WebEx.

1.5.1 Were the respondents who provided feedback all EV owners?

1.5.1.1 If not, how many respondents were not EV owners?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.5.1.

5.0 Reference: Exhibit B-1, pages 19-22 and Appendix F

The referenced pages provide the quantitative results from feedback received following a fast charging service rate design virtual workshop carried out through WebEx.

1.5.1 Were the respondents who provided feedback all EV owners?

1.5.1.2 If not, please segment the three key results reported on pages 19-21 as between EV owners and non-EV owners.

RESPONSE:

BC Hydro is unable to provide the requested segmentation as we do not know which participants were EV owners and which were not EV owners.

Please also refer to BC Hydro's response to BCOAPO IR 1.5.1.

6.0 Reference: Exhibit B-1, page 24
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, page 19

1.6.1 Please provide a revised version of Table 2 that includes any additional jurisdictions/providers from the FortisBC Application not already captured in BC Hydro table.

RESPONSE:

Please see below for the original Table 2 of the Application, and additional rows covering jurisdictions included in in Table 3-3 of FortisBC Inc. Application for Approval of Rate Design and Rates for EV DCFC Service Revised and Updated September 30, 2020.

Source: Table 2 of BC Hydro's Application

Operator	Service	Rate (cents/min) @ Power Level	Number of Sites and Fast Chargers in B.C.
City of North Vancouver	Single 50 kW charger	20 ¢ 50 kW	1 site 1 charger
City of Vancouver	Single or 2 x 50 kW chargers	21 ¢ 50 kW	5 sites 9 chargers
Electrify Canada	4 x chargers up to 350 kW Ample lighting, major retail parking lots	27 ¢ <90kW[1] 57 ¢ >90kW*	3 sites (additional 5 sites under construction) 12 chargers
FortisBC	Single or 2 x 50 kW chargers	Current: 30 ¢ 50 kW Proposed: 27 ¢ 50 kW 54¢ 100 kW	15 sites 20 chargers
Hydro Quebec Electric Circuit Network	Basic to high quality stations Single, 2 x, 4 x, 6 x – 50 kW, and some 100 kW	20.1 ¢ 50 kW 20.1 ¢ 100 kW[2]	~250 sites in Quebec
Petro-Canada	2 x chargers up to 350 kW Ample lighting, on-site amenities/staff	27 ¢ up to 350 kW	12 sites 23 chargers

Operator	Service	Rate (cents/min) @ Power Level	Number of Sites and Fast Chargers in B.C.
Tesla	**Proprietary stations (Tesla only)** **Many chargers per site**	**22 ¢ <60kW** **44 ¢ >60kW**	**16 sites** **172 chargers**

1. **Twenty per cent member discount available for $4/month.**
2. **Interim rate.**

Additional Jurisdiction in Table 3-3 of FortisBC Inc. Application for Approval of Rate Design and Rates for EV DCFC Service Resided and Update September 30, 2020

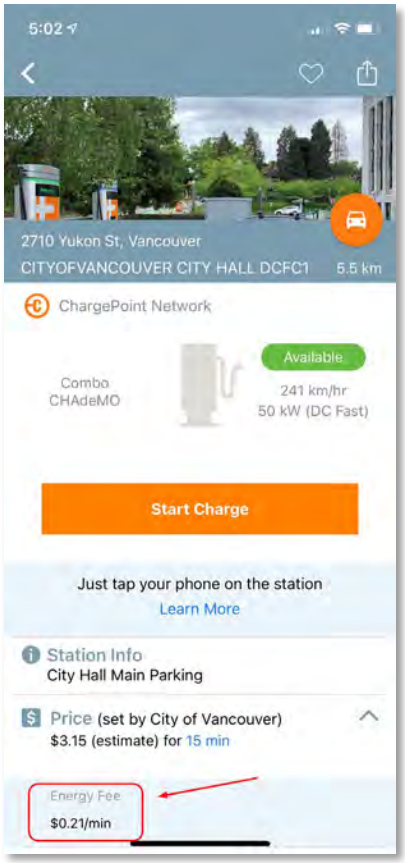
Operator	Service	Rate (cents/min) @ Power Level	Number of Sites and fast chargers in B.C.
Alberta	**50 kW**	**$0.33/min**	**Approximately 18 in Alberta**
New Brunswick	**50 kW**	**$0.25.min**	**Approximately 25 in New Brunswick**
Ontario	**50 KW**	**$0.283/min**	**Approximately 75 in Ontario**

6.0 Reference: Exhibit B-1, page 24
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, page 19

1.6.2 It is noted that the rate quoted by BC Hydro for the City of Vancouver differs from those quoted by FortisBC. Furthermore, the 26 cents quoted by FortisBC reconciles with rates current posted by the City of Vancouver (https://vancouver.ca/streets-transportation/electric-vehicles.aspx). Please explain the basis for the 21 cents/minute rate quoted by BC Hydro.

RESPONSE:

The rate BC Hydro listed for City of Vancouver 50kW stations was correct at $0.21/min based on the PlugShare information at the time. BC Hydro has re-verified the City of Vancouver 50 kW rate for the City Hall station on April 28, 2021 based on what appears in the ChargePoint network app, used by the City of Vancouver, as shown below.

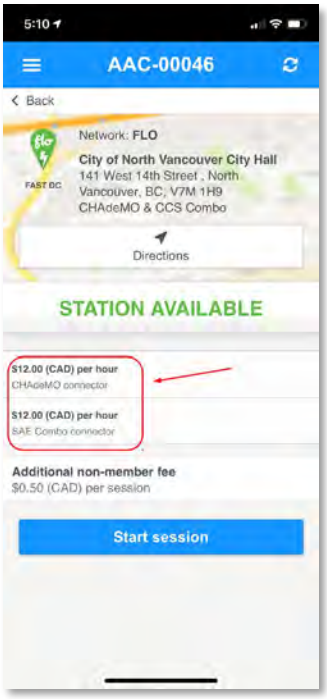


6.0 Reference: Exhibit B-1, page 24
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, page 19

1.6.3 Please provide the basis for the 20 cents/minute rate quoted for the City of North Vancouver. According to the City of North Vancouver's web-site, the current rate appears to be $16/hour which is equivalent to 27 cents/minute. (https://www.cnv.org/city-services/streets-and-transportation/sustainable-transportation/electric-vehicles/where-to-charge-your-electric-vehicle)

RESPONSE:

The rate BC Hydro listed for the City of North Vancouver 50 kW stations was correct at $0.20/min ($12/hr) based on the PlugShare information at the time. BC Hydro has re-verified the City of North Vancouver 50 kW rate for the City Hall station on April 28, 2021 based on what appears in the FLO network app, used by the City of North Vancouver, as follows:



7.0 Reference: Exhibit B-1, pages 11 and 25

The Application states (page 11): "the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment".

The Application also states (page 25):

"The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (SGS) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (MGS) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute."

1.7.1 Are each of BC Hydro's EV charging sites metered?

RESPONSE:

BC Hydro fast charging stations are metered at a site level. Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for a table that includes a column regarding metering for each site.

Please also refer to BC Hydro's response to BCUC IR 1.5.11.1 for an explanation of the site metering.

7.0 Reference: Exhibit B-1, pages 11 and 25

The Application states (page 11): "the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment".

The Application also states (page 25):

"The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (SGS) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (MGS) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute."

1.7.1 Are each of BC Hydro's EV charging sites metered?

1.7.1.1 If yes, for each existing site with a 25 kW station, please indicate whether the overall monthly usage for the site is such that it would be considered a Small General Service "customer"? (Note: For purposes of the response please consider the period April 1, 2019 to March 31, 2020).

RESPONSE:

BC Hydro would like to clarify that the Proposed Rates are based on the power level of a fast charging station where a "fast charging station" in the Application refers to a fixed device capable of charging an electric vehicle using a direct current as noted on page 1 of the Application.

As such, Small General Service rate would be applicable to 25 kW fast charging stations which have demand of less than 35 kW and Medium General Service rate would be applicable for 50 kW and 100 kW fast charging stations which have demand between 35 kW and 150 kW.

7.0 Reference: Exhibit B-1, pages 11 and 25

The Application states (page 11): "the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment".

The Application also states (page 25):

"The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (SGS) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (MGS) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute."

1.7.1 Are each of BC Hydro's EV charging sites metered?

1.7.1.2 If yes and the overall monthly usage for some/all sites with 25 kW stations exceeds that applicable to SGS customers, please explain why the SGS rate is considered applicable for BC Hydro's 25 kW stations.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.7.1.1.

7.0 Reference: Exhibit B-1, pages 11 and 25

The Application states (page 11): "the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment".

The Application also states (page 25):

"The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (SGS) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (MGS) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute."

1.7.1 Are each of BC Hydro's EV charging sites metered?

1.7.1.3 If yes, does the maximum demand for any of BC Hydro's EV sites exceed 150 kW such that the site would not be considered an SGS or MGS customer? (Note: For purposes of the response please consider the period April 1, 2019 to March 31, 2020).

RESPONSE:

The maximum demand for any of BC Hydro's EV sites does not exceed 150 kW.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.1 Please confirm that, based on Table 3, at utilization rates of 25% and 30%, an EV charging rate of 21 cents per minute would more than cover the full cost of EV charging service.

RESPONSE:

As shown in an updated Table 3 below with added rows for a 25 per cent and 30 per cent utilization rate, for a 50 kW station with electric vehicle charging load characteristics described on page 28 and 29 of the Application, a rate of 21 cents per minute would cover the full cost of service (electricity, maintenance and capital costs) described in Scenario 3. But please refer to BC Hydro's response to BCUC IR 1.14.9 where BC Hydro explains that a utilization of 20 per cent is a longer-term objective, and BC Hydro has no evidence to indicate that such utilization levels will be achieved over the near term.

Utilization Rate		Scenario 1	Scenario 2	Scenario 3
(%)	Average Number of Charging Sessions per Station per Month	Electricity Costs (RS 1500 Equivalent) ($/min)	Electricity + Station Maintenance Costs ($/min)	Full Cost of Service: Electricity + Maintenance + Capital Costs ($/min)
3.0	46	0.25	0.76	1.29
3.7	57	0.21	0.62	1.06
5.0	77	0.17	0.47	0.79
5.5	84	0.16	0.43	0.73
10.0	153	0.11	0.26	0.42
15.0	230	0.09	0.19	0.29
20.0	307	0.07	0.15	0.23
25.0	383	0.07	0.13	0.19
30.0	460	0.06	0.12	0.17

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.1 Please confirm that, based on Table 3, at utilization rates of 25% and 30%, an EV charging rate of 21 cents per minute would more than cover the full cost of EV charging service.

1.8.1.1 If not confirmed, please explain why.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.8.1.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.2 Does BC Hydro have any estimate as to when in future it will be able to set fast charging service rates at a level sufficient to recover the full costs of the service?

RESPONSE:

At this time BC Hydro does not have an estimate of when in the future we will be able to set fast charging service rates at a level sufficient to recover the full costs of the service. We expect the results of the monitoring and evaluation plan, presented in section 5 of the Application, would provide relevant information on this question.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.3 Did BC Hydro consider deferring the near term short fall in revenues vs. the full cost of service to a regulatory deferral account for future recovery from EV customers when utilization rates reach a level whereby the charging rates could be set at levels that exceed costs?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.2.5.1.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.3 Did BC Hydro consider deferring the near term short fall in revenues vs. the full cost of service to a regulatory deferral account for future recovery from EV customers when utilization rates reach a level whereby the charging rates could be set at levels that exceed costs?

1.8.3.1 If yes, why was this alternative rejected?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.2.5.1.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

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"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.3 Did BC Hydro consider deferring the near term short fall in revenues vs. the full cost of service to a regulatory deferral account for future recovery from EV customers when utilization rates reach a level whereby the charging rates could be set at levels that exceed costs?

1.8.3.2 If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.2.5.1.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

1.8.4 BCUC 7.3 asks whether BC Hydro "has considered levelized rates." If not addressed in response to BCUC 7.3 please indicate if BC Hydro considered an approach such as that taken by FortisBC where a multi-year plan for EV charging rates is established such that the rates cover the cost of service (based on net present value analysis) over the term of plan but are set such that they under recover in the early years when utilization rates are low and over recover in the latter years when utilization rates are higher? (Note: Such an approach could involve rates that are fixed in absolute terms for the period or rates that increase annually with BC Hydro general rate increases).

RESPONSE:

Please refer to BC Hydro's responses to BCUC IRs 1.7.3.1 and 1.15.4.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

The FortisBC Application states:

"Due to the levelized nature of the rate, there will be some (early) years where the EV charging revenue will be less than the cost of service. In these years, all other FBC customers will bear the costs in excess of revenues. Conversely, in years where the charging revenue is greater than the cost of service, all other FBC customers will benefit from the excess of revenues."

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1.8.4.1 If yes, why was it rejected?

RESPONSE:

Please refer to BC Hydro's responses to BCUC IRs 1.7.3.1 and 1.15.4.

8.0 Reference: Exhibit B-1, pages 25-26 and page 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 20
Exhibit A-3, BCUC 7.3

The Application states:

"BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below."

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1.8.4.2 If not, why not?

RESPONSE:

Please refer to BC Hydro's responses to BCUC IRs 1.7.3.1 and 1.15.4.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

FBC's response to BCOAPO 2.35.1 states:

"The kWh usage data provided in response to BCOAPO IR 1 11.4 through 11.6 was determined from the internal metering of the DCFC stations and associated reporting software. Although this metering is not approved for billing customers on an energy basis, it is reasonable to use this information for providing the kWh deliveries as requested in BCOAPO IR 1 11.4 through 11.6."

BC Hydro's Application states (page 11):

While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.9.1 Is the individual station metering used by BC Hydro capable of providing the energy used per charging session?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.11.1 regarding the use of a BC Hydro revenue meter to measure the energy dispensed to a vehicle per charging session.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

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While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.9.2 Please provide more details regarding how the 13.1 kWh average usage per charging session (per page 29) was determined.

RESPONSE:

The average electricity consumption per charging session of 13.1 kWh for 50 a kW charging station is calculated using the following formula and information:

= (Annual total consumption of all 50 kW charging stations[1]) / (Annual total number of charging sessions at all 50 kW charging stations[1])

= (2,746,344 kWh) / (210,330 sessions)

= 13.1 kWh per session

[1] **Based on data collected from BC Hydro's fast charging stations from April 1, 2019 to March 31, 2020.**

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

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1.9.3 Is the Average Electricity Consumption per Charging Session of 13.1 kWh based solely on the electricity usage of the charging station or does it include an allowance for the electricity required by lighting and other ancillary equipment at the site?

RESPONSE:

The electricity consumption used in average electricity consumption per charging session of 13.1 kWh (Fiscal 2020), as shown in BC Hydro's response to BCOAPO IR 1.9.2, is based on energy dispensed to the vehicle according to the measurement device built into the station.

Specifically, the said electricity consumption does not include the electricity required by lighting and other ancillary equipment and the Proposed Rates do not recover the costs of electricity required by lighting and other ancillary equipment.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

FBC's response to BCOAPO 2.35.1 states:

"The kWh usage data provided in response to BCOAPO IR 1 11.4 through 11.6 was determined from the internal metering of the DCFC stations and associated reporting software. Although this metering is not approved for billing customers on an energy basis, it is reasonable to use this information for providing the kWh deliveries as requested in BCOAPO IR 1 11.4 through 11.6."

BC Hydro's Application states (page 11):

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1.9.3 Is the Average Electricity Consumption per Charging Session of 13.1 kWh based solely on the electricity usage of the charging station or does it include an allowance for the electricity required by lighting and other ancillary equipment at the site?

1.9.3.1 If based solely on the electricity usage of the charging station, please confirm that the proposed rates do not recover the electricity usage required by lighting and other ancillary equipment at BC Hydro's EV charging sites.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.9.3.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

FBC's response to BCOAPO 2.35.1 states:

"The kWh usage data provided in response to BCOAPO IR 1 11.4 through 11.6 was determined from the internal metering of the DCFC stations and associated reporting software. Although this metering is not approved for billing customers on an energy basis, it is reasonable to use this information for providing the kWh deliveries as requested in BCOAPO IR 1 11.4 through 11.6."

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1.9.3 Is the Average Electricity Consumption per Charging Session of 13.1 kWh based solely on the electricity usage of the charging station or does it include an allowance for the electricity required by lighting and other ancillary equipment at the site?

1.9.3.2 If based solely on the electricity usage of the charging station, what would the usage value need to be in order to include (based on April 1, 2019 to March 31, 2020 data) an appropriate allowance for lighting and other ancillary equipment usage? As part of the response please explain how the adjustment for lighting and other equipment usage was determined.

RESPONSE:

BC Hydro is unable to complete this analysis at this time as doing so would require new analysis and modelling of electricity use at numerous sites. Extracting, cleaning, and modelling these data would take longer than is available for this current information request process.

BC Hydro notes the Proposed Rates are intended for electric vehicle charging only, and not for other electricity end uses such as lighting.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

FBC's response to BCOAPO 2.35.1 states:

"The kWh usage data provided in response to BCOAPO IR 1 11.4 through 11.6 was determined from the internal metering of the DCFC stations and associated reporting software. Although this metering is not approved for billing customers on an energy basis, it is reasonable to use this information for providing the kWh deliveries as requested in BCOAPO IR 1 11.4 through 11.6."

BC Hydro's Application states (page 11):

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1.9.4 It is noted that in its Application FBC used an average consumption of 20 kWh per charge event based on average historical kWh volumes per charge session at its existing stations (page 13). BC Hydro's Application states that the 13.1 kWh per charging session is based on data collected from BC Hydro's fast charging stations from April 1, 2019 to March 31, 2020.

RESPONSE:

BC Hydro is unable to identify a question.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

FBC's response to BCOAPO 2.35.1 states:

"The kWh usage data provided in response to BCOAPO IR 1 11.4 through 11.6 was determined from the internal metering of the DCFC stations and associated reporting software. Although this metering is not approved for billing customers on an energy basis, it is reasonable to use this information for providing the kWh deliveries as requested in BCOAPO IR 1 11.4 through 11.6."

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While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.9.4 It is noted that in its Application FBC used an average consumption of 20 kWh per charge event based on average historical kWh volumes per charge session at its existing stations (page 13). BC Hydro's Application states that the 13.1 kWh per charging session is based on data collected from BC Hydro's fast charging stations from April 1, 2019 to March 31, 2020.

1.9.4.1 Please provide a schedule that for each 50 kW charging station in-service for this period sets out: i) the average number of charging sessions per month and ii) the average kWh per charging session (based solely on charging station usage).

RESPONSE:

Please see Attachment 1 to this information request.

BC Hydro redacts column H and I in the attachment and files this information confidentially with the BCUC to maintain confidentiality over commercially sensitive information, such as the average number of sessions and average kWh for each of BC Hydro's stations during this period, the disclosure of which could cause harm to ratepayers.

BC Hydro will make the information available to interveners with a legitimate interest in seeing it, upon signing the BCUC's form of confidentiality undertaking.

BCOAPO 1.9.4.1 - Information on BC Hydro Fast Charging Stations (Charger-based view) - Fiscal 2020 average sessions per month and kWh per month

Municipality/Location	Station Name	Physical Address	Region	In-Service Date	Status	BCOAPO 1.9.4.1 Avg # of Charging Sessions Per Month April 1, 2019 to March 31, 2020	BCOAPO 1.9.4.1 Avg kWh per Charging Session April 1, 2019 to March 31, 2020
Surrey	Surrey - Powertech Labs	12388 88 Ave. Surrey, BC	Metro Vancouver	13-Jul-2013	Decommissioned	[redacted]	
Nanaimo	Nanaimo - Conference Centre	101 Gordon St, Nanaimo, BC	Vancouver Island	23-Aug-2013	Complete		
Duncan	Duncan - Island Savings Centre	2687 James St, Duncan, BC	Vancouver Island	19-Oct-2013	Complete		
Kamloops	Kamloops - Hillside Stadium	910 McGill Rd Kamloops, BC	Southern Interior	27-Jan-2014	Complete		
North Vancouver, City of	North Vancouver - 1st & Lonsdale	140 1st St E North Vancouver, BC	Metro Vancouver	23-Sep-2014	Complete		
Sechelt District Municipality	Sechelt - Trail Bay Mall	5755 Cowrie Street, Sechelt, BC	Non-Metro / Fraser Valley	15-Dec-2014	Complete		
Saanich	Saanich Uptown	3440 Saanich Road, Victoria, BC	Vancouver Island	9-Jan-2015	Decommissioned		
Abbotsford	Abbotsford - EcoDairy	1356 Sumas Way Abbotsford, BC	Non-Metro / Fraser Valley	5-Mar-2015	Complete		
Revelstoke	Revelstoke	301 Victoria Rd, Revelstoke, BC	Southern Interior	15-Mar-2015	Complete		
Langley, District Municipality	Langley Events Centre	7888 200 Street Langley, BC	Non-Metro / Fraser Valley	2-Apr-2015	Complete		
Merritt	Merritt Visitor Information Centre	2202 Voght St Merritt, BC	Southern Interior	1-May-2015	Complete		
Penticton	Penticton	234 Main St Penticton, BC	Southern Interior	7-Jul-2015	Decommissioned		
Hope	Hope	839 4 Ave, Hope, BC	Non-Metro / Fraser Valley	30-Oct-2015	Complete		
Keremeos	Keremeos	702 4 St, Keremeos, BC	Southern Interior	9-Nov-2015	Complete		
Salmon Arm	Salmon Arm	381 Ross St Salmon Arm, BC	Southern Interior	18-Nov-2015	Complete		
Colwood	Colwood - Park and Ride	1830 Old Island Hwy, Colwood, BC	Vancouver Island	16-Dec-2015	Complete		
Boston Bar	Boston Bar - Canyon Lanes	47585 Trans Canada Hwy., Boston Bar, BC	Southern Interior	1-Jan-2016	Complete		
Whistler	Whistler	4010 Whistler Way, Whistler, BC	Non-Metro / Fraser Valley	12-Jan-2016	Complete		
Spences Bridge	Spences Bridge	3633 Station St, Spences Bridge, BC	Southern Interior	9-Feb-2016	Decommissioned		
West Kelowna	West Kelowna	3678 Brown Rd, West Kelowna, BC	Southern Interior	1-Jun-2016	Complete		
Chase	Chase	400 Shuswap Ave, Chase, BC	Southern Interior	10-Jun-2016	Complete		
Princeton	Princeton	114 Tapton Ave, Princeton, BC	Southern Interior	30-Jun-2016	Complete		
Chilliwack	Chilliwack	45950 Cheam Ave, Chilliwack, BC	Non-Metro / Fraser Valley	1-Jul-2016	Complete		
Manning Park	Manning Park	7500 BC-3, Manning Park, BC	Southern Interior	31-Jul-2016	Complete		
Vernon	Vernon	3004 32nd Ave, Vernon, BC	Southern Interior	1-Sep-2016	Complete		
Surrey	Surrey Central City Hall	13450 104 Avenue, Surrey, BC	Metro Vancouver	25-Oct-2016	Decommissioned		
Malakwa	Malakwa Supermarket	4270 Oxbow Frontage Rd, Malakwa, BC	Southern Interior	31-Oct-2016	Complete		
Squamish	Squamish	37950 2nd Ave. Squamish BC	Non-Metro / Fraser Valley	1-Nov-2016	Complete		
Cranbrook	Cranbrook	38 Cranbrook St N, Cranbrook, BC	Kootenays	6-Apr-2017	Complete		
Canal Flats	Canal Flats - Columbia Discovery Centre	4925 Burns Ave, Canal Flats, BC	Kootenays	11-Dec-2017	Complete		
Radium Hot Springs	Radium Community Centre	4863 Stanley St, Radium Hot Springs, BC	Kootenays	11-Dec-2017	Complete		
Jaffray	Jaffray Pump & Pantry	7311 Bertrand Rd., Jaffray, BC	Kootenays	25-Jan-2018	Complete		
Ucluelet	Ucluelet - Pacific Rim Visitor's Centre	2791 Pacific Rim Hwy, Ucluelet, BC	Vancouver Island	9-Apr-2018	Complete		
Port Alberni	Port Alberni - No Frills	3455 Johnston Road, Port Alberni, BC	Vancouver Island	16-Apr-2018	Complete		
Nanaimo	Nanaimo - Superstore	6435 Metral Drive, Nanaimo, BC	Vancouver Island	17-Apr-2018	Complete		
Richmond	Richmond - Superstore	4651 No. 3 Road, Richmond, BC	Metro Vancouver	18-Apr-2018	Complete		
Surrey	Surrey - South Superstore	2332 160 St., Surrey, BC	Metro Vancouver	18-Apr-2018	Complete		
Vancouver	Vancouver - Grandview Hwy Superstore	3185 Grandview Highway, Vancouver, BC	Metro Vancouver	18-Apr-2018	Complete		
Qualicum Beach	Qualicum - Quality Foods	133 West Fern, Qualicum, BC	Vancouver Island	19-Apr-2018	Complete		
Coquitlam	Coquitlam - Superstore West	1301 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	20-Apr-2018	Complete		
Vancouver	UBC - Wesbrook Place	6163 University Blvd, Vancouver, BC	Metro Vancouver	23-Apr-2018	Complete		
Campbell River	Campbell River - Community Centre	401 11 Ave, Campbell River, BC	Vancouver Island	1-May-2018	Complete		
Courtenay	Courtenay - Superstore	757 Ryan Road, Courtenay, BC	Vancouver Island	1-May-2018	Complete		
Coquitlam	Coquitlam - Superstore East	3000 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	11-May-2018	Complete		
Sidney	Sidney	2330 Bevan Avenue, Sidney, BC	Vancouver Island	25-May-2018	Complete		
Vancouver	Vancouver - Homer St 1	561 Homer Street, Vancouver, BC	Metro Vancouver	25-May-2018	Complete		
Vancouver	Vancouver - Homer St 2	561 Homer Street, Vancouver, BC	Metro Vancouver	25-May-2018	Complete		
West Vancouver	West Vancouver - Horseshoe Bay	6400 Bruce Street, District of West Vancouver, BC	Metro Vancouver	25-May-2018	Complete		
Mission	Mission Superstore	32136 Lougheed Highway, Mission, BC	Non-Metro / Fraser Valley	29-May-2018	Complete		

Municipality/Location	Station Name	Physical Address	Region	In-Service Date	Status	BCOAPO 1.9.4.1 Avg # of Charging Sessions Per Month April 1, 2019 to March 31, 2020	BCOAPO 1.9.4.1 Avg kWh per Charging Session April 1, 2019 to March 31, 2020
Sparwood	Sparwood	100 Centennial St, Sparwood, BC	Kootenays	5-Jun-2018	Complete	[redacted]	[redacted]
Britton Creek	Britton Creek Rest Area 1	Exit 228 at Coquihalla Lakes Rd, BC	Southern Interior	13-Jun-2018	Complete		
Britton Creek	Britton Creek Rest Area 2	Exit 228 at Coquihalla Lakes Rd, BC	Southern Interior	13-Jun-2018	Complete		
Golden	Golden	820 9 Ave South, Golden, BC	Kootenays	30-Jun-2018	Complete		
Surrey	Surrey Tynehead Gas Station	16815 - 96th Ave, Surrey, BC	Metro Vancouver	17-Jul-2018	Complete		
Vancouver	Vancouver - Kerrisdale	5356 West Boulevard, Vancouver, BC	Metro Vancouver	11-Aug-2018	Complete		
Rogers Pass	Rogers Pass Discovery Centre	9520 Trans Canada Hwy, Rogers Pass, BC	Kootenays	18-Dec-2018	Complete		
Vancouver	Vancouver - SE Marine Drive Superstore	350 South East Marine Drive, Vancouver, BC	Metro Vancouver	31-Dec-2018	Complete		
Field	Field - Yoho National Park	Field, BC - Yoho National Park Visitors Centre	Kootenays	15-Jan-2019	Complete		
Surrey	Surrey - Cloverdale	5771 176A St, Surrey BC	Metro Vancouver	31-Jan-2019	Complete		
Vancouver	Vancouver - SE Marine Superstore (Expansion)*	350 South East Marine Drive, Vancouver, BC	Metro Vancouver	2-Jul-2019	Complete		
70 Mile House	70 Mile House	1597 BC-97, 70 Mile House, BC	Southern Interior	19-Jul-2019	Complete		
Cache Creek	Cache Creek	1270 Stage Rd, Cache Creek, BC	Southern Interior	19-Jul-2019	Complete		
Clinton	Clinton	1423 BC-97, Clinton, BC	Southern Interior	19-Jul-2019	Complete		
Coquitlam	Coquitlam - Superstore East (Expansion)	3000 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	21-Aug-2019	Complete		
Richmond	Richmond - Superstore (Expansion)	4651 No. 3 Road, Richmond, BC	Metro Vancouver	17-Sep-2019	Complete		
Surrey	Surrey - South Superstore (Expansion)	2332 160 St., Surrey, BC	Metro Vancouver	30-Sep-2019	Complete		
Saanich	Saanich 1	3544 Blanshard Street, Victoria, BC	Vancouver Island	9-Oct-2019	Complete		
Saanich	Saanich 2	3544 Blanshard Street, Victoria, BC	Vancouver Island	9-Oct-2019	Complete		
Port Hardy	Port Hardy	7360 Columbia Street, Port Hardy, BC	Vancouver Island	10-Oct-2019	Complete		
Blue River	Blue River	Blue River V0E 1J0	Northern Interior	16-Oct-2019	Complete		
Valemount	Valemount	735 Cranberry Lake Road, Valemount, BC	Northern Interior	17-Oct-2019	Complete		
McBride	McBride	100 Robson Centre, McBride, BC	Northern Interior	18-Oct-2019	Complete		
Sechelt District Municipality	Madeira Park	12808 Maderira Park Rd, Maderira Park, BC	Non-Metro / Fraser Valley	31-Oct-2019	Complete		
Colwood	Colwood (Expansion)	1830 Old Island Hwy, Colwood, BC	Vancouver Island	1-Nov-2019	Complete		
North Vancouver, City of	North Vancouver (Expansion)	140 1st St E North Vancouver, BC	Metro Vancouver	6-Nov-2019	Complete		
Hope	Hope (Expansion)	839 4 Ave, Hope, BC	Non-Metro / Fraser Valley	9-Nov-2019	Complete		
Delta	South Delta/Tsawwassen	1406 Tsawwassen Dr S, Tsawwassen, BC	Metro Vancouver	22-Nov-2019	Complete		
Powell River	Powell River	5001 Joyce Avenue, Powell River, BC	Non-Metro / Fraser Valley	5-Dec-2019	Complete		
Quesnel	Quesnel	2335 Maple Dr, Quesnel, BC	Northern Interior	15-Jan-2020	Complete		
Hixon	Hixon	367 Von Lienen Road, Hixon, BC	Northern Interior	15-Jan-2020	Complete		
Williams Lake	Williams Lake	450 Mart Street, Williams Lake, BC	Northern Interior	30-Jan-2020	Complete		
Nanaimo	Nanaimo (Expansion)	6435 Metral Drive, Nanaimo, BC	Vancouver Island	20-Mar-2020	Complete		
Sidney	Sidney (Expansion)	2330 Bevan Avenue, Sidney, BC	Vancouver Island	20-Mar-2020	Complete		
Port Alberni	Port Alberni (Expansion)	3455 Johnston Road, Port Alberni, BC	Vancouver Island	30-Apr-2020	Complete		
Chilliwack	Chilliwack (Expansion)	45950 Cheam Ave, Chilliwack, BC	Non-Metro / Fraser Valley	8-Jun-2020	Complete		
Campbell River	Campbell River (Expansion)	401 11 Ave, Campbell River, BC	Vancouver Island	12-Jun-2020	Complete		
Courtenay	Courtenay (Expansion)	757 Ryan Road, Courtenay, BC	Vancouver Island	12-Jun-2020	Complete		
Port McNeill	Port McNeill	1594 Beach Drive, Port McNeill, BC	Vancouver Island	12-Jul-2020	Complete		
Coquitlam	Coquitlam - Superstore West (Expansion)	1301 Lougheed Hwy, Coquitlam, BC	Metro Vancouver	17-Sep-2020	Complete		
Vancouver	Grandview Hwy - Superstore (Expansion)	3185 Grandview Hwy, Vancouver, BC	Metro Vancouver	21-Sep-2020	Complete		
Prince George	Prince George 1	2155 Ferry Avenue, Prince George, BC	Northern Interior	14-Dec-2020	Complete		
Prince George	Prince George 2	2155 Ferry Avenue, Prince George, BC	Northern Interior	14-Dec-2020	Complete		
Burns Lake	Burns Lake 1	Site 1 - 313 Highway 16 W , Burns Lake, BC	Northern Interior	11-Dec-2020	Complete		
Burns Lake	Burns Lake 2	Site 1 - 313 Highway 16 W , Burns Lake, BC	Northern Interior	11-Dec-2020	Complete		
Victoria	Victoria 1	1420 Store St. Victoria, BC	Vancouver Island	23-Mar-2021	Complete		
Victoria	Victoria 2	1420 Store St. Victoria, BC	Vancouver Island	23-Mar-2021	Complete		
Sechelt District Municipality	Sechelt (Expansion)	5755 Cowrie Street, Sechelt, BC	Vancouver Island	22-Feb-2021	Complete		
Surrey	Surrey - Cloverdale (Expansion)	5771 176A St, Surrey BC	Metro Vancouver	2-Feb-2021	Complete		
Prince Rupert	Prince Rupert 1	101 1 Ave E, Prince Rupert, BC	Northern Interior	15-Dec-2020	Complete		
Prince Rupert	Prince Rupert 2	101 1 Ave E, Prince Rupert, BC	Northern Interior	15-Dec-2020	Complete		

Municipality/Location	Station Name	Physical Address	Region	In-Service Date	Status	BCOAPO 1.9.4.1 Avg # of Charging Sessions Per Month April 1, 2019 to March 31, 2020	BCOAPO 1.9.4.1 Avg kWh per Charging Session April 1, 2019 to March 31, 2020
Vancouver	UBC - Wesbrook Place (Expansion)	6163 University Blvd, Vancouver, BC	Metro Vancouver	18-Dec-2020	Complete	[redacted]	[redacted]
Vancouver	Vancouver - Kerrisdale (Expansion)	5356 West Boulevard, Vancouver, BC	Metro Vancouver	31-Mar-2021	Complete		
West Vancouver	District of West Vancouver (Expansion)	6400 Bruce Street, District of West Vancouver, BC	Metro Vancouver	31-Mar-2022	Incomplete		
Whistler	Whistler (Expansion)	4010 Whistler Way, Whistler, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Harrison Hot Springs	Seabird Island 1	77 Lougheed Highway, Sqewqel Gas Bar and Convenience	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Harrison Hot Springs	Seabird Island 2	77 Lougheed Highway, Sqewqel Gas Bar and Convenience	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Fraser Lake	Fraser Lake 1	TBC - 30 Carrier Crescent, Fraser Lake, BC	Northern Interior	31-Mar-2022	Incomplete		
Fraser Lake	Fraser Lake 2	TBC - 30 Carrier Crescent, Fraser Lake, BC	Northern Interior	31-Mar-2022	Incomplete		
Gold River	Gold River 1	TBC - 375 Nimpkish Dr, Gold River, BC	Vancouver Island	31-Mar-2022	Incomplete		
Gold River	Gold River 2	TBC - 375 Nimpkish Dr, Gold River, BC	Vancouver Island	31-Mar-2022	Incomplete		
Houston	Houston 1	TBC - 3289 Highway 16, Houston, BC	Northern Interior	31-Mar-2022	Incomplete		
Houston	Houston 2	TBC - 3289 Highway 16, Houston, BC	Northern Interior	31-Mar-2022	Incomplete		
Kitimat	Kitimat 1	TBC - 276 City Centre, Kitimat, BC	Northern Interior	31-Mar-2022	Incomplete		
Kitimat	Kitimat 2	TBC - 276 City Centre, Kitimat, BC	Northern Interior	31-Mar-2022	Incomplete		
Lillooet	Lilllooet 1	TBC - 615 Main Street, Lilllooet, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Lillooet	Lilllooet 2	TBC - 615 Main Street, Lilllooet, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Maple Ridge	Maple Ridge 1	TBC - 22441 Dewdney Trunk Rd #102, Maple Ridge, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Maple Ridge	Maple Ridge 2	TBC - 22441 Dewdney Trunk Rd #102, Maple Ridge, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
McLeod Lake	McLeod Lake 1	TBC - 1 Carp Lake Rd, McLeod Lake, BC	Northern Interior	31-Mar-2022	Incomplete		
McLeod Lake	McLeod Lake 2	TBC - 1 Carp Lake Rd, McLeod Lake, BC	Northern Interior	31-Mar-2022	Incomplete		
New Hazelton	New Hazelton 1	TBC - 4633 10th Ave, New Hazelton, BC	Northern Interior	31-Mar-2022	Incomplete		
New Hazelton	New Hazelton 2	TBC - 4633 10th Ave, New Hazelton, BC	Northern Interior	31-Mar-2022	Incomplete		
Burnaby	North Burnaby 1	TBC - 490 Sperling Avenue, North Burnaby, BC	Metro Vancouver	31-Mar-2022	Incomplete		
Burnaby	North Burnaby 2	TBC - 490 Sperling Avenue, North Burnaby, BC	Metro Vancouver	31-Mar-2022	Incomplete		
Pemberton	Pemberton 1	TBC - 7452 Frontier Street, Pemberton, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Pemberton	Pemberton 2	TBC - 7452 Frontier Street, Pemberton, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Smithers	Smithers 1	TBC - 3743 Second Avenue, Smithers, BC	Northern Interior	31-Mar-2022	Incomplete		
Smithers	Smithers 2	TBC - 3743 Second Avenue, Smithers, BC	Northern Interior	31-Mar-2022	Incomplete		
Vanderhoof	Vanderhoof 1	TBC - Ryley Lane, Vanderhoof	Northern Interior	31-Mar-2022	Incomplete		
Vanderhoof	Vanderhoof 2	TBC - Ryley Lane, Vanderhoof	Northern Interior	31-Mar-2022	Incomplete		
Sooke	Sooke 1	TBC - 6660 Sooke Rd, Sooke, BC V9Z 0A5	Vancouver Island	31-Mar-2022	Incomplete		
Sooke	Sooke 2	TBC - 6660 Sooke Rd, Sooke, BC V9Z 0A5	Vancouver Island	31-Mar-2022	Incomplete		
Duncan	Duncan 1	TBC - 291 Cowichan Way, Duncan, BC	Vancouver Island	31-Mar-2022	Incomplete		
Duncan	Duncan 2	TBC - 291 Cowichan Way, Duncan, BC	Vancouver Island	31-Mar-2022	Incomplete		
Powell River	Powell River (Expansion)	5001 Joyce Avenue, Powell River, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Langley, District Municipality	Langley Events Centre (Expansion)	7888 200 Street Langley, BC	Non-Metro / Fraser Valley	31-Mar-2022	Incomplete		
Ucluelet	Ucluelet - Pacific Rim Visitor's Centre (Expansion)	2791 Pacific Rim Hwy, Ucluelet, BC	Vancouver Island	31-Mar-2022	Incomplete		
Blue Sky Country	Canyon Hwy Station 1	TBC - Canyon Hwy, BC	Southern Interior	31-Mar-2023	Incomplete		
Blue Sky Country	Canyon Hwy Station 2	TBC - Canyon Hwy, BC	Southern Interior	31-Mar-2023	Incomplete		
Vernon	Vernon (Expansion)	3004 32nd Ave, Vernon, BC	Southern Interior	31-Mar-2023	Incomplete		
Terrace	Terrace 1	TBC - 14309 BC-16, Terrace, BC	Northern Interior	31-Mar-2023	Incomplete		
Terrace	Terrace 2	TBC - 14309 BC-16, Terrace, BC	Northern Interior	31-Mar-2023	Incomplete		
Cranbrook	Cranbrook (Expansion)	38 Cranbrook St N, Cranbrook, BC	Kootenays	31-Mar-2023	Incomplete		
Nanaimo	Nanaimo - Conference Centre (Expansion)	101 Gordon St, Nanaimo, BC	Vancouver Island	31-Mar-2023	Incomplete		
Merritt	Merritt Visitor Information Centre (Expansion)	2202 Voght St Merritt, BC	Southern Interior	31-Mar-2023	Incomplete		
Manning Park	Manning Park (Expansion)	7500 BC-3, Manning Park, BC	Southern Interior	31-Mar-2023	Incomplete		
West Kelowna	West Kelowna (Expansion)	3678 Brown Rd, West Kelowna, BC	Southern Interior	31-Mar-2023	Incomplete		
Salmon Arm	Salmon Arm (Expansion)	381 Ross St Salmon Arm, BC	Southern Interior	31-Mar-2023	Incomplete		
70 Mile House	70 Mile House (Expansion)	1597 BC-97, 70 Mile House, BC	Southern Interior	31-Mar-2023	Incomplete		
Blue River	Blue River (Expansion)	Blue River V0E 1J0	Northern Interior	31-Mar-2023	Incomplete		
Cache Creek	Cache Creek (Expansion)	1270 Stage Rd, Cache Creek, BC	Southern Interior	31-Mar-2023	Incomplete		
Kamloops	Kamloops - Hillside Stadium (Expansion)	910 McGill Rd Kamloops, BC	Southern Interior	31-Mar-2023	Incomplete		

Municipality/Location	Station Name	Physical Address	Region	In-Service Date	Status	BCOAPO 1.9.4.1 Avg # of Charging Sessions Per Month April 1, 2019 to March 31, 2020	BCOAPO 1.9.4.1 Avg kWh per Charging Session April 1, 2019 to March 31, 2020
Sechelt District Municipality	Madeira Park (Expansion)	12808 Maderira Park Rd, Maderira Park, BC	Non-Metro / Fraser Valley	31-Mar-2023	Incomplete	[redacted]	
McBride	McBride (Expansion)	100 Robson Centre, McBride, BC	Northern Interior	31-Mar-2023	Incomplete		
Port Hardy	Port Hardy (Expansion)	7360 Columbia Street, Port Hardy, BC	Vancouver Island	31-Mar-2023	Incomplete		
Port McNeill	Port McNeill (Expansion)	1594 Beach Drive, Port McNeill, BC	Vancouver Island	31-Mar-2023	Incomplete		
Quesnel	Quesnel (Expansion)	2335 Maple Dr, Quesnel, BC	Northern Interior	31-Mar-2023	Incomplete		
Delta	South Delta/Tsawwassen (Expansion)	1406 Tsawwassen Dr S, Tsawwassen, BC	Metro Vancouver	31-Mar-2023	Incomplete		
Mission	Mission Superstore (Expansion)	32136 Lougheed Highway, Mission, BC	Non-Metro / Fraser Valley	31-Mar-2023	Incomplete		
Williams Lake	Williams Lake (Expansion)	450 Mart Street, Williams Lake, BC	Northern Interior	31-Mar-2023	Incomplete		
Prince George	Prince George (Expansion)	2155 Ferry Avenue, Prince George, BC	Northern Interior	31-Mar-2023	Incomplete		
Surrey	Surrey Tynehead Gas Station (Expansion)	16815 - 96th Ave, Surrey, BC	Metro Vancouver	31-Mar-2023	Incomplete		
Surrey	Surrey - Powertech Labs (new site) 1	12388 88 Ave. Surrey, BC	Metro Vancouver	31-Mar-2023	Incomplete		
Surrey	Surrey - Powertech Labs (new site) 2	12388 88 Ave. Surrey, BC	Metro Vancouver	31-Mar-2023	Incomplete		
Surrey	Surrey - Powertech Labs (new site) 3	12388 88 Ave. Surrey, BC	Metro Vancouver	31-Mar-2023	Incomplete		
Phase 1 - Other	None	None	None	NA	Complete		
Phase 2 - Other	Various	Various	Various	Various	Complete		
Grand Total							

Note

* Expansion refers to the addition of a station at an existing site.

9.0 Reference: Exhibit B-1, pages 11 and 28-29
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 13 and Exhibit B-17, BCOAPO 2.35.1

FBC's response to BCOAPO 2.35.1 states:

"The kWh usage data provided in response to BCOAPO IR 1 11.4 through 11.6 was determined from the internal metering of the DCFC stations and associated reporting software. Although this metering is not approved for billing customers on an energy basis, it is reasonable to use this information for providing the kWh deliveries as requested in BCOAPO IR 1 11.4 through 11.6."

BC Hydro's Application states (page 11):

While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.9.4 It is noted that in its Application FBC used an average consumption of 20 kWh per charge event based on average historical kWh volumes per charge session at its existing stations (page 13). BC Hydro's Application states that the 13.1 kWh per charging session is based on data collected from BC Hydro's fast charging stations from April 1, 2019 to March 31, 2020.

1.9.4.2 Please provide a summary schedule that sets out: i) the average kWh per charging session across all stations, ii) the median kWh per charging session across all stations, iii) the minimum and maximum station values for the average kWh per charging session across all stations, iv) the average number of charging sessions per month across all charging stations, v) the median number of charging sessions per month across all stations and vi) the minimum and maximum values for the average number of charging sessions per month across all stations.

RESPONSE:

Below is summary table based on data collected from BC Hydro 50 kW fast charging stations from April 1, 2019 to March 31, 2020:

F2020	kWh Per Charging Session	Charging Sessions Per Month across all stations
Min	**0.001**	**11,370**
Median	**11.08**	**16,936**
Average	**13.41**	**17,525**
Max	**115.28**	**22,591**

10.0 Reference: Exhibit B-1, pages 11 and 28-29

BC Hydro's Application states (page 11):

"While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.10.1 Does the calculation of the charging rate to recover electricity costs use 50 kW as the value for peak demand (per Equation 1, page 28)?

RESPONSE:

Peak demand of 50 kW is used in equation 1 shown on page 28 of the Application which calculates the time-based rate that would be required to recover the cost of electricity (Energy and Demand Charges) under the Medium General Service Rate Schedule 1500 for 50 kW fast charging stations.

Specifically, the said peak demand does not include demand attributable to lighting and other ancillary equipment.

10.0 Reference: Exhibit B-1, pages 11 and 28-29

BC Hydro's Application states (page 11):

"While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.10.1 Does the calculation of the charging rate to recover electricity costs use 50 kW as the value for peak demand (per Equation 1, page 28)?

1.10.1.1 If yes, please confirm that the calculation does not include any addition "demand" attributable to lighting and other ancillary equipment associated with the charging site.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.10.1.

10.0 Reference: Exhibit B-1, pages 11 and 28-29

BC Hydro's Application states (page 11):

"While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.10.1 Does the calculation of the charging rate to recover electricity costs use 50 kW as the value for peak demand (per Equation 1, page 28)?

1.10.1.2 If the calculation does not include any addition "demand" attributable to lighting and other ancillary equipment associated with the charging site, what would the demand billing determinant need to be in order to include (based on April 1, 2019 to March 31, 2020 data) an appropriate allowance for lighting and other ancillary equipment usage? As part of the response please explain how the adjustment for lighting and other equipment usage was determined.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.9.3.2 where BC Hydro explains that BC Hydro is unable to complete this analysis at this time as the data required for the calculation requested is not readily available and could not be ready in time to respond.

10.0 Reference: Exhibit B-1, pages 11 and 28-29

BC Hydro's Application states (page 11):

"While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.10.2 Does the MGS rate include a monthly customer charge?

RESPONSE:

Medium General Service (MGS) Rate Schedules have Basic Charge, Energy Charge and Demand Charge as shown in those rate schedules.

BC Hydro has not included the Basic Charge in the calculation for electricity cost recovery for simplicity and due to the fact that the amount is small and difficult to allocate to an unknown number of station customers each month.

10.0 Reference: Exhibit B-1, pages 11 and 28-29

BC Hydro's Application states (page 11):

"While the electricity provided to the charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle."

1.10.2 Does the MGS rate include a monthly customer charge?

1.10.2.1 If yes, please explain why this charge has not been included in the calculation of the rate to recover electricity costs.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.10.2.

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.1 Please explain how the 3 to 5 percent range was established based on the "DCFC RATE DESIGN STUDY FOR THE COLORADO ENERGY OFFICE" (DCFC Rate Design Study) prepared by the Rocky Mountain Institute, given the Study's statement that 5% is representative of many DCFC's today.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.16.1 where BC Hydro explains that as this is BC Hydro's first rates for electric vehicle fast charging service, we have no actual data on how Customers may respond to the newly introduced rates. While BC Hydro's expectation is that the station utilization will vary with the rates to be set and the survey response is indicative of this, there are also various other factors aside from rates, such as electric vehicle sales, that affect station utilization.

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.2 Did BC Hydro contact either the City of Vancouver or the City of North Vancouver and inquire regarding the current utilization rates for their EV charging stations?

RESPONSE:

BC Hydro has not requested or received detailed utilization data from the City of North Vancouver or the City of Vancouver.

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.2 Did BC Hydro contact either the City of Vancouver or the City of North Vancouver and inquire regarding the current utilization rates for their EV charging stations?

1.11.2.1 If yes, what were the results?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.11.2.

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.3 Please confirm that the F2022 utilization rate for 50 kW stations used by FortisBC in its application was between 5% - 6% (i.e. 2.72 charge events per station per day at 30.2 minutes each per BCOAPO 12.5).

RESPONSE:

Utilization rate for 50 kW station operated by FortisBC Inc. in year 2022 is 5.7 per cent based on FortisBC's response to BCOAPO IR 1.12.5 to the FortisBC Inc. Rate Design and Rates for Electric Vehicle Direct Current Fast Charging Service Application[1], as calculated below:

= [(Charge events per station per day) x (Charging time per char event)] / [(24 hours) x (60 minutes per hour)]

= [(2.72 charge events per station per day) x (30.12 minutes per charge event)] / [(24 hours) x (60 minutes per hour)]

= 5.7%

[1] **Link to FortisBC proceeding:** https://www.bcuc.com/Documents/Proceedings/2020/DOC_59867_B-8-1-REDACTED-FBC-Responses-to-BCOAPO-IR1.pdf

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.4 Please confirm that the DCFC Rate Design Study indicates that 30% utilization "is representative of the utilization rates that a public DCFC might experience in a mature EV market".

RESPONSE:

Confirmed.

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.5 Please confirm that, in its Application, FortisBC assumed the utilization rate for 50 kW stations would be 25% by F2030 (12 charge events per day at 30.12 minutes per event per BCOAPO 12.5).

RESPONSE:

Utilization rate for 50 kW stations operated by FortisBC Inc. in year 2030 is 25.1 per cent based on FortisBC's response to BCOAPO IR 1.12.5 to the FortisBC Inc. Rate Design and Rates for Electric Vehicle Direct Current Fast Charging Service Application[1], as calculated below:

= [(Charge events per station per day) x (Charging time per char event)] / [(24 hours) x (60 minutes per hour)]

= [(12.00 charge events per station per day) x (30.12 minutes per charge event)] / [(24 hours) x (60 minutes per hour)]

= 25.1%

[1] **Link to FortisBC proceeding:** https://www.bcuc.com/Documents/Proceedings/2020/DOC_59867_B-8-1-REDACTED-FBC-Responses-to-BCOAPO-IR1.pdf

11.0 Reference: Exhibit B-1, pages 24 and 31
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-8-1, BCOAPO 12.5

The Application states (page 31): "based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station."

The Application also states (page 31): "As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time."

The referenced "market study" states (page 5) that 5% utilization is "representative of many DCFCs today".

1.11.6 Please extend Table 3 in the Application to include utilization rates of 25% and 30%.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.8.1.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.1 How was the $8,000 per station established and what activities does it include?

RESPONSE:

BC Hydro's operation and maintenance practice and corresponding expenditures for fast charging stations (or referred to as chargers herein) are established based on the fundamental asset management principle - value maximization and balance between Investment, Performance and Risk. Investment, Performance and Risk balance is used in the decision-making process and fundamentally is reflected through factors, such as the reliability of fast charging station, preventive and corrective maintenance schedule, expected station availability and time to repair.

The $8,000 per station represents the average estimated cost with +/-50 per cent accuracy due to uncertainty of an actual charger cost estimate. The uncertainty related to the exact asset need is managed through estimated average cost per charger, which is established to take into account factors such as overall asset population, different age of assets, different models (i.e., 25 kW, 50 kW, 100 kW), varying preventive maintenance needs, usage and time required to address a charger outage, repair crew travel times and parts.

Newly installed assets or assets with lower usage may require less frequent maintenance, while assets with high usage (>15 charging sessions per day) may need more frequent maintenance. Similarly, higher usage of a charger will lead to greater wear and tear of different charger components that consequently leads to higher maintenance cost.

In its maintenance program, BC Hydro uses the preventive maintenance schedule recommended by the charger manufacturers in combination with a condition based methodology and tracks the continuously evolving charger technology and its use on the BC Hydro fast charging station network system to adjust the program as required.

The overall cost per station is used to cover, in an optimized manner, hardware (i.e., charger station) and software (i.e., network management system) cost necessary for the continuous and reliable operation of the station. This cost includes items such as preventive maintenance and repairs due to wear and tear on a charging station and associated labour, network management system annual and licencing fee per station.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.2 In what year's dollars is the $8,000 based?

RESPONSE:

The maintenance costs of $8,000 per year per station are based on fiscal 2021.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.3 Please provide more details as to what the additional $800,000 per year in labour costs is for, what year's dollars it is based on and whether it varies with the number of stations.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.5 that details that the labor costs represent a team in Customer Service Key Business Unit who lead the development of transportation electrification strategies within BC Hydro including electric vehicles adoption and promotion. Supporting electric vehicle fast charging infrastructure implementation is only a portion of their responsibilities.

This amount is stated in fiscal 2022 dollars and is not related to the number of stations in-service.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.4 Does BC Hydro's maintenance cost of $8,000 per station cover the same activities/items as FortisBC's $5,193 maintenance cost per station?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.1 where BC Hydro explains the activities that BC Hydro's maintenance cost of $8,000 per station covers.

BC Hydro is unable to comment on FortisBC's maintenance practice of its fast charging stations.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.4 Does BC Hydro's maintenance cost of $8,000 per station cover the same activities/items as FortisBC's $5,193 maintenance cost per station?

1.12.4.1 If not, what are the differences?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.4.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.4 Does BC Hydro's maintenance cost of $8,000 per station cover the same activities/items as FortisBC's $5,193 maintenance cost per station?

1.12.4.2 If yes, can BC Hydro explain the difference in cost per station?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.4.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.5 It is noted that, in the case of FortisBC, FLO provides certain service such as the network management services (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing. Are similar service/activities required to support BC Hydro EV charging stations?

RESPONSE:

For its public electric vehicle fast charging service, which activities are retained in-house or contracted to external resources is based on consideration of several factors, including faster responses to customers' inquires, control of some key elements of the service, flexibility to adjust service if necessary, and privacy and security of customer data.

The day-to-day operation of BC Hydro's fast charging stations performed by BC Hydro's in-house staff includes:

- **Daytime telephone support, seven days a week, leveraging BC Hydro's existing call centres in Vancouver and Vernon;**
- **PlugShare and ChargeHub monitoring, pro-active messaging (e.g., local power outage) and customer response;**
- **Regular site and station inspections, leveraging BC Hydro staff and BC Hydro fleet across BC Hydro service territory;**
- **Issues management and triage, such as remote diagnosis and management and coordination with external vendors mentioned below;**
- **Spare parts inventory management;**
- **Information support on BC Hydro's website and related proactive customer communications (e.g., email and social media); and**
- **Overall end-to-end service level management, monitoring and reporting.**

Operational activities that BC Hydro contracts to external vendors and contractors include:

- **Activities that BC Hydro currently contracts to AddEnergie Technologies;**
  - **EV network (IT) management system (connectivity between charging stations and central database, billing and payment processing, user interfaces such as mobile application and web portals, advanced remote diagnosis, and roaming operations);**
  - **After-hours telephone support (outside BC Hydro call centre hours);**
- **Site or station repairs by local electrical contractors by region and other relevant contractors as required;**
- **Spare parts storage and logistics; and**
- **advanced engineering support by Powertech Labs Inc.**

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.5 It is noted that, in the case of FortisBC, FLO provides certain service such as the network management services (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing. Are similar service/activities required to support BC Hydro EV charging stations?

1.12.5.1 If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.5.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.5 It is noted that, in the case of FortisBC, FLO provides certain service such as the network management services (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing. Are similar service/activities required to support BC Hydro EV charging stations?

1.12.5.2 If yes, where are the costs of these services included in BC Hydro's analysis?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.1 where BC Hydro explains the asset management costs that were included in BC Hydro's analysis to estimate the $8,000 per station per year in station maintenance costs.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.6 Are there any taxes or payments in lieu of taxes associated with BC Hydro's EV sites and stations?

RESPONSE:

BC Hydro does not pay any property taxes or payments in lieu of taxes specifically in regards to our public electric vehicle fast charging sites and stations.

As described in the Proposed Rate Schedules in Appendix B, the rate set out in the rate schedules are exclusive of goods and services and provincial sales taxes.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.6 Are there any taxes or payments in lieu of taxes associated with BC Hydro's EV sites and stations?

1.12.6.1 If yes, what are they and are they included in the $8,000 per year per station?

RESPONSE:

The $8,000 per year per station does not include taxes or payments in lieu of taxes.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.7 Are there carbon credits associated with the operation of BC Hydro's EV charging stations?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.2.1.

12.0 Reference: Exhibit B-1, page 30
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, pages 15-16

The Application states:

"Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year."

The FortisBC Application states (page 16):

"FBC estimates that the operating and maintenance cost is $5,193 annually per station for both 50 kW and 100 kW stations. This includes maintenance, travel, repairs outside of warranty, and FBC network management expenses including half of a full-time equivalent (FTE) employee. The operating and maintenance cost drops to $4,900 in year 2026 as FBC expects to reduce costs related to managing network administration of FBC stations."

The FortisBC Application also states (page 15):

"A transaction fee of 15 percent for global management services is charged by FLO and is added to the calculated EV rate before the transaction fee. This fee covers the network management services provided by FLO (station status monitoring, remote diagnostics/upgrades, etc.), 24/7 telephone support for customers using the DCFC stations, as well as payment collection and processing."

1.12.7 Are there carbon credits associated with the operation of BC Hydro's EV charging stations?

1.12.7.1 If yes, why are they not factored into the determination of the rates?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.2.1.

13.0 Reference: Exhibit B-1, page 30
BC Hydro F2022 RRA, Exhibit B-4, BCUC 1.1.3 and 1.1.5

In BC Hydro's F2022 RRA the following EV charging station costs were identified as being included in the Revenue Requirement:

Electric Vehicle Infrastructure Costs
$ million

	Fiscal 2022 Forecast	Appendix A Reference
Operating & Maintenance Costs		
Labour	0.8	Schedule 1, Line 2
Contract Services	1.0	Schedule 1, Line 2
Total Operating & Maintenance	1.8	
Depreciation	0.5	Schedule 1, Line 5
Cost of Energy	0.4	Schedule 1, Line 1
Total EV Infrastructure Costs	**2.7**	

1.13.1 Does the $800,000 in labour costs cited in the above Table from the F2022 RRA represent the $800,000 labour costs referenced in the current Application (page 30)? If not, please explain what each $800k represents and why they are different.

RESPONSE:

Confirmed.

13.0 Reference: Exhibit B-1, page 30
BC Hydro F2022 RRA, Exhibit B-4, BCUC 1.1.3 and 1.1.5

In BC Hydro's F2022 RRA the following EV charging station costs were identified as being included in the Revenue Requirement:

Electric Vehicle Infrastructure Costs
$ million

	Fiscal 2022 Forecast	Appendix A Reference
Operating & Maintenance Costs		
Labour	0.8	Schedule 1, Line 2
Contract Services	1.0	Schedule 1, Line 2
Total Operating & Maintenance	1.8	
Depreciation	0.5	Schedule 1, Line 5
Cost of Energy	0.4	Schedule 1, Line 1
Total EV Infrastructure Costs	**2.7**	

1.13.2 The Application indicates that the maintenance cost for 50 kW charging stations is $8,000 per station. What are the maintenance costs per station for 25 kW and 100 kW charging stations?

RESPONSE:

BC Hydro maintenance cost model is flexible to accommodate 25 kW and 100 kW chargers within estimated average of $8,000 per station per year with the designed uncertainty range.

Please refer to BC Hydro's response to BCOAPO IR 1.12.1 which details how various factors, including different models of asset (i.e., 25 kW, 50 kW, 100 kW), are taken into consideration in estimating the average maintenance cost of $8,000 per station.

13.0 Reference: Exhibit B-1, page 30
BC Hydro F2022 RRA, Exhibit B-4, BCUC 1.1.3 and 1.1.5

In BC Hydro's F2022 RRA the following EV charging station costs were identified as being included in the Revenue Requirement:

Electric Vehicle Infrastructure Costs
$ million

	Fiscal 2022 Forecast	Appendix A Reference
Operating & Maintenance Costs		
Labour	0.8	Schedule 1, Line 2
Contract Services	1.0	Schedule 1, Line 2
Total Operating & Maintenance	1.8	
Depreciation	0.5	Schedule 1, Line 5
Cost of Energy	0.4	Schedule 1, Line 1
Total EV Infrastructure Costs	**2.7**	

1.13.3 Please reconcile the $8,000 per station in maintenance cost referenced in the current Application (page 30) and response to the preceding question regarding the maintenance cost for 25 kW and 100 kW stations with the O&M costs included in the F2022 RRA and the number of stations BC Hydro plans to have in operation in F2022 (i.e., 155 per BCH RRA, Exhibit B-4, BCUC 1.1.5).

RESPONSE:

In BC Hydro's response to BCOAPO IR 1.12.1 we explain that the $8,000 per station represents the average estimated maintenance cost (+/- 50 per cent accuracy) and total cost uncertainty is managed through the overall asset population and the maintenance activities included.

As presented in the Fiscal 2022 Revenue Requirements Application (RRA), BC Hydro forecasts 96 eligible charging stations at the beginning of fiscal 2022 and 155 eligible charging stations at the end of fiscal 2022 for an average of approximately 126 chargers in-service in fiscal 2022. The total maintenance costs for these 126 stations for fiscal 2022 is estimated at $1.0 million as stated in Exhibit B-4, BC Hydro's responses to BCUC IRs 1.1.3 and 1.1.5, in BC Hydro's F2022 RRA proceeding, and is calculated as follows:

126 chargers x $8,000 per charger per year = $1,008,000

Please refer to BC Hydro's response to BCUC IR 1.7.5 which states the labour costs of $0.8 million represent a team of staff in Customer Service Key Business Unit who lead the development of transportation electrification strategies within BC Hydro, including electric vehicles adoption and promotion. Supporting electric vehicle fast charging infrastructure implementation is only a portion of their responsibilities.

14.0 Reference: Exhibit B-1, page 31

1.14.1 Please provide the detailed calculation supporting the 62 cents / minute associated with Scenario 2 with a 3.7% utilization rate.

RESPONSE:

Below is detailed calculation on how rate of $0.62 per minute for 3.7 per cent utilization for 50 kW station shown in Scenario 2 of Table 3 in the Application is calculated:

= Equation 1 (Rate to recovery electricity costs) + Equation 2 (Rate to recover station maintenance costs

= [{(Peak Demand x Demand Charge) / Average Number of Charging Session per Station per month + (Average Electricity Consumption per Charging Session x Energy Charge)} / Average Charging Session Length]

+

[{(Annual Maintenance Costs) /12 months} / Average Number of Charging Session per Station per month / Average Charging Session Length]

= [{(50 kW x $5.39/kW) / 56.7 charging sessions + (13.1 kWh x $0.0963/kWh)} / 28.6 minutes]

+

[($8,000 /12 months) / 56.7 charging sessions / 28.6 minutes]

= [21 cents/minute] + [41 cents/minute]

=62 cents per minute

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.1 Please explain what is meant by a "dual station site"? Is the number of dual station sites equivalent to the number of EV charging stations and, if not, what is the difference for F2022?

RESPONSE:

A "dual station site" means that we have two fast charging stations at one site.

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for an updated site information as of April 1, 2021, and to BC Hydro's response to BCOAPO IR 1.1.2 where we explain the differences for fiscal 2022 between Appendix C to Fiscal 2022 RRA and the updated site information provided in BC Hydro's response to BCOAPO IR 1.1.1.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.2 The Application states that "Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included". Are there capital contributions from other third parties that are "guaranteed" and, if yes, what are the gross capital costs per dual station when these contributions are also not included (i.e. what is the gross capital cost prior to any reduction for capital contributions)?

RESPONSE:

There are no third-party capital contributions that are guaranteed.

The $235,000 amount per dual station does not include any third-party contributions.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.3 With respect to BCUC 1.1.4 and 1.1.5, please reconcile the total capital expenditures on prescribed undertakings (net of capital contributions) of $10.4 M with the total capital additions over the same period of $5.3 M.

RESPONSE:

In BC Hydro's Fiscal 2022 Revenue Requirements Application proceeding, which is pending before another BCUC Panel, BC Hydro's response to BCUC IRs 1.1.4 and 1.1.5 provided capital expenditures and capital additions in fiscal 2022. The difference between capital expenditures and capital additions is a timing difference of when capital expenditures are incurred and when the completed project is put into service.

There is a timing difference because a capital project (in this case, consisting of multiple stations) aren't put into service until all expenditures and contributions are incurred or received.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.4 As of F2022 what are the total capital additions (net of all contributions) for 50 kW charging stations consistent with the F2022 RRA?

RESPONSE:

In BC Hydro's Fiscal 2022 Revenue Requirements Application proceeding, which is pending before another BCUC Panel, BC Hydro's response to BCUC IR 1.1.5 provided capital additions in fiscal 2022, which totalled $5.3 million. BC Hydro estimates that the total capital additions, net of all contributions, of 50 kW charging stations is $5.1 million of the $5.3 million.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.5 Please explain how the $85,000 and $235,000 values quoted in the current Application were calculated and reconcile them to the capital expenditures and capital additions attributed to EV charging stations in the F2022 RRA and the number of planned 50 kW EV charging stations for F2022.

RESPONSE:

As noted in the Application (page 30), gross capital costs are approximately $235,000 per dual station site. This includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and equipment capital cost investments by BC Hydro. Third-party contributions, which are not guaranteed, bring the expected future net cost per dual station site down to $85,000.

The capital expenditures and capital additions forecast in the Fiscal 2022 Revenue Requirements Application had a currency date of April 2019 (consistent with the Capital Plan in that application), which did not include projects that have since been approved and did not include shifts in the timing of capital expenditures and capital additions. Therefore, the expected future dual station site values quoted in the Application or number of planned 50 kW electric vehicle charging stations cannot be reconciled to the Fiscal 2022 Revenue Requirements Application.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.6 Please reconcile the $0.5M in depreciation for EV charging stations included in the F2022 revenue requirement (per BC Hydro F2022 RRA, Exhibit B-4, BCUC 1.1.3) and the 155 planned EV stations for F2022 (per BC Hydro F2022 RRA, Exhibit B-4, BCUC 1.1.5) with the $85,000 in capital costs per dual station site and the 10 year amortization per cited in the current Application.

RESPONSE:

As noted in BC Hydro's response to BCUC IR 1.1.5, capital expenditures and capital additions forecast in the Fiscal 2022 Revenue Requirements Application, which is pending before another BCUC Panel, has a currency date of April 2019 (consistent with the Capital Plan in that application). As discussed in BC Hydro's response to BCUC IR 1.1.5 in the Fiscal 2022 Revenue Requirements Application, the forecast number of fast charging stations of 155 was based on information at the time of the filing of that application. Therefore, the fiscal 2022 depreciation of $0.5 million is not aligned to the 155 stations.

The $85,000 capital cost estimate referenced in the question is BC Hydro's expected future net cost for a dual station site in the Application and is not necessarily reflective of historical capital spend to date.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.7 Can BC Hydro explain why its gross capital expenditures per station ($235,000 or more if this value includes contributions that are "guaranteed") are significantly higher than FortisBC's ($5.17 M/ 40 stations = ~ $130,000 per station)?

RESPONSE:

BC Hydro is unable to provide submissions on FortisBC's costs. However, we note that a charging site's capital costs are dependent on several factors, including charging station electrical capacity, manufacturer, geographical location, any electrical service upgrades required, signage, safety and security barriers.

As noted in the Application, expected future gross capital costs are forecast to be $235,000 per dual station site (two stations at a single site) and this does not include any third-party contributions. Third-party contributions, which are not guaranteed, are estimated at $150,000 per dual station site, bringing the expected future net cost to $85,000.

15.0 Reference: Exhibit B-1, page 30
BC Hydro's F2022 RRA, Exhibit B-4, BCUC 1.1.4 & 1.1.5
FortisBC, Application for Approval of Rate Design and Rates for EV DCFC Service, September 2020, Exhibit B-5, page 15

In BC Hydro's F2022 RRA (BCUC 1.1.4) the following capital expenditures related to EV charging stations were identified for the period F2013 to F2022:

($ million)	Actual								Forecast		
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022	Total
Gross Capital Expenditures	0.8	1.7	0.7	1.1	1.3	3.4	2.5	6.2	3.2	0.1	21.0
Less: Contributions in Aid	(0.8)	(1.7)	(0.7)	(1.0)	(0.9)	(0.4)	(2.1)	(1.7)	(1.0)	(0.3)	(10.6)
Net Capital Expenditures	-	-	-	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**
Less Non-prescribed undertaking:	0.00	(0.02)	0.00	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.0**	**(0.0)**	**0.0**	**0.1**	**0.4**	**3.0**	**0.4**	**4.5**	**2.2**	**(0.2)**	**10.4**

In BC Hydro's F2022 RRA (BCUC 1.1.5) the following capital additions related to EV charging stations were identified for the period F2013-F2022:

($ million)	Actual								Forecast	
	F2013	F2014	F2015	F2016	F2017	F2018	F2019	F2020	F2021	F2022
Capital Additions	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.1	0.3
Less: Non-prescribed undertakings	0.00	0.00	0.00	0.00	0.00	0.00	(0.03)	0.00	0.00	0.00
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**2.4**	**2.1**	**0.3**

The current Application states (page 30):

"Capital costs are approximately $85,000 per dual station site, amortized over ten years net of contributions by third parties such as NRCan are included. This figure includes costs such as site selection, properties, legal, design, engineering, lighting, signage, line construction, civil construction and capital cost investments by BC Hydro. Gross capital costs are approximately $235,000 per dual station site when contributions, which are not guaranteed, by third parties such as NRCan are not included."

The FortisBC Application states (page 15):

"FBC's estimates that its gross capital expenditures for the forty EV charging stations (existing and planned) across 23 sites will be $5.17 million. To date FBC has spent $3.48 million on EV charging stations, and plans to spend an additional $1.69 million in 2021. These expenditures cover EV station kiosks, charger connectors, poles, towers, conductors, line transformers, civil work, installation and commissioning."

1.15.8 Please explain why the capital-related costs BC Hydro has identified in the current Application as being associated with EV charging stations do not include any provision for financing costs (e.g., interest costs on the debt required to finance the EV stations).

RESPONSE:

As explained in the response to Hearing Undertaking No. 7 of the Fiscal 2022 Revenue Requirements Application proceeding, BC Hydro manages its debt on a portfolio basis and does not attribute specific debt or finance charges to specific items such as electric vehicle charging infrastructure.

16.0 Reference: Exhibit B-1, page 31

1.16.1 Please provide the detailed calculations supporting the $1.06 / minute associated with Scenario 3 based on a 3.7% utilization rate.

RESPONSE:

Below is detailed calculation on how rate of $1.06 per minute for 3.7 per cent utilization for 50 kW station shown in Scenario 3 of Table 3 in the Application is calculated:

= Equation 1 (Rate to recovery electricity costs) + Equation 2 (Rate to recover station maintenance costs + Equation 3 (Rate to recover station capital costs)

= [{(Peak Demand x Demand Charge) / Average Number of Charging Session per Station per month + (Average Electricity Consumption per Charging Session x Energy Charge)} / Average Charging Session Length]

+

[{(Annual Maintenance Costs) /12 months} / Average Number of Charging Session per Station per month / Average Charging Session Length]

+

{(Annualized Capital Costs) /12 months} / Average Number of Charging 1Session per Station per month / Average Charging Session Length

= [{(50 kW x $5.39/kW) / 56.7 charging sessions + (13.1 kWh x $0.0963/kWh)} / 28.6 minutes]

+

[($8,000 /12 months) / 56.7 charging sessions / 28.6 minutes]

+

[{($85,000) /12 months} / 56.7 charging sessions / 28.6 minutes]

= [21 cents/minute] + [41 cents/minute] + [44 cents/minute]

=$1.06 per minute

17.0 Reference: Exhibit B-1, pages 10 and 32

The Application states (page 10):

"A 50 kW fast charging station can charge an electric vehicle to 80 per cent within 30 to 40 minutes, depending on the size of the battery and how depleted the battery is when charging commences. A 25 kW charging station can take up to twice as long to charge as a 50 kW station, depending on the starting state of charge and the electric vehicle make and model. A 100 kW fast charging station may not double the charging speed of a 50 kW station unless the vehicle is capable of being charged at this higher power level."

The Application also states (page 32):

"As discussed above, BC Hydro proposes 12 cents per minute for the fast charging service at 25 kW stations. We expect the station utilization rate of the 50 kW and 25 kW stations to be similar, because 25 kW stations will be mainly used as replacements to 50 kW stations that are under repair and when no other charging equipment for 50 kW stations is available in inventory.

Assuming the 25 kW stations have a utilization of 3.7 per cent, the Proposed Rate of 12 cents per minute will recover all of electricity supply costs and some charging station capital and maintenance costs.

BC Hydro proposes 27 cents per minute for fast charging service at 100 kW stations. The rate will collect sufficient revenues to recover at least electricity supply costs (Energy and Demand charges) under the MGS rate so long as the station utilization rate is 6.5 per cent or greater. The station utilization needed for electricity cost recovery is higher for the 100 kW station than it is for the 50 kW station because the Peak Demand is higher. BC Hydro expects that utilization will be higher at the 100 kW stations because they are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated."

1.17.1 For F2022 will there be any charging sites where 25 kW stations will be installed on a permanent basis? If so, how many sites and how many such stations will there be at these sites?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 where we have provided information in the attachment to that information request, including updated fiscal 2022 deployment plans.

17.0 Reference: Exhibit B-1, pages 10 and 32

The Application states (page 10):

"A 50 kW fast charging station can charge an electric vehicle to 80 per cent within 30 to 40 minutes, depending on the size of the battery and how depleted the battery is when charging commences. A 25 kW charging station can take up to twice as long to charge as a 50 kW station, depending on the starting state of charge and the electric vehicle make and model. A 100 kW fast charging station may not double the charging speed of a 50 kW station unless the vehicle is capable of being charged at this higher power level."

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1.17.2 Given that: i) 25 kW stations can take up to twice as long to charge and ii) 25 kW stations will be used mainly used as replacements to 50 kW stations that are under repair and when no other charging equipment for 50 kW stations is available in inventory, why is it reasonable to assume that they will have the same utilization rate as 50 kW stations? Is BC Hydro assuming that in situations where 25 kW stations are in-service, there will be the same number of charging events and each event will last the same time (as for 50 kW stations) even though EV owners are likely to receive only ½ the charge (as they would from a 50 kW station)?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.12.4.

17.0 Reference: Exhibit B-1, pages 10 and 32

The Application states (page 10):

"A 50 kW fast charging station can charge an electric vehicle to 80 per cent within 30 to 40 minutes, depending on the size of the battery and how depleted the battery is when charging commences. A 25 kW charging station can take up to twice as long to charge as a 50 kW station, depending on the starting state of charge and the electric vehicle make and model. A 100 kW fast charging station may not double the charging speed of a 50 kW station unless the vehicle is capable of being charged at this higher power level."

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Assuming the 25 kW stations have a utilization of 3.7 per cent, the Proposed Rate of 12 cents per minute will recover all of electricity supply costs and some charging station capital and maintenance costs.

BC Hydro proposes 27 cents per minute for fast charging service at 100 kW stations. The rate will collect sufficient revenues to recover at least electricity supply costs (Energy and Demand charges) under the MGS rate so long as the station utilization rate is 6.5 per cent or greater. The station utilization needed for electricity cost recovery is higher for the 100 kW station than it is for the 50 kW station because the Peak Demand is higher. BC Hydro expects that utilization will be higher at the 100 kW stations because they are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated."

1.17.3 Given that the charging speed is higher for a 100 kW station (versus a 50 kW station) what does a 6.5% utilization rate translate into in terms of number of charging events per month?

RESPONSE:

When responding to BCUC IR 1.7.2, BC Hydro noticed an error in page 32 of the Application. This page should have indicated that the utilization of 100 kW station is 5.5 per cent. This is corrected in Errata No. 1 to the Application. This error does not change the rate calculation.

The utilization rate of 5.5 per cent is equivalent to average of 84 charging sessions per station per month.

Full working model of the calculation is provided as Attachment 1 to BCUC IR 1.7.2.

18.0 Reference: Exhibit B-1, pages 32-33 and pages 36-37

The Application states:

"We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024. This timeline will allow for the collection and analysis of two full fiscal years of utilization and financial data (fiscal 2022 and fiscal 2023) as well as the completion 1 of customer and stakeholder engagement informed by the results of the evaluation."

1.18.1 Please explain why it is expected to take a full year to prepare the evaluation report.

RESPONSE:

To clarify, the preparation of an evaluation report is not expected to take a full year. The timeline for preparing the report is further described below.

A clean complete data set covering load and revenue data for all of fiscal 2023 will become available in late summer 2023. Once these data are available, analysis and completion of preliminary results will take approximately two months. Depending on the findings of the preliminary results, BC Hydro may want to conduct further customer research and stakeholder engagement on the findings to fully inform the BCUC submission. Preparing for, conducting and completing research, and engagement typically take six to eight weeks. Following this process, compiling and finalizing the BCUC submission may take approximately four to six weeks. This timeline results in the submission filing being ready in Q1 of 2024.

18.0 Reference: Exhibit B-1, pages 32-33 and pages 36-37

The Application states:

"We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024. This timeline will allow for the collection and analysis of two full fiscal years of utilization and financial data (fiscal 2022 and fiscal 2023) as well as the completion 1 of customer and stakeholder engagement informed by the results of the evaluation."

1.18.2 If new rates were proposed, would BC Hydro propose that they be implemented as soon as practical or would implementation not occur until April 1, 2025 so as to correspond with annual general rate increases?

RESPONSE:

BC Hydro does not have enough information at this time to make a determination on the question posed in this information request and suggests that the appropriate time to consider this question is when the finding of the evaluation become available in 2024.

For example, there may be some efficiencies in aligning changes in rate design with the timing of general rate increases or decreases. However, if the new rate designs involve converting to electricity-based rates, then implementation considerations regarding metering and billing will likely be a primary factor influencing the timeline of implementation.

19.0 Reference: Exhibit B-1, pages 33-34 and Appendix B

1.19.1 With respect to Special Condition #2, please provide a schedule that for the period April 1, 2019 to March 31, 2020 indicates for each station: i) how many times BC Hydro had to disconnect, interrupt or terminate service due to one/more of the reasons listed and ii) the overall time involved.

RESPONSE:

BC Hydro does not have a record of every Special Condition No. 2 type situation for the period of April 1, 2019 to March 31, 2020, but below is a representative sample of the types of situations that arose:

Site	Service Interruption Description	Date Identified /Reported	Date Resolved/ Opened	Duration of Service Impact	Comments
Examples – Fiscal 2020 (April 1, 2019 to March 31, 2020)					
West Kelowna	**Station transformer kiosk hit by car**	**February 9, 2020**	**February 20, 2020**	**11 days**	**Special part order required**
Coquitlam West	**Technical/Equipment Failure**	**June 12, 2019**	**June 12, 2019**	**<6 hours**	**Charge Engine Failure Requiring Full Station Swap**
Langley	**Technical/Equipment Failure**	**September 24, 2019**	**September 25, 2019**	**<24 hours**	**Full Station Swap Required**
Hope	**Safety Concern**	**November 13, 2019**	**November 15, 2019**	**<48 hours**	**Arcing at meter base/conductors replaced**
Examples – Fiscal 2021 (April 1, 2020 to March 31, 2021)					
Hope	**Cable theft/vandalism**	**October 28, 2020**	**October 28, 2020**	**<6 hrs**	**Spare parts on hand / same day repair**
Vancouver Marine Drive	**Attempted cable theft/vandalism**	**January 15, 2021**	**January 15, 2021**	**<6hrs**	**Spare parts on hand / same day repair**
Coquitlam East	**Attempted cable theft/vandalism**	**January 16, 2021**	**January 16, 2021**	**<6 hrs**	**Spare parts on hand / same day repair**
Ucluelet	**Site Accessibility**	**June 5, 2020**	**June 16, 2020**	**11 days**	**Parks Canada Closure due to COVID**
Rogers Pass	**Environmental (Contaminated Soil Remediation)**	**September 16, 2020**	**September 17, 2020**	**24 hours**	**Planned soil remediation work resulting in 24-hour outage**

20.0 Reference: Exhibit B-1, pages 34-35

1.20.1 Please explain the range of performance rankings that BC Hydro uses when assessing Proposed Rates using the Bonbright rate design criteria. For example, is "good" the highest performance rating and is "poor" the lowest performance rating?

RESPONSE:

BC Hydro typically assesses the Bonbright criteria from poor to very good, with poor being the lowest ranking and very good being the best ranking.

20.0 Reference: Exhibit B-1, pages 34-35

1.20.2 With respect to Bonbright Criteria #1 (Price signals to encourage efficient use and discourage inefficient use), would it be correct to say that the Proposed Rates do not reflect BC Hydro's marginal cost because they do not include/recover any marginal costs associated with the installation/operation/maintenance of the EV stations themselves?

RESPONSE:

BC Hydro does not believe the statement in the information request is correct.

The Proposed Rate do not reflect BC Hydro's marginal cost of electricity, because they are flat, time-based rates that do not vary with our marginal costs. For example, our marginal cost of capacity is higher during periods of peak demand (e.g., winter evenings) and lower during periods of weak demand (e.g., overnight); therefore, a time varying rate would have better economic efficiency than a flat rate.

BC Hydro does not consider the installation/operation/maintenance cost of the stations to be marginal costs. BC Hydro considered marginal costs as the costs (or savings) associated with one additional kWh or kW of output.

The installation/operation/maintenance cost of the stations themselves are largely fixed costs that do not change based on the electricity dispensed by the fast charging stations.

20.0 Reference: Exhibit B-1, pages 34-35

1.20.3 Would it be correct to say that the ranking of Proposed Rates performance is to some extent subjective, particularly when the assessment against an individual criteria involves multiple considerations (e.g. the Proposed Rates may be considered to result in a Fair apportionment of costs among customers in that they charge a higher rate for higher kW charging stations but not so in that overall the rates do not recover the full cost EV charging from the customers concerned)?

RESPONSE:

BC Hydro's view is that it is correct to say that the ranking of Proposed Rates performance is to some extent subjective. We view the Bonbright assessment as a helpful tool to illustrate trade-offs and considerations, and not a tool to provide precise measurement.

21.0 Reference: Exhibit B-1, page 37

1.21.1 The discussion regarding implementation of the rates includes "Configure each charging station individually with the applicable rate based on the power level of the station on the date of implementation". However, the discussion does not include any activities related to establishing infrastructure and processes required to determine customers' bills for use of an EV station or to collect payment from customers. Has this already been put in place and are the associated costs include in Scenarios 2 and 3 as set out in Table 3 of the Application?

RESPONSE:

BC Hydro has been working with our technology vendor to prepare and get ready the charging network/billing/payment system over the last two years to ensure it was ready when this application was filed.

Scenarios 2 and 3 in Table 3 are inclusive of the $8,000 per station per year in maintenance costs, of which costs associated with the billing and payments system are part.

22.0 Reference: Exhibit B-1, pages 37-39

1.22.1 Will customers be able to use a credit card to pay for their EV charging session if they do not have a mobile phone capable of "reading" a QR code sticker? If yes, how would this be accomplished?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.21.1 where we explain that BC Hydro has not pursued physical credit card readers for its fast charging stations as this would add additional cost and complexity.

22.0 Reference: Exhibit B-1, pages 37-39

1.22.2 With respect to billing option #4, will BC Hydro be charged by FLO or Chargepoint if EV customers pay using their services? If yes, what will be the charge to BC Hydro per charging event?

RESPONSE:

BC Hydro will not be specifically charged extra for a roaming transaction initiated via FLO or ChargePoint. BC Hydro's standard network transaction costs will apply.

Please also refer to BC Hydro's response to BCUC IR 1.20.1 where we explain the transaction fees (if any) associated with a charging activation option.

22.0 Reference: Exhibit B-1, pages 37-39

1.22.3 With respect to billing option #4, will EV customers be levied a surcharge by either FLO or Chargepoint if they pay using FLO's/Chargepoint's services?

RESPONSE:

Customers may be levied a surcharge at the discretion of the roaming provider if they use a non-BC Hydro activation method. This surcharge would be kept by the roaming provider.

At this time, BC Hydro is not aware of FLO or ChargePoint levying a surcharge when activating BC Hydro stations.

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.1 What is BC Hydro's commitment statement regarding the accessibility of its public fast charging sites to persons with disabilities?

RESPONSE:

BC Hydro is committed to incorporating accessibility into its public fast charging sites where possible and practical. BC Hydro has demonstrated this commitment by working with VEVA to document guidelines for public fast charging stations. These guidelines are provided as Attachment 1 to this response and are also available on BC Hydro's web site at: https://www.bchydro.com/powersmart/electric-vehicles/industry/fast-charging.html

A summary of guidelines to create a barrier-free and accessible station is on page 16 of the attached guidelines document.

New stations will be built with accessibility in mind and pursuant to these guidelines. Existing stations will be upgraded over time where possible and practical (generally when additional charging stations are added).

EV Fast Charging
Design & Operational Guidelines

FOR PUBLIC DCFC STATIONS IN BRITISH COLUMBIA

Published: March 2021
Version 1.1

CS-509

BC Hydro
Power smart

Prepared by:

BC Hydro Power smart

Powertech
The Power of Trust. The Future of Energy.

In consultation with:

British Columbia | cleanBC GO ELECTRIC

British Columbia | Ministry of Transportation and Infrastructure

DISCLAIMER

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Contents

Chapter 1: Overview

1. Welcome

Thanks for your interest in Direct Current (DC) fast charging stations. We're proud to power transportation electrification with clean and renewable electricity and support British Columbia's CleanBC goal of 100% zero emission vehicles sold by 2040.

We've been piloting and deploying EV fast charging stations since 2013 and we're sharing our knowledge and experience with other organizations in B.C. Although these guidelines are not intended as industry standards, they can help you avoid some of the challenges we faced. You may even want to build upon these guidelines and take the EV fast charging experience even further.

By working together to build an extensive, reliable, consistent and accessible public EV fast charging network, we can help remove barriers to EV adoption and accelerate the growth of zero emission transportation in B.C. We welcome your interest, support and feedback.

2. Background

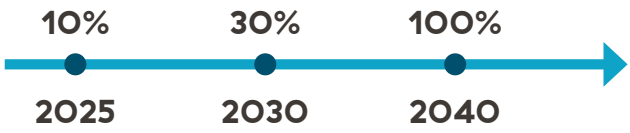
Electric vehicles are becoming an increasingly popular choice among consumers. In B.C. alone, the number of registered electric vehicles—which includes battery electric vehicles and plug-in electric vehicles—has grown from 5,500 at the end of 2016 to more than 50,000 by the end of 2020.

However, there is a long way to go before we meet the Province of B.C.'s Zero-Emission Vehicles (ZEV) Act. Potential EV owners are also concerned about their ability to charge conveniently. That means we need to work together to remove barriers to EV adoption and growth.

ZEV ACT

In 2019 the Government of British Columbia passed the ZEV Act, which requires all new cars and light trucks sold from 2040 onwards to be zero emission vehicles. ZEVs include battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV) and hydrogen fuel cell electric vehicles (FCEV).

ZEV sales as a percentage of new vehicle sales



PERCEPTIONS OF PUBLIC CHARGING

Concerns over charging—the perception that public charging stations are not conveniently located, for example—is one of the barriers to EV adoption[1].

Developing a robust, reliable and dense network of charging stations can address this concern and alleviate any anxiety drivers have that they can easily, quickly and conveniently charge whenever they need to.

[1] Understanding Potential for PEV Adoption in B.C.: A Consumer Lens, IPSOS (Oct 2019)

ABOUT THE GUIDELINES

Our fast charging station guidelines are based on what we have learned about selecting driver–friendly site locations, and designing and operating EV fast charging stations. As of February 2021, we've installed 93 DC fast chargers at 71 sites. We have evolved our approach by regularly consulting with our EV drivers.

These guidelines will be useful to any organization considering installing one or a network of fast chargers, such as:

- Municipalities or other local government entities
- Businesses wanting to operate their own stations or act as a site host
- Health authorities
- Post–secondary institutions
- Indigenous communities
- Airports
- Other government entities in B.C.

Installing fast chargers is a way to visibly display your commitment to innovation, sustainability and B.C.'s clean energy goals.

Chapter 2: A quick primer

"Always design a thing by considering it in its next larger context—a chair in a room, a room in a house, a house in an environment, an environment in a city plan." — Eero Saarinen

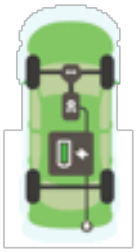
1. The customer journey

Although these guidelines are focused on public fast charging only, it is good to remember that the effort involved in locating and charging at a public fast charging station is only a small part of a driver's entire EV journey.

We need to consider how charging fits into the broader ecosystem of a driver's life and charging habits.

EV awareness	Think about buying an EV	Buying an EV	Choosing charging options	Charging an EV		EV end-of-life
	Discovery	Purchase	Installing a home Level 2 charger	Charging at home		
	Decision	Ownership	Preparing to use a public charger	Using a public charger		
				Level 1 and Level 2	DC fast charging	

If you decide to commit to this process, make sure to apply the customer lens to your evaluation and design work. The better you know your customers—the EV drivers you want to attract—the better your site selection, charging station design and utilization rate.



2. Electric vehicles

While there are currently four different electric vehicle technologies, this document will focus only on plug-in electric vehicles which include battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV).

"Plug-in electric vehicle" is the technical term that describes vehicles with a battery that can be charged by plugging into an electrical source. Unlike conventional hybrids which generate electricity through regenerative braking, plug-in electric vehicles need to connect to a charging source in order to charge. Across the electric vehicle community, "EV" is the accepted generic term for plug-in electric vehicles.

See **Appendix 1** for more information about different electric vehicle technologies.

3. Charging

There are different power levels for charging; the higher the power level, the less time it takes to charge. Charge times can vary from 15 minutes to 20 hours depending on the type of EV you are driving and which power level you are using to charge.

All EVs have what is called a 'J plug' (J1772), which is used for Level 1 and Level 2 charging. Alternating current (AC) is delivered to the on-board charger in the EV and it is converted to direct current (DC), which charges the battery. For fast charging, the AC to DC conversion is done within a DC fast charger because an on-board charger capable of that conversion would be much to large for an EV. For DC fast charging, there are currently two types of plugs available:

- **CCS** Used by most manufacturers including BMW, General Motors and Volkswagen.
- **CHAdeMO** Used by Mitsubishi and Nissan. While Tesla has a proprietary plug, it can use CHAdeMO or a J plug with an adapter.

Here is an overview of different charging levels and plug types in use across North America:

Level 1 Wall outlet charging	Level 2 AC charging	DC fast charging
○ Power output: 1.4kW ○ Involves plugging EV into a standard 120V wall socket	○ Power output: 6.6 to 7.2kW ○ Requires single-phase power input at 208V or 240V	○ Power output: 25 to 350kW + ○ Anything above 50kW requires 3-phase high-power input
 Wall outlet	 J1772 or 'J plug'	 CCS  CHAdeMO

See **Appendix 2** for details.

4. What solution is right for you?

Before proceeding down the path of selecting site locations and designing charging stations, it is useful to spend some time thinking about your overall strategy, whether you are planning to install a single charging station or a network of them.

WHAT ARE YOUR BROADER ELECTRIFICATION GOALS?

- Are you trying to remove barriers to EV adoption and grow demand for charging?
- Do you want to support your organization's green goals?
- Is this part of a broader initiative to integrate EVs with other forms of electrified transportation such as e-bikes, taxis, car-sharing, ride-hailing, buses, light rail, etc.?

HAVE YOU DONE AN ORGANIZATIONAL AND FINANCIAL ASSESSMENT?

- Do you have the financial resources and capacity to meet at least a 10-year commitment?
- What cost recovery or subsidization model have you considered? Sustainment, operations and maintenance of fast charging stations requires sufficient annual budget.
- Do you have the human resources, expertise and capacity to manage your fast charging stations or administer and manage vendor contracts?
- What will you want to do in-house versus out-source to another vendor? Think of functions like customer support, maintenance and repairs, network management, etc.

It is also useful to think about how you want EV drivers to use and interact with your charging station. Knowing your goals and knowing who you are trying to attract to your station will result in a better utilization rate.

Here is a comparison of different charging levels, their characteristics and what they're best suited for:

	Level 1 Wall outlet	Level 2 AC Charging	DC fast charging
	Best suited for at-home charging	Best balance when it comes to charging speed, cost and time—whether at home, work or at a public site	Best for drivers who need to quickly come and go
Use case	Best for overnight charging at home due to the slow charge rate	Best for destination charging where EV drivers can leave their vehicles for a few hours (e.g. at work) or where the station host wants drivers to stay onsite (e.g. shopping mall)	Best for en route charging where the goal is to charge quickly so EV drivers can get back on the road as soon as possible
Location	Due to the slow charge rate, Level 1 charging might be more suitable for locations such as long-term airport parking, workplaces or park and ride	Ideal locations include workplaces, shopping malls, recreation centres, movie theatres, arenas and tourist destinations	Generally located along highways and main thoroughfares
Charge times[2]	Ten hours of Level 1 charging will add about 70 km of range	2.5 hours of Level 2 charging will add about 100 km of range	Generally, 30-40 minutes at a DC fast charger will add about 100 km of range The rate of charge will drop to a trickle at some point; for many EVs this is when the battery is 85% full
Customer experience & driver obligations	EV drivers without a dedicated wall outlet in their parking spot will often use an extension cord to bring power from a nearby wall outlet (with permission from the outlet's owner, of course)	The maximum acceptable charging time at a Public Level 2 charger is four hours This means it is acceptable for drivers to leave their vehicles while they go shopping, see a movie or go for a workout EV drivers are encouraged to set a timer, or enable notifications from the charger network provider, so they don't overstay	The maximum acceptable charging time at a Public DC fast charger is 30-40 minutes at busy locations and if others are waiting Drivers should stay nearby in case there is an issue with the charger or if they need to move their vehicles to allow the next driver to charge Clear signage is helpful to remind drivers of good etiquette

If DC fast charging is right for you, please continue reading for recommended practices in selecting a site location, and designing and installing a driver-friendly site.

[2] Charge times can vary depending on a number of variables including EV type, battery state of charge, temperature, power output, etc.

Chapter 3: Design and operations guidelines

Before we take you through the process of selecting a site location and designing a fast charging station, we would like to remind you about a few things when it comes to budgeting for your site. While Federal (NRCan) and Provincial (CleanBC Go Electric) programs will fund a large portion of capital costs if you choose to leverage them, station owners need to budget for station operations for upwards of 10 years.

When you start putting together your budget for your site, be aware of potential fixed and variable costs with respect to installation and ongoing maintenance. The following is not meant to be a comprehensive list; only a reminder that it is important to consider balancing the elements of costs and revenue (should you wish to charge EV drivers to use your station) so that you can sustain your station over the longer term.

Carefully consider your design and equipment selection. The lowest capital cost option could potentially lead to higher operating costs or the need for future upgrades to address less than optimal design or equipment purchase decisions.

Potential costs		Potential contribution & revenue sources
Fixed ○ Hardware (fast charger, kiosk) ○ Fixtures (lighting, signage) ○ Installation costs ○ Electrical distribution system upgrades or extensions ○ Paving & stall painting ○ Design elements (branding, weather protection, seating, etc.) ○ Adequate insurance coverage	**Variable** ○ Energy costs (kWh and demand) ○ Customer support costs ○ Ongoing maintenance and repairs ○ Network management costs ○ Operations & issue management ○ Inventory & spare parts ○ Write-offs and replacement of equipment damaged or beyond repair	○ Federal (NRCan) & Provincial (Clean BC Go Electric) DCFC incentive programs ○ Price per charge (time-based)* ○ Parking fees ○ Branding & marketing ○ Utilization * Subject to Measurement Canada approval, kWh-based pricing may be an option in the future

1. Designing things right—what EV drivers want

Let's start with the most important element in site location and station design: EV driver experience. Make sure you include EV owners, both current and potential ones, in your consultation work to make sure that you create a good experience. Consider their needs and how they might want to interact with your station.

Our own consultation and engagement with EV drivers around fast charging revealed a number of important expectations and insights, which are summarized here. These insights are reflected in our guidelines for station location and design in the next section.

- **Growing B.C.'s EV charging network** Drivers want more stations and more chargers.
- **Operating a reliable charging network** Drivers expect chargers to be working all the time.
- **Considering driver experience & safety** Drivers appreciate a station that is safe and provides a good experience.

a. Growing B.C.'s EV charging network

"We need more fast chargers to cover the whole province and meet the needs of a growing number of EV drivers."

Drivers not only want stations in a greater number of locations but also want more than one station at a given location. Since some sites can be much busier than others, adding additional charging stations reduces wait times for drivers. Another important consideration is that drivers are looking to ensure that stations are installed along popular travel corridors to reduce anxiety about being able to charge while travelling. Ideally, stations should be spaced out in 80–100 km intervals along highway corridors.

Site locations should be examined in a broader context. For example, if a site's location is a junction for multiple corridors, you might want to consider not only the number of fast chargers at that site, but also supplementing the station with other chargers such as a Level 2 charger or a lower power 25kW unit. What you decide should align with the goals and objectives of

your station and your organization. What is the charging experience you want to create? Do you want EV drivers to stay longer at your site or do you want to encourage a quick charge?

b. Operating a reliable network

"Fast charger was down again. I had to settle for a Level 2 which meant having to cancel plans to see a movie with my son."

EV drivers expect chargers to be working when they arrive at a station to charge. A non-operational charging station can erode EV driver confidence not only in the site host but also in the public charging network. Make sure you provide robust maintenance and service support and prioritize consistency in experience across the charging network.

Here are some of the activities to think about (see **Operating a Station** in the next section for a complete list):

- Keep equipment well-maintained; do regular inspections and cleaning
- If possible, install more than one charger at a station location or ensure that there are alternative charging options close by if a dual charger station is not an option
- Be available (or have your vendor available) to help 24/7 and provide a way for EV drivers to call for help or to report a problem
- Ensure repairs are done on a timely basis

c. Considering driver experience & safety

"I like when I can grab a coffee or run some errands while I charge."

A preferred driver experience can be created by selecting a site with the following elements[3].

i. Proximity to amenities

For many EV drivers, "waiting time is wasted time" and they would like something to do while they charge or wait to charge. Choose a site location that is within walking distance to shops, banks, washrooms and other amenities. Also ensure there is cellular coverage in the area.

ii. Safety

It is important to think about driver safety as they get out of their cars to charge or if they decide to wait in their cars while they charge. Considerations include adequate lighting, security and open sight-lines.

iii. User experience

This covers a broad area of how drivers will interact with your station including what they will need to activate a charge such as a mobile app or RFID card, how they will pay to charge, and how you will enable out-of-town drivers to charge, etc.

iv. Etiquette

A scan of PlugShare[4] comments will quickly reveal driver frustrations over charging behaviour. A lack of awareness of proper EV charging etiquette can lead to conflict between some EV drivers. For example, more than 30 per cent of EV owners have had another EV driver unplug, or attempt to unplug their vehicle while it was charging at a public station. In addition, 24 per cent have experienced extreme frustration when other EV drivers use a public fast charger to fully charge their vehicle[5]. One way to address etiquette concerns is to include etiquette reminders either as part of station signage or on stickers placed directly on the chargers. See **Appendix 3** for suggested etiquette rules.

v. Accessibility

A great station is a barrier-free and accessible station. Drivers have different degrees of accessibility needs so make sure you are not inadvertently creating any barriers that will make it difficult or impossible to use your stations. We have chosen to embed accessibility considerations throughout our suggested design guidelines but have called them out in a section under **Designing a fast charging station**.

[3] BC Hydro focuses on selecting station sites with amenities already in place as it does not have the mandate to build amenities.
[4] PlugShare is a comprehensive database of electric vehicle charging stations in North America, Europe, and Asia. It has a number of features including enabling EV drives to find nearby charging stations, upload photos, sign-in and out of stations, and leave notes for other drivers.
[5] BC Hydro online survey of EV drivers in B.C. (August 2019).

2. Overview of the installation process

Planning the installation of an EV charging station requires coordination between a number of local groups including the site owner, governing authorities, the utility provider and contractors.

The following is a summary of the steps involved in the implementation of a new charging station along with what each section will cover:

- **Choosing a site location** A list of features to look for when selecting the right location to install a charger.
- **Designing a station** Recommended design elements to help create a driver–friendly place to charge.
- **Putting it all together** A few sample layouts that incorporate our recommended design elements.
- **Selecting vendors and contractors** Questions you might want to ask when hiring the right people to operate your station.
- **Operating a station** Service level recommendations for each of the activities needed when operating a reliable, user–friendly station.

a. Choosing a site location

When you are deciding where to install chargers it helps to assess potential locations against a number of criteria. Create a shortlist of potential site locations and evaluate them against this set of criteria we've created for you.

See **Appendix 4** for a checklist you can take with you as you evaluate your sites.

i. Driver experience

A good driver experience can be created by selecting sites that are close to amenities, are safe and allow drivers to easily access them.

Proximity to amenities

- **Refreshments** Can drivers grab something to eat or drink nearby?
- **Shopping** Can drivers quickly run some errands like shopping or banking?
- **Washrooms** Are public washrooms close by? Consider the needs of drivers and any passengers they might have with them.
- **Cellular coverage/Wi–Fi/Hotspot** Is there network coverage? Access to cell coverage or Wi–Fi might be needed when activating a charge or calling for assistance.

Personal safety

- **Lighting** Is the general area well–lit?
- **Open sightline** Is the site clearly visible to vehicles and pedestrians passing by and not hidden behind buildings, vegetation, etc.?
- **Foot traffic** Is the area frequented by pedestrians or other passersby?

Tip One method to assess personal safety is to visit the site after dark. Determine if this would be a location where EV drivers would feel comfortable getting out of their vehicles to charge or sitting in their vehicles while charging.

Access

- **24/7/365 access** Are EV drivers going to be able to access the chargers at all times?
- **Enroute convenience** Is the charging station close to main travel routes, highways or thoroughfares in your community?
- **Ingress/egress** Will EV drivers be able to easily drive in and out of the site?

ii. Space requirements

- **Space to charge** Do you have a minimum of 1.5 stalls per charger to accommodate charging equipment and accessibility requirements?
- **Room to expand** If demand regularly exceeds capacity, is there room to add additional chargers?
- **Space for other equipment** Is there room for additional lighting, signage, etc.?

iii. Power supply

As part of this process, you will need to contact your local utility to help you with the following:

- **Power** Consult your equipment suppliers to determine how much power you will need to operate your charger(s), lighting, etc. Fast chargers with a power output of 50kW or more typically require a 3-phase power input.
- **Access to power** Determine if the proposed location for your chargers has good access to the existing electrical distribution system. If not, you may need to budget for the cost of an electrical service extension.
- **Capacity** Ask about the capacity of the local utility transformer to feed power to your site. If there isn't enough capacity, you may need to budget for the cost of a transformer upgrade.
- **Reliability** Ask about grid reliability.
- **Energy costs** Gather information about how much it will cost to power your site. Build in a range for light, medium and heavy usage. Ask if your utility offers time-varying or EV charging-specific rates.
- **Voltage** Be aware that available voltage from Canadian utilities may be different than from American utilities. Purchasing a charger designed for US distribution voltages (e.g. 480V) may require a new or additional transformer downstream of the utility transformer.
- **Electrical design standards** Your local utility representative will direct you to the applicable design standards for ensuring your electrical equipment can be properly connected to the power distribution grid. For electrical design standards that apply after the meter (on the customer side), consult the Canadian Electrical Code.
- **Other applicable codes and standards** Be sure to work with qualified professionals, such as certified electricians and engineers who are well-versed in designing charging stations.
- **Permitting and safety inspection** Before you start construction, consult your utility, your local municipality and Technical Safety BC to understand what the permitting and inspection requirements are for your fast charger project. An electrical permit is always required. Additional permits may include a Street Use Permit, a Traffic Management Plan, and in some cases, a Business Permit. Before a site can open to the public, it must pass a final safety inspection.

iv. Community planning

Ideally, your new EV charging station will dovetail with existing and long-term plans for the surrounding community.

- **Development** Will the proposed station fit in with future development plans for the area? Will the charging station help trigger a transformation in the area? Will you need to re-zone a specific area as part of a land-use planning exercise? It is expensive to relocate a DC fast charging station so think about what the area might look like at least 10 years into the future.
- **Economic growth** How well will your new station align with the longer term economic development plans for the community? Will it drive traffic into the commercial core as part of a Downtown Beautification Plan? Or will it be located close to a highway rest stop with a locally owned coffee stand with access to public washrooms?

v. Back-up charging

Are there Level 2 charging stations nearby to allow EV drivers to charge and get back enroute, if the charger breaks down? If not, consider installing your own Level 2 charger as a back-up.

Focus on Level 2 chargers—how they can play a role in the charging experience

Here are some guidelines around how best to incorporate Level 2 charging into the fast charging experience.

- Include a Level 2 charger in your fast charging station when there are no other charging options within 2 km.
- Even when a fast charging station design includes more than one fast charger, a Level 2 charger should still be included.
- After a certain point in the charging process, fast chargers slow down considerably. It is faster to switch to a Level 2 charger at this point if EV drivers need to reach a 100% charge; if they are planning to go on a long trip, for example. This will also have the benefit of freeing up the fast charger for another driver.
- Level 2 charging is an option for electric vehicles that are not supported by fast charging, such as PHEVs.

b. Designing a fast charging station

No matter which layout you choose, we recommend that you think about incorporating the design elements we've outlined in this section. We also recommend installing more than one charging unit as sites with only one fast charger will have much higher operating costs.

Note: See **Appendix 5** for sample technical specifications for the equipment included below (main switch kiosk, lighting, wayfinding beacon, informational signage, concrete pads and bollards).

i. Safety & security features

Personal safety

- **Station placement** Install charging stations in high pedestrian and/or high vehicular traffic areas with open lines of sight to provide natural surveillance.
- **Lighting** If there isn't enough proximal lighting, you will need to install lighting directly above the charging station to ensure the station is well-lit at night. Install pedestrian scale LED lighting with cut off fixtures. Some recommendations for minimum lighting requirements include:
  - Face of charger 108 Lux measured out to a distance of 1.5 metres. Beyond 1.5 metres, extend the arc to a total distance of 18 metres at 32 Lux.
  - Back and sides of charger 32 Lux measured out to a distance of 18 metres.
- **Surveillance** Including surveillance should help drivers feel safer and could help protect the equipment from vandalism.
- **Signage** Include emergency contact numbers for drivers and consider signage stating that the charging station does not contain any high value metals if the station is going to be located in a criminally active area.
- **Landscaping** Keep the ground vegetation in proximity to the charging station to maximum of two feet. Prune the trees in proximity to the station up to a minimum of eight feet. Make sure vegetation management is included in your charging station maintenance plans.

Equipment safety

- **Bollards** Install bollards to provide equipment protection. Make sure they are bright and reflective so they are highly visible to drivers. Also ensure the distance between bollards is close enough to protect the charger from vehicle damage but also wide enough to provide an accessible path to the charger. A distance of 1.2 metres (4 feet) to 1.7 metres (5.5 feet) between bollards should achieve both goals.
- **Wraps** Consider wrapping your charging station with anti-graffiti film.
- **Concrete pad** When using a precast concrete pad for a fast charger, the pad is elevated flush with grade so as to not make it difficult for a driver in a wheelchair to reach the screen or charging cables.

ii. Signage and communication

- **PlugShare and ChargeHub** We recommend you register your station on the following third party EV station listing websites and apps: PlugShare and ChargeHub. Include descriptive elements such as photos of your site and equipment, address, exact map location, support phone number and instructions on use.
- **Wayfinding** It is helpful to have roadside signage that points drivers in the right direction or alerts them that a charging station is nearby. This reduces EV drivers from needing take their eyes off the road to search for nearby stations and raises awareness of the existence of a fast charging network to prospective EV purchasers. Ideally, each fast charging station has at least four wayfinding signs.

When it comes to roadside signage, note there is a difference between provincial highway and municipal road signage:

Highway wayfinding

Ministry of Transportation & Infrastructure (MOTI) allows highway signs for charging stations 50 kW and above. Signage is subject to location-specific approval.

Municipal Wayfinding

Municipalities, on the other hand, have jurisdiction over signage within their boundaries. Contact your local municipal office for more information.

See **Appendix 6** for more information.

- **Beacons** It is also helpful to have a prominent identifier that drivers can see when they arrive at a location, so they can easily locate the charging station from across a parking lot or reduced sight-lines (such as trees blocking the view). A back-lit beacon helps highlight the station at night. The beacon should be aligned to the identity of the charging station operator.
- **Stalls** Paint stalls with clear signage, such as an EV charging symbol, to indicate that the stalls are for EV charging only.

- **Maximum charging time** It is recommended to post signage reminding drivers to keep their charging time within the maximum allotted time. While 30-40 minutes is generally considered the maximum acceptable charging time for a single 50kW charging station, you can consider adjusting this time based on the power level and number of chargers at your station. As the number of chargers at a station increases and queuing drops or disappears , you could even consider eliminating the time limit altogether.

Here are some suggestions for maximum charging times at stations with two and four chargers:

Power level	Max charge time at two-charger stations	Max charge time at four-charger stations
25kW	60 minutes	90 minutes
50kW	40 minutes	60 minutes
100kW	30 minutes	40 minutes
200kW	20 minutes	30 minutes

- **Charging instructions** Drivers may need instructions on the steps they need to take, and in what order, to charge their EVs.
- **Roaming** Stations that support activation via networks other than the base network for the station reduces barriers for activation from drivers from other jurisdictions. Signage should highlight all the networks that the charger supports. Currently the BC Hydro EV, FLO and ChargePoint networks all have roaming interoperability.

BC Hydro EV app

FLO

ChargePoint

- **Pricing information** Provide clear information about how much it costs to charge (unless it is free) and if parking is extra (though drivers may not like having to pay for parking in addition to paying for charging).
- **Etiquette** Drivers sometimes need to be reminded of good charging behaviour. See **Appendix 3** for a list of common etiquette rules.
- **Driver support** Be sure to provide a way for drivers to get help and to report charging station issues. It might be helpful to include the address of the station as well.

Tip Consider including some of the above elements in a sticker that can be placed in a prominent location on the charger or on an information panel. See **Branding & identity** below to see the station sticker BC Hydro created.

iii. Branding & identity

Station branding is not just the physical wrapping of a charger but also represents the overall identity of your organization and how it supports B.C.'s growing EV charging network. When you brand the physical experience of your station, ensure all of the other elements of the driver experience are aligned: accessibility, amenities, customer support, website or app, station reliability and regular maintenance.

If you decide to brand your chargers, remember that this represents a visual deployment of your strategy and you will want to ensure that your ability to deliver a good driver experience is aligned with brand quality. Be mindful of the EV driver experience you want to create and how you will maintain this long-term.

BC Hydro example

The BC Hydro EV charging network has a consistent look and feel. For example, we wrap our fast chargers to align with our branding and marketing messages. We also align our mobile app, website and customer service and other EV programs to this experience.

Charger wrap	Mobile app	Station stickers	Outreach vehicle
			

Petro-Canada example

In late 2019, Petro-Canada completed a network of electric vehicle fast charging stations across Canada at its locations along the Trans-Canada, called the Electric Highway™.. The chargers are capable of charging at a rate of up to 350kW (CCS) and 100kW (CHAdeMO). Drivers have the choice of activating a charge either through a custom Petro-Canada EV app, or through contactless payment on the charger. The stations feature an illuminated canopy and charger to provide ample lighting, as well as access to amenities such a stores, restaurants and car washes at selected retail locations.

LeadingAhead Energy example

LeadingAhead Energy has built a demonstration station in Squamish, B.C. that incorporates best practices in accessibility and barrier-free station design. The overall identity of the station includes Coast Mountain visual elements. LeadingAhead Energy uses the open protocol startup network, SWTCH.

Photo credit: Fast charging station in Squamish B.C., LeadingAhead Energy, 2020.

iv. Other elements to improve station experience

- **Grade** Ensure the entire area, including the charger, is on grade. Some drivers might experience difficulty transporting the charging cable even if there is a minor slope.
- **Surface** The parking stall and area around the charger must be paved so that it doesn't hinder movement, particularly if the driver is in a wheelchair or if the driver has other mobility issues.
- **Weather protection** If you are choosing to install a charging station outside and if you have the budget for it, consider providing weather protection for drivers while they are charging or waiting to charge. Ensure there is clearance from the roof or ability to open the roof when you need to crane chargers in and out.
- **Other fixtures** Consider adding fixtures such as garbage and recycling receptacles or other assets that are valuable to drivers such as a place to sit. Each additional fixture should be added to your ongoing operating cost to ensure proper and ongoing maintenance.
- **Cable management** Charging cables can be damaged by drivers who do not not put them away properly. And when left on the ground, they can pose a tripping hazard. Cables also need to be long enough to reach an electric vehicle's charge port which adds weight to the cable. Cables will also get heavier with higher-powered charging stations. This creates challenges for drivers who struggle with the weight of the cables or those who use mobility aids. Prolonging the life of cables and improving user experience can be addressed by installing a cable management system, like the ones at certain gas stations where the cable retracts when not in use.

Focus on barrier-free and accessible station design elements

Here is a summary of guidelines to create a barrier-free and accessible station*:

- **Bollards** A distance of about 1.2 metres (4 feet) to 1.7 metres (5.5. feet) between bollards should protect the charger from damage and allow for access to station. Also ensure there is enough space around the charger to be able to manoeuvre a wheelchair, for example.
- **Surface** The parking stall surface and the area around the charger should have a firm, slip-resistant and level surface using concrete or asphalt. Do not use gravel.
- **Concrete pad** When using a precast concrete pad for a fast charger, the pad should be elevated flush with grade so as to not make it difficult to reach the screen or charging cables. If the concrete pad cannot be flush with the grade, consider an access ramp.
- **Signage** All signage and instructions for using the charger should use a clear and easy-to-read font.
- **Accessible stall dimensions** If you have the space, ensure the stall is at least 3.7 metres (12 feet) wide which includes at least 1.5 metres (5 feet) for entering and leaving a vehicle. This will provide adequate space for parking and an access aisle for reaching the charger. Even if your stall is an accessible one, it is not necessary to paint an "accessibility parking space marking" in the stall. This way, the charging stall will remain open to all drivers wanting to charge.
- **Charger** Purchase a charger that meets US ADA requirements of placing the screen, holster and cables at a more accessible height.

* Our list is not an exhaustive one so be sure to take the time to consult any relevant municipal, provincial or federal accessibility codes and guidelines as they are being updated regularly.

c. Putting it all together—sample layouts

Now that we have provided guidance around selecting an ideal site and designing a user-friendly station, here are some station layouts that incorporate the design elements described in the previous section.

Although fast chargers can be installed curbside, in parkades and surface lots—see **Appendix 7** for an overview of common layouts, their attributes and challenges to designers and drivers—we will focus on some surface lot configurations.

- Pull-in, chargers in front of stall
- Pull-in, chargers in between stalls
- Pull-through

For each layout, we provide a "before" and "after" illustration to give you an idea of what changes and upgrades need to be made.

i. Pull-in, chargers in front of stall

This layout is a good choice for a surface lot location. Although we've provided a two-charger configuration, this design allows you to add additional chargers.

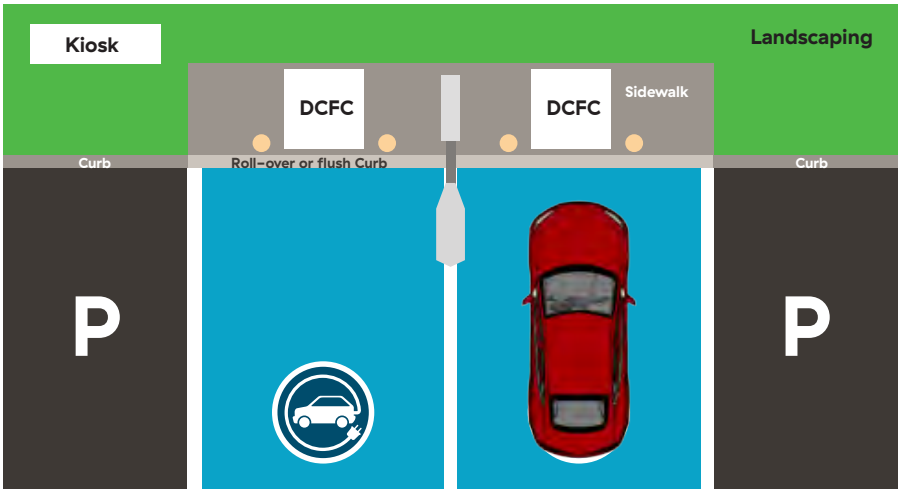
BEFORE CONSTRUCTION

Here is how the site might look like before construction as well as a list of upgrades you should consider making to it:

List of upgrades

- Install two chargers
- Convert three stalls into two accessible-sized ones
- Replace existing curb with a roll-over or flush curb to make it easy to access the chargers
- Place chargers on paved, on grade surface to enable accessibility
- Install bollards to protect the chargers
- Paint stalls and add an EV charging logo to indicate stalls are for EV charging only
- Add overhead lighting
- Add informational signage

AFTER CONSTRUCTION (BIRD'S-EYE VIEW)



AFTER CONSTRUCTION (PERSPECTIVE)

See **Appendix 8** for detailed specs.

ii. Pull–in, chargers in between stalls

Similar to the pull–in design above, this layout is also a good choice for a surface lot location. Instead of chargers at the front of the station, this one has chargers in between stalls. If you have three stalls, you can create one regular and one accessible stall. If you have four stalls, you can create a fully–accessible station without having to install a roll–over or flush curb to enable easy access to the chargers.

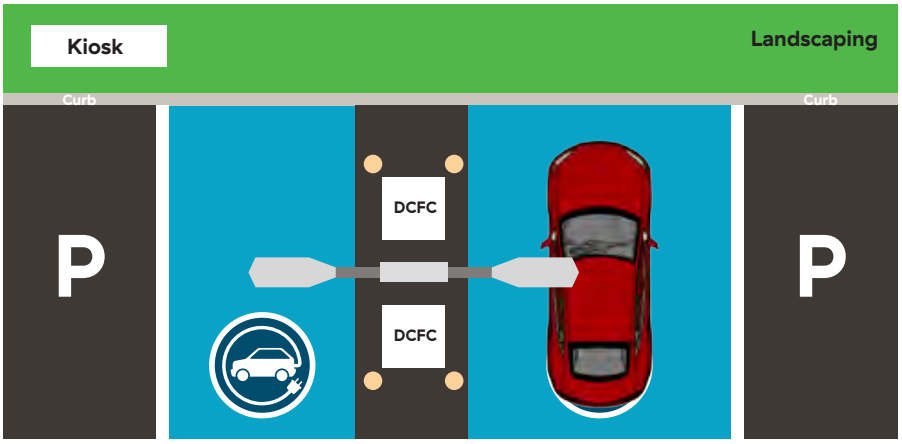
BEFORE CONSTRUCTION

Here is how the site might look like before construction as well as a list of upgrades you should consider making to it:

List of upgrades

- Install two chargers
- Convert three stalls into one regular–sized stall and one accessible–sized stall (if you are able to take four stalls this will enable you to create two accessible–sized stalls)
- Place chargers on paved, on grade surface to enable accessibility
- Install bollards to protect the chargers
- Paint stalls and add an EV charging logo to indicate stalls are for EV charging only
- Add overhead lighting
- Add informational signage

AFTER CONSTRUCTION (BIRD'S–EYE VIEW)



AFTER CONSTRUCTION (PERSPECTIVE)

See **Appendix 9** for detailed specs.

iii. Pull-through

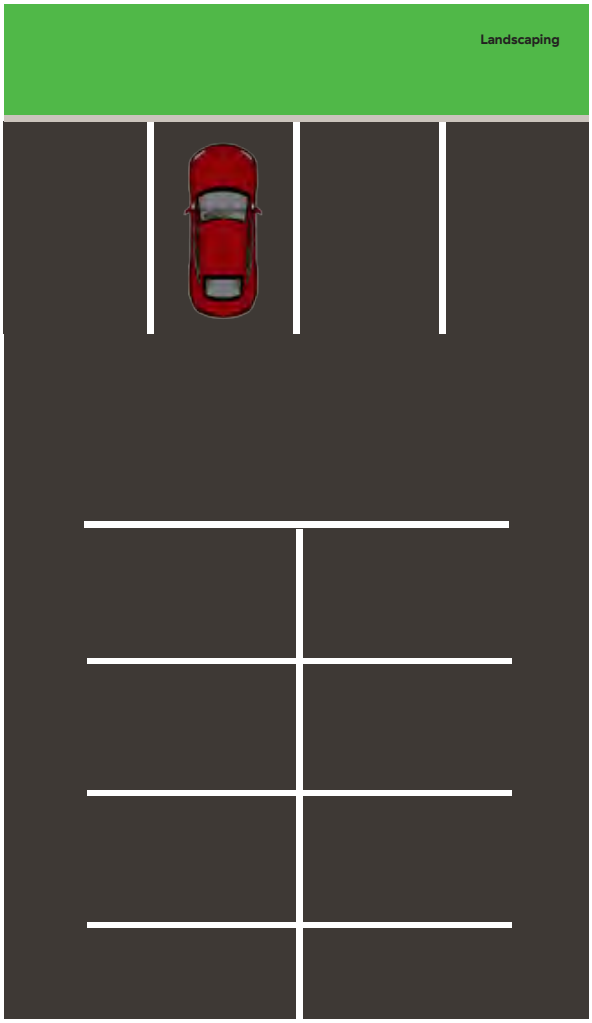
If your site has the room for it, a pull-through design is great option. It can accommodate larger EVs like pick-up trucks or EVs pulling trailers. Much like gas stations, drivers can easily park on the side where the station is closest to their vehicle's charge port. It can also easily accommodate accessibility requirements.

Here is how the site might look like before construction as well as a list of upgrades you should consider making to it:

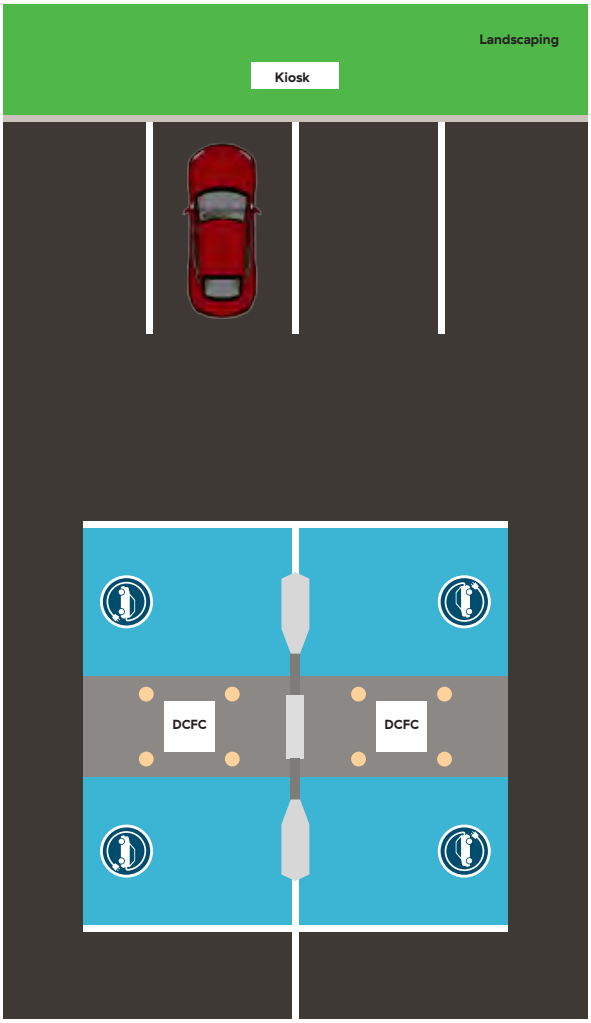
List of upgrades

- Install two chargers
- Convert six stalls into two accessible pull-through lanes
- Place chargers on paved, on grade surface to enable accessibility
- Install bollards to protect the chargers
- Paint stalls and add an EV charging logo to indicate stalls are for EV charging only
- Add overhead lighting
- Add informational signage

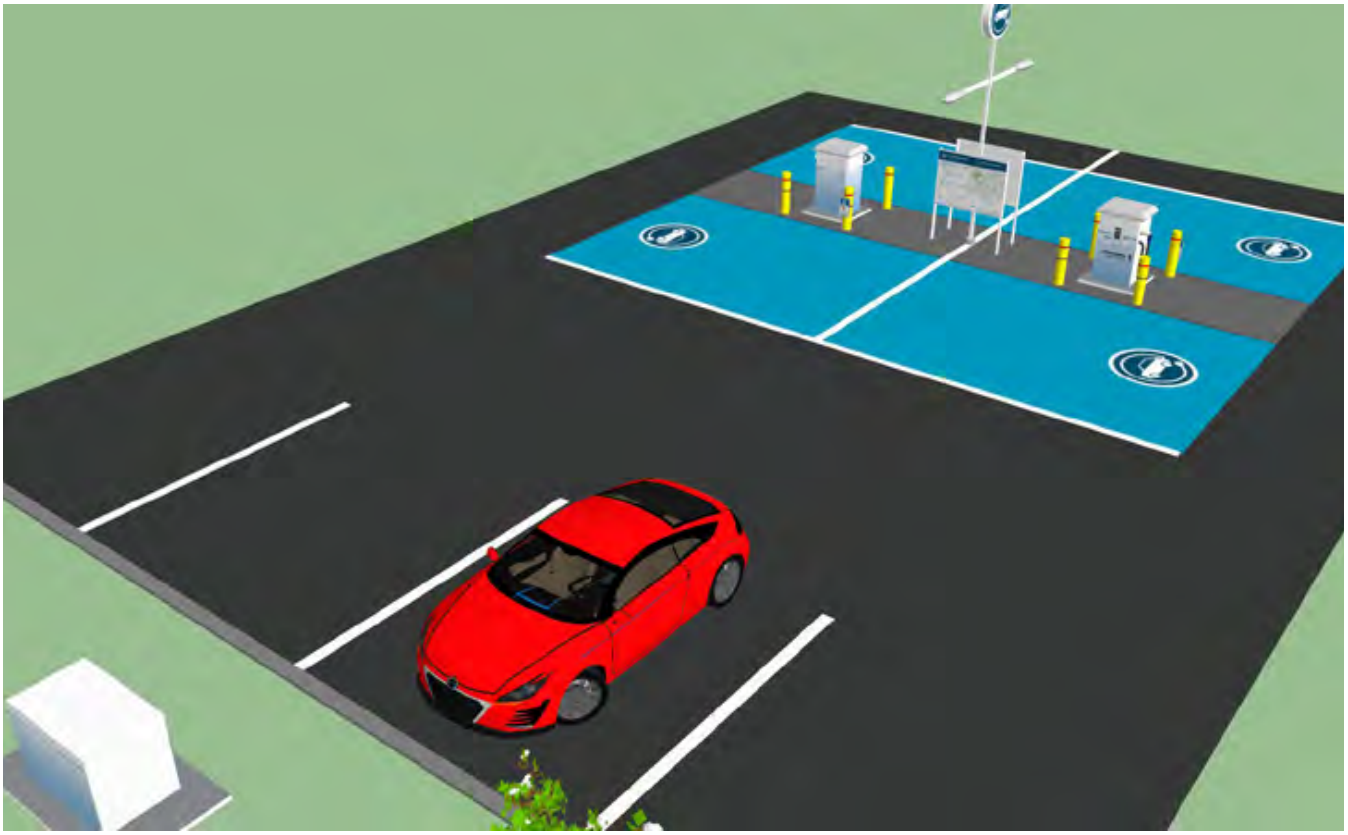
BEFORE CONSTRUCTION



AFTER CONSTRUCTION (BIRD'S-EYE VIEW)



AFTER CONSTRUCTION (PERSPECTIVE)



See **Appendix 10** for detailed specs.

d. Selecting vendors and contractors

As you go about selecting which vendors will supply the hardware and services and which contractors will help you assess, install and maintain your charging station, you should decide which part(s) of the operations you intend to outsource after your charging station is installed. See the next section on **Operating a fast charging station** for a list of ongoing maintenance and support tasks.

To help you with your vendor selection process, see **Appendix 11** for procurement example.

i. Selecting an EV charging equipment vendor

Tip Always make your hardware and network selections in tandem as they are mutually dependent.

WHAT TO LOOK FOR WHEN EVALUATING A VENDOR

- Business is in good standing
- Track record of deployment in Canada
- Strong supply chain of equipment components
- Ability to provide range of services required (from basic to fully managed)
- Strong warranty program including firmware updates
- Ability to adhere to B.C. and Canadian laws and standards (e.g. electrical safety, privacy, security)

WHAT TO LOOK FOR WHEN EVALUATING CHARGING EQUIPMENT

- Meets or exceeds applicable electrical safety and engineering standards
- Durable enough to withstand frequent use and seasonal changes
- Can be serviced on-site (e.g. modular components)
- Spare parts available in B.C. and/or can be shipped within 24 hours for the life of the charger (at least five years)
- Cables, connectors and cable management built for durability, accessibility and reliability
- Supports multiple activation options—mobile app, RFID card, credit card—and works with selected network
- Accessible interface with easy-to-reach buttons, no screen glare (e.g. meets US ADA standards)
- Support of Open Charge Point Protocol (OCPP) and other standards as appropriate (**Note:** OCPP support within hardware does not guarantee automatic and seamless integration with your selected network. If your hardware and network vendors are different, you must hold them accountable to work together to ensure they meet service level requirements.)
- Upgradeable hardware
- Strong network connectivity and upgrade path (e.g. LTE today, 5G and OCPP 2.0.1 in the future)

ii. Selecting a network management vendor

Tip: Always make your hardware and network selections in tandem; they are mutually dependent.

WHAT TO LOOK FOR WHEN EVALUATING AN EV NETWORK VENDOR

- Proven network track record of network operations (EV driver-facing and operations)
- Solid product roadmap (e.g. proven track record of features and functionality enhancements)
- Multiple activation options (mobile app, RFID card, credit card)
- Roaming with other key networks in B.C. to make it easy for EV drivers (BC Hydro EV, FLO, ChargePoint, Greenlots & potential future ones)
- Privacy & security approach (stores data in Canada, adheres to B.C. privacy laws, has a strong cyber security practice)
- Flexible payment options including member-based options such as mobile app or card, one-time credit card use (either via website or physical credit card reader), call centre, roaming
- If you are looking for a fully-serviced network, the ability to manage the network end-to-end from call centre, operations/triage, case management, repair dispatch through to inventory management
- Ability to push remote firmware upgrades to chargers

Vertically integrated versus de-coupled solutions

There are two possible paths an EV station owner can take when sourcing vendors and equipment: vertically integrated versus de-coupled solutions. This is an important decision that will set the stage for your station operations, customer experience and costs for 5 to 10 years. The following table summarizes the pros and cons of each.

	Vertically integrated solutions	De-coupled solutions
Definition	Same vendor for both EV network (IT) and hardware (charger)	Same or separate vendor for EV network (IT) and hardware (charger)
Pros	○ One vendor relationship for both hardware and software ○ Packaged solution ○ Strong alignment, compatibility and service agreement between hardware and software ○ Less complexity for site owners with less experience or smaller networks ○ Generally large user base and high user experience built-in ○ Full service offering ○ Potential ability to purchase packaged white-label network solutions ○ Most vertically integrated solutions moving towards OCPP compatibility ○ Payment solution between hardware and software is fully aligned	○ Flexibility in choosing hardware and software from separate vendors ○ Choose service components à la carte ○ Ability to create your own network ecosystem ○ Potentially lower vendor cost if you have the internal resources to develop your solution and align hardware and software experience ○ All open standard solutions that are OCPP framework compliant ○ Offers potentially higher resilience if one network's connection is no longer available ○ Potential ability to purchase packaged turn-key solutions
Cons	○ Not as flexible (potentially unable to de-couple hardware and software) ○ Potentially higher vendor costs for full-service offering (lower internal resource cost) ○ Possibility of stranded assets if proprietary service terminated operations ○ Software customization features may not be possible or can be more difficult to realize for the owner (this is different from configuration options)	○ Hardware and software may not work perfectly together (even if both follow the OCPP protocol) if you don't buy a prepackaged turnkey solution. ○ Internal resource requirements to coordinate between vendors and handle technical issues (e.g. network or hardware firmware issues) ○ Payment solution between hardware and software may not be aligned and may require additional effort to align

iii. Selecting a contractor to manage the installation

A contractor should be able to do the following for you:

- Act as a general contractor with a proven ability to manage the details
- Determine voltage and amperage requirements of selected charging equipment
- Work with your local electric utility to verify electrical capacity for additional load and recommend any necessary property or electrical service upgrades
- Determine if communication to the equipment is required
- Estimate installation cost for installing charging equipment as per manufacturer guidelines
- Obtain local permit for installation
- Schedule the installation
- Coordinate with local inspector to validate installation
- Be certified to provide required services and approved by Safety Inspectors

e. Operating a fast charging station

Creating a consistent and reliable experience for EV drivers is key to supporting B.C.'s ZEV goals. Drivers expect charging stations to be operating and supported 24/7, 365 days a year. And if something does go wrong, drivers expect a quick resolution.

Here is a list of tasks involved in operating a station along with minimum and recommended service levels.

Category / Tasks	Minimum service levels	Recommended service levels
Maintenance		
Pro-active inspections ○ Wipe screen, check cables ○ Visually inspect charger, cables and station area ○ Conduct test charge with EV ○ Confirm parking lot lights are working	Monthly	Weekly: Urban / high-usage areas Bi-weekly: Less frequent usage areas
Graffiti removal	Within 10 days of being reported	Within 1 business day of being reported
Snow removal / salting	<24 hours ○ Plow lot any time > 15cm of snow falls	<12 hours ○ Plow lot any time >10 cm of snow falls ○ Hand shovel snow around charger, and salt around charger and on EV charging stalls
Spare part / inventory management ○ Ensure inventory of critical spare parts such as connector cables ○ Pro-active order of priority spare parts ○ Ensure backup plan for complete hardware failures or damage	Quarterly: Small fleet of stations Monthly: Larger fleet of stations	Monthly: Small fleet of stations Weekly: Larger fleet of stations
Emergency		
Public safety issue ○ Vehicle accident related to station ○ Charger or kiosk electrical safety issue	<15 minutes of report ○ Call fire department ○ If applicable, call BC Hydro to report emergency: **1 800 BCHYDRO**	<5 minutes of report ○ Call fire department ○ If applicable, call BC Hydro to report emergency: **1 800 BCHYDRO**

Category / Tasks	Minimum service levels	Recommended service levels
Repairs		
Repair Tier 1 ○ Charger is operational; minor repair is required ○ No safety issues; e.g. fan is loud and needs maintenance	Within 30 calendar days ○ Post a status message on PlugShare/ChargeHub within 3 business days	Within 10 business days ○ Post a status message on PlugShare/ChargeHub within 1 business day
Repair Tier 2 ○ Charger is functional but has network Issues ○ Minor electrical work needed ○ Fee not being charged	<7 days ○ Post a status message on PlugShare/ChargeHub within 1 business day	<48 hours ○ Repair triage same business day ○ Post a status message on PlugShare/ChargeHub within 4 business hours
Repair Tier 3 ○ Charger not functional ○ Major repair required	<2 days ○ Post a status message on PlugShare/ChargeHub within 1 business day	<24 hours ○ Repair triage same business day ○ Post a status message on PlugShare/ChargeHub within 4 business hours
Replace (beyond repair)		
Complete swap of DCFC or kiosk ○ Beyond reasonable on-site Repair Tier 3 ○ Full replacement/use of backup equipment	Station with only 1 charger: <30 days Station with at least 1 other working charger: <90 days ○ Station owner should have financial or insurance means to completely replace stations beyond repair within a reasonable time period	Station with only 1 charger: <24 hours (following Repair Tier 3 attempt) Station with at least 1 other working charger: <10 days ○ Assumes backup equipment available in inventory in B.C.
Network operations & station monitoring (utilization of system tools and dashboards)		
Remote monitoring	n/a, OR Within 2 business days if service is part of vendor service agreement	Customer-reported issues: <24 hours reactive ○ Investigate/triage: Use system tools (e.g. Network / hardware management systems) ○ Dispatch field staff to perform site check/test charge: Same business or next business day ○ Update social media platforms—Plugshare/ChargeHub: <8 hours ○ Dispatch electrical contractor as per Repair Tier categorization (see above)

Category / Tasks	Minimum service levels	Recommended service levels
Error notification	n/a, OR Within 2 business days if services is part of vendor service agreement	Network operator notification: <24 hours reactive ○ Review system tools/dashboards: Network/hardware management systems ○ Investigate/triage: Use system tools (e.g. Network/hardware management systems) ○ Dispatch Field Service Rep to perform site check/test charge ○ Update social media platforms—Plugshare/ChargeHub: <8 hours ○ Consult with charger manufacturer or network vendor, as required ○ Dispatch electrical contractor as per Repair Tier categorization (see above)
RFID/scanning	n/a, OR Within 2 business days if services is part of vendor service agreement	Customer-reported issues: <24 hours reactive ○ Review system tools/dashboards: Network/hardware management systems ○ Investigate/triage: Use system tools (e.g. Network/hardware management systems) ○ Dispatch Field Service Rep to perform site check/test charge ○ Update social media platforms—Plugshare/ChargeHub: <8 hours ○ Consult with charger manufacturer or network vendor, as required ○ Dispatch electrical contractor as per Repair Tier categorization (see above)
Customer support		
Contact centre hours and capabilities ○ Toll-free number ○ Able to remotely initiate charging session ○ Able to provide member/payment support	6 am – midnight, 7 days a week ○ Repair triage by next business day ○ Immediate emergency support	24/7, 365 days a year ○ Repair triage same business day ○ Immediate emergency support

Category / Tasks	Minimum service levels	Recommended service levels
Contact centre metrics ○ First call resolution % (FCR) ○ Average wait time in min (AWT) ○ Customer satisfaction top box score % (CSAT)	○ FCR: >60% ○ AWT: <5 mins average wait time ○ CSAT: 70% satisfied and very satisfied	○ FCR: >80% ○ AWT: <2 mins average wait time ○ CSAT: 85% satisfied and very satisfied
Crowd-sourced platform monitoring & response ○ PlugShare ○ ChargeHub	Within 1 business day ○ Monitor and respond to user comments and photos ○ Target to maintain PlugShare scores above 7.0	<4 hours M-F, next day weekends and holidays ○ Monitor and respond to user comments and photos ○ Target to maintain PlugShare scores above 9.0
Social media monitoring ○ Twitter ○ Others as applicable	○ Within 1 business day ○ Monitor user comments and photos ○ Proactively post/triage to other channels	○ Same day ○ Monitor user comments and photos ○ Proactively post/triage to other channels

Chapter 4: Planning for the future

Although it is difficult to predict with absolute certainty what the e-mobility industry will look like 10 to 20 years from now, all current forms of transportation will likely be electrified. If you want to ensure your charging stations remain relevant, you need to plan for emerging and future EV types and transportation markets.

Stations that are not upgraded to align to changing e-mobility environment will likely not be relevant after 5 to 10 years and will need to be decommissioned. Ensure you build upgrading or decommissioning costs into your business case.

Emerging EV-related scenarios and trends

- EV pickup trucks and SUVs
- Trailers that might be carrying recreational vehicles that also require charging (e-bikes, ATVs, snow mobiles or personal watercraft)
- Commercial fleet electrification
- Autonomous EVs
- Ride-hailing EVs
- Charging hubs that support all types of electric transportation
- 350kW fast chargers which can charge EVs in as little as ten minutes
- Wireless charging

EV fast charging station design and equipment will change over time

- Larger fast chargers—such as 350kW chargers—will likely not directly replace 50kW chargers. Larger chargers will have a higher impact on the distribution system and a separate process for assessment and connection will most likely be required by the Utility. To upgrade a station from 50kW to 350kW, assume you will need a complete rebuild. Also, these high power architectures will likely move toward centralized electrical equipment cabinets to allow for smaller footprint dispensers.
- Charger cables will look different as chargers get larger and more powerful. We may start to shift to using cables that are water-cooled. Charger cables may get longer or shorter depending on charger and vehicle technologies, and station layouts.
- Finally, charging locations and sites that are suitable for today's EV fleet may not be adequate in in the future.

Let's work together

We support the evolution of transportation electrification in B.C. This requires a coordinated effort across government, private sector and other organizations. Finding innovative solutions means bringing together the best ideas. We hope you find these guidelines helpful and welcome your feedback we evolve them over time.

Do you have questions? Email us at **evsupport@bchydro.com** or call **1 866 338 3369**.

Appendices

1. Electric vehicle technologies

Here is an overview of different electric vehicle technologies. However, these guidelines are applicable only to the first two: BEVs and PHEVs.

Vehicle type	How it works	Battery range	Other information
Battery electric vehicle (BEV or more commonly, EV)	A BEV is powered entirely by a battery and single or dual electric motors There is no gas back-up Has to be plugged into a charger	100 km for first generation BEVs and up to 600 km for today's extended range BEVs	BEVs can also recharge their batteries through regenerative braking. This means that instead of using the brakes, the electric motor(s) slows down the vehicle, captures that energy and feeds it back into the battery.
Plug-in hybrid electric vehicle (PHEV)	Runs mostly on batteries Has a gas-powered internal combustion engine that recharges the battery and/or replaces the electric motor when the battery is low and more power is required	Typical PHEVs drive for 30-80 km using only electricity before they start using gasoline, and can then drive for about 500 km depending on the size of the fuel tank	PHEVs are often cheaper and cleaner to run than traditional hybrid vehicles (HEVs) because they can be recharged by the power grid. You'll still need to buy gas—but far less frequently.
Hybrid electric vehicle (HEV)	Has two drive systems that run simultaneously: a gas-powered engine and fuel tank, along with an electric motor and a battery	Most HEVs have a range of about 900 km	HEVs should not to be confused with PHEVS. HEVs are not plug-ins, as they can't be recharged from the power grid.
Fuel-cell electric vehicle (FCEV)	Uses on-board fuel cells to generate electricity from hydrogen and oxygen to power an electric motor All the energy comes from hydrogen fuel	Today's commercially available FCEVs have a range of about 500 km	Takes a few minutes to refuel and emits only water from its exhaust.

2. Electric vehicle charging levels

Here is an overview of various EV charging levels, power requirements and where they are commonly found.

Charging level	Power	Time to charge	Used for	Comments
Level 1: Wall outlet charging	1.4kW output Requires standard 120V/15A wall socket 1.9kW available with a NEMA 5-20 plug on a 20A circuit	Charges 8 km/hour ○ BEV: 12-20 hours ○ PHEV: 6-12 hours	○ Home ○ Emergency charging	○ Typical household outlet
Level 2: AC charging	6.6 – 7.2 kW output Requires 208V or 240V power input	Charges 30-40 km/hour ○ BEV: 2-8 hours ○ PHEV: 1-2.5 hours	○ Home ○ Businesses ○ Common areas	○ Requires a 30A or 40A circuit, similar to those used by a typical household appliance such as an oven or clothes dryer ○ Requires installation by a qualified electrician
DC fast charging	25 to 350kW + output Requires 3-phase high-power input	Charges 200-250 km/hour at 50kW ○ BEV: 1-4 hours ○ PHEV: 15 min-3 hours	○ Businesses ○ En route charging ○ Common areas	○ Requires installation of DC fast charger (DCFC) ○ There are currently two types of connectors that connect DCFCs to vehicles: CHAdeMO (Japanese standard) and SAE Combo (USA standard) ○ Vehicles that don't have either of these two standard connectors need to purchase adaptors to charge at a DCFC

3. Etiquette

To come up with a list of etiquette rules, we reviewed PlugShare comments and polled a number of EV drivers to identify the biggest complaints around charging behaviour.

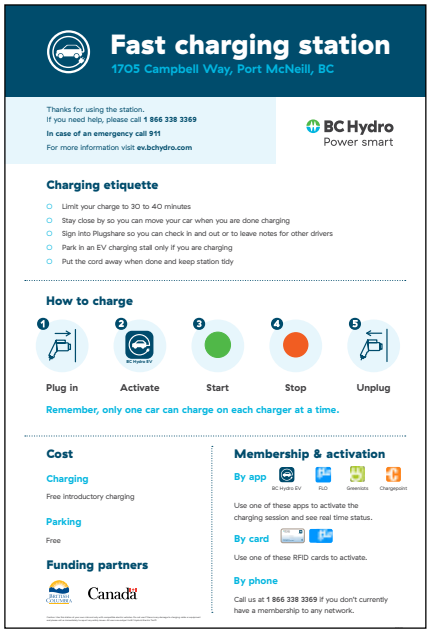
Here are our suggestions to help encourage good behaviour at charging stations:

1. Take only what you need, and limit your charge to 30–40 minutes[7]
2. Stay close by in case you need to move your vehicle to let someone else charge
3. Don't park in an EV charging stall if you're not charging or waiting to charge
4. Put the charging cord away, and keep the station tidy
5. Don't unplug others, unless there's a note that gives you the green light
6. Use PlugShare to keep others informed

BC Hydro examples

Charging station stickers

Information panel



[7] **Note:** This is our recommendation at fast charging stations, but the maximum charge time might vary based on the speed of the charge and how long you want people to stay.

4. Site evaluation checklist

Take this checklist with you when assessing potential charging station sites.

	Site 1	Site 2	Site 3
Driver experience			
Proximity to amenities ○ Refreshments ○ Shopping/banking ○ Washrooms ○ Cellular/Wi-Fi/Hotspot			
Personal safety ○ Adequate lighting ○ Open sightlines ○ Foot traffic			
Access ○ 24/7/365 access ○ En route convenience ○ Ingress/egress			
Space requirements			
○ Space for two chargers ○ Space for accessible stall(s) ○ Room to expand ○ Space for other equipment			
Power supply			
○ Access to power ○ Available capacity			
Community planning			
○ Future development ○ Economic growth			
Back-up charging			
○ Nearby DC fast charging ○ Nearby Level 2 charging			
Other accessibility requirements			
○ Surface is on-grade (no slope) ○ Surface is paved (or can be paved) ○ No curb (or curb can be removed)			

5. Station equipment—sample technical specifications

BC Hydro and Powertech Labs (see **Appendix 12** for more information about Powertech Labs) have evolved the technical specifications for fast charging station elements over the past six years.

In addition to a DC fast charger, you'll need:

- Main switch kiosk
- Lighting
- Wayfinding beacon
- Informational signage
- Concrete pads for the charger, kiosk and lighting
- Bollards

LIST OF FIGURES

Important—Engineer Review Required

The following designs are for reference only. Specifications for your particular station needs should be reviewed and stamped by a qualified engineer.

Main switch kiosk

The main switch kiosk cabinet provides space for a main breaker to disconnect electrical power to the charging station, as well as transformers to step down/up voltage to supply the DC fast chargers, station lighting and auxiliary loads.

Here is an example of a BC Hydro kiosk cabinet.

Figure 1: BC Hydro kiosk for EV charging station

On the next page, we include three, single-line diagrams for kiosk designs that we currently use.

- Design A – Suited for 600V incoming service
- Design B – Suited for 208V incoming service
- Design C – Future-proofed for higher-powered fast charging

DESIGN A — SUITED FOR 600V INCOMING SERVICE

Two 75kVA transformers supply two 50kW DC fast chargers, and one 3kVA transformer supplies auxiliary loads including station lighting, internal receptacles, and kiosk heating and cooling systems.

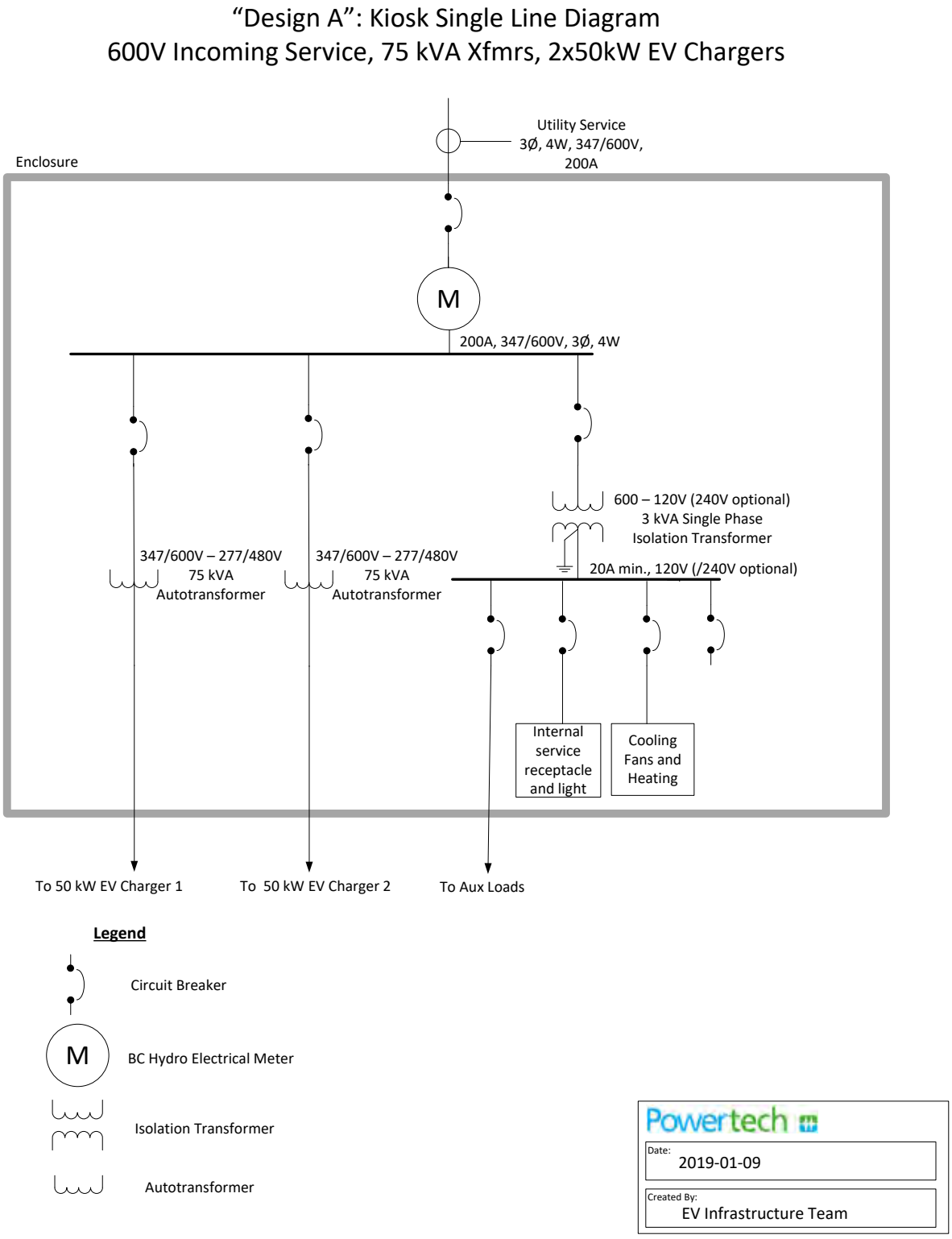


Figure 2: Kiosk design for 600V incoming service

DESIGN B — SUITED FOR 208V INCOMING SERVICE

Two 75kVA transformers supply two 50kW DC fast chargers, and one 3kVA transformer supplies auxiliary loads including station lighting, internal receptacles, and kiosk heating and cooling systems.

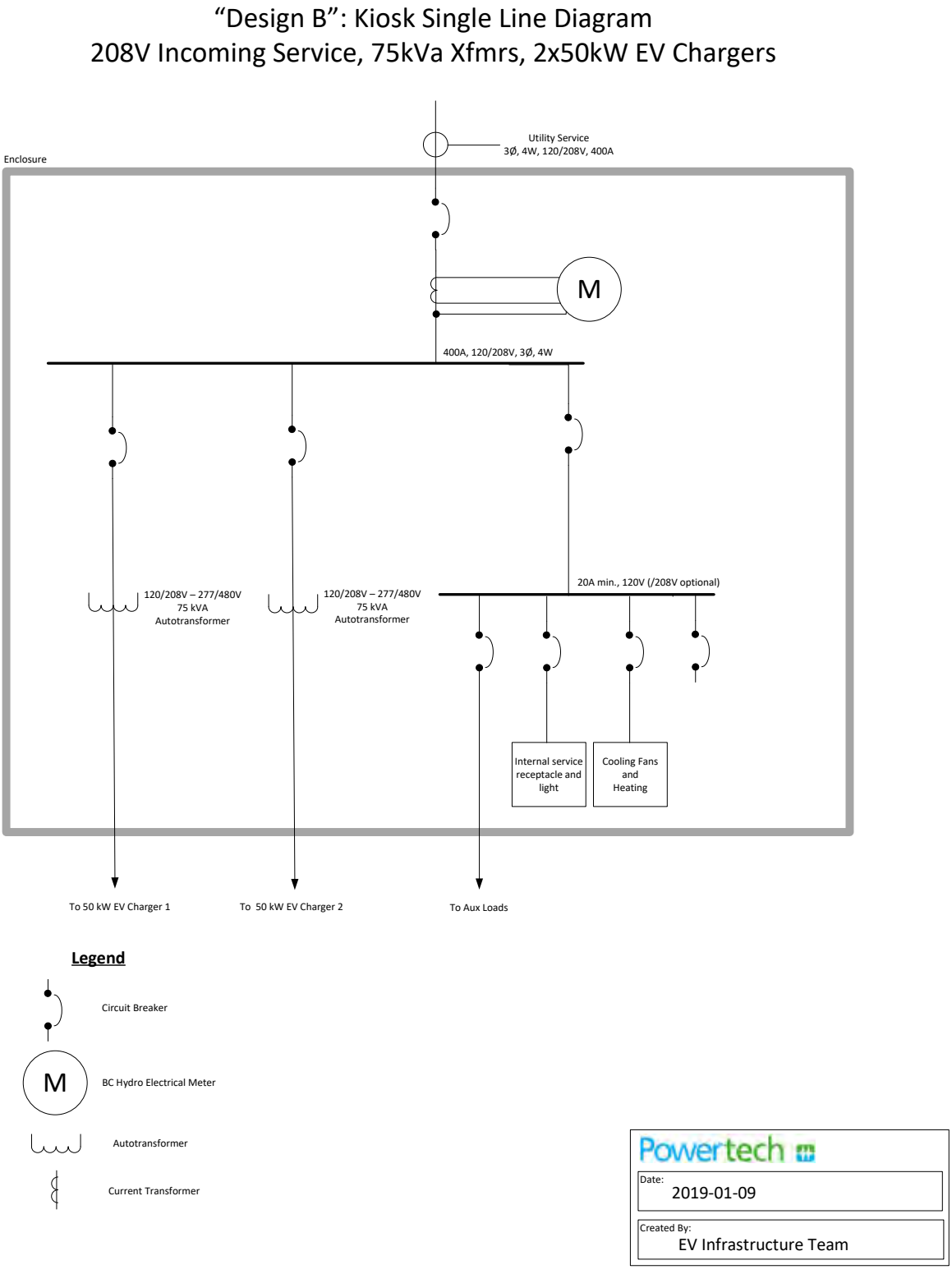


Figure 3: Kiosk design for 208V incoming service

DESIGN C — FUTURE-PROOFED FOR HIGHER-POWERED FAST CHARGING

Two 112.5 kVA transformers can supply up to four 50 kW DC fast chargers or two 100kW EV chargers.

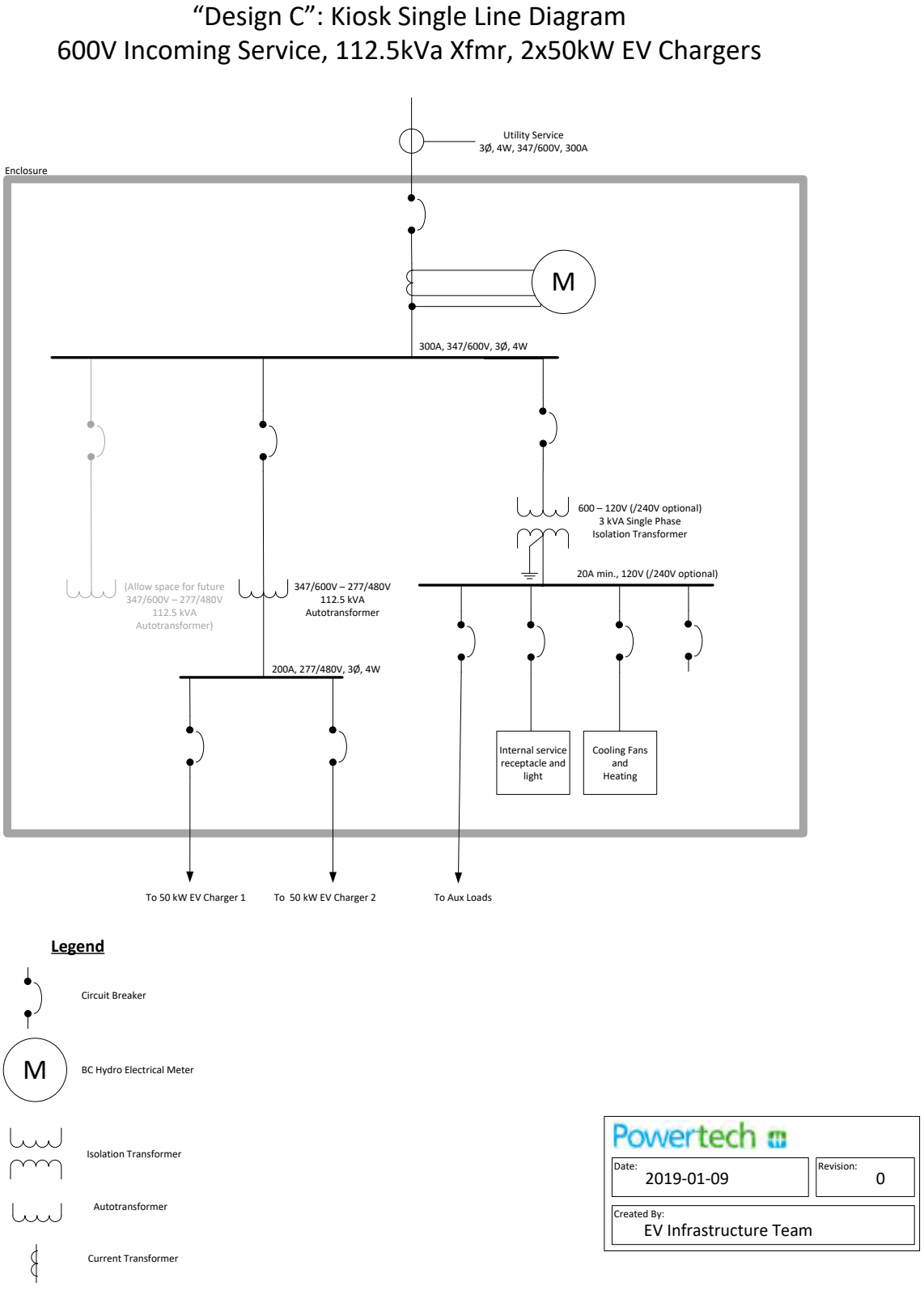


Figure 4: Kiosk design for higher-powered fast charging

Lighting

We use two different light pole sizes at our EV charging stations: 17 foot and 14 foot poles. 17 foot poles are installed at most of our stations, while 14 foot poles are installed at stations with overhead limitations such as utility power lines. Both sizes provide appropriate lighting density without excessive glare.

Below is an example of one of our light pole assemblies.

Figure 5: Example of a BC Hydro light pole assembly

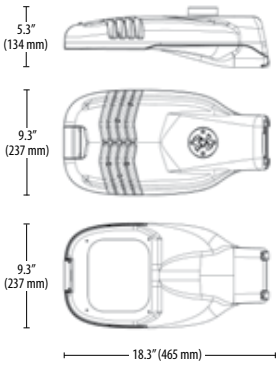
Luminaires

Luminaires are selected to provide optimal station light distribution, for safety as well as an enhanced charging experience after dark. Below is a typical luminaire we use at our stations.

NXT™ SERIES

NXT-C SPECIFICATIONS

Housing:	Single piece, die-cast A360 premium aluminum alloy with <0.6% copper content
Operating Temperature:	-40 °C to +40° C (-40 °F to +104 °F)[1]
Mounting:	1.625" - 2.375" (42 - 60 mm) O.D. Tenons
Mounting Methods:	Horizontal Entry or Post-Top Mount
Weight:	12 lbs (5.4 kg)
EPA Rating:	<0.34 ft² (< 0.032 m²)
Lens Material:	IK09 Rated Glass
Ingress Protection:	Power Supply and optical module are located inside chamber rated IP66 per IEC 60529/ANSI C136.25. Luminaire is rated for wet locations.
Finish:	Durable polyester powdercoat topcoat



Available Colors: GREY (RAL 7035) | BRONZE (RAL 7022) | BLACK (RAL 9005)

	NXT-C (12 LEDs)					
ELECTRICAL						
Drive Currents (mA)	525	700	850	1050	1200	1250[4]
Power Consumption (W)	22	27	34	42	48	50
Input Voltage (V)	120 - 277V (Standard)					
Surge Protection	Meets the requirements of ANSI C-High (10kV / 10kA)					
Power Factor	>0.90					
OPTICS & PERFORMANCE						
Photometry (Distribution)	2ES, 4AH					
Color Temperature (CCT)	4000K (Standard) 3000K & 5000K (Optional)					
Color Rendering Index (CRI)	~70					
3000K Fixture Efficacy (Lm/W)	101	99	96	88	84	83
4000K Fixture Efficacy (Lm/W)	105	104	99	94	90	88
3000K Fixture Output (Lm)	2,020	2,760	3,250	3,700	4,000	4,130
4000K Fixture Output (Lm)	2,300	2,800	3,368	3,930	4,300	4,400
LED L70 (Hours)	> 100,000 hours (@ maximum drive current)					
PHOTOCELL & CONTROLS						
Photocell Options	20-year life photocell available.					
Control & Monitoring	Dimming power supply (1-10V) is standard equipment. We offer a complete range of control and monitoring solutions					

1. 1250mA maximum temperature is 40 °C. -40 °C for fixed installation only. 2. Not all model configurations are DLC qualified - consult factory for details. 3. Only products with a CCT of 3000K (or less) meet International Dark Sky Association requirements.
4. 1250mA drive current only available with UL Certification option.

Values shown are subject to ±5% tolerance. Color temperatures shown are ±300K type 2ES distribution. If post-top version is specified, add 5.4" (137 mm) to overall length dimension. Illustrated Above: NXT-C in grey (RAL 7035).
All information provided is subject to change without notice.

Figure 6: BC Hydro Luminaires for EV charging stations

We currently use 3LB and 3HB luminaires. As seen in the figure below, 3LB light has a low backlight distribution pattern, which is a good fit for installation in front of residential buildings where light distribution towards the building is not desirable. The 3HB light has a high backlight distribution pattern which is a good fit for darker parking lots where light distribution is required over a wide area.

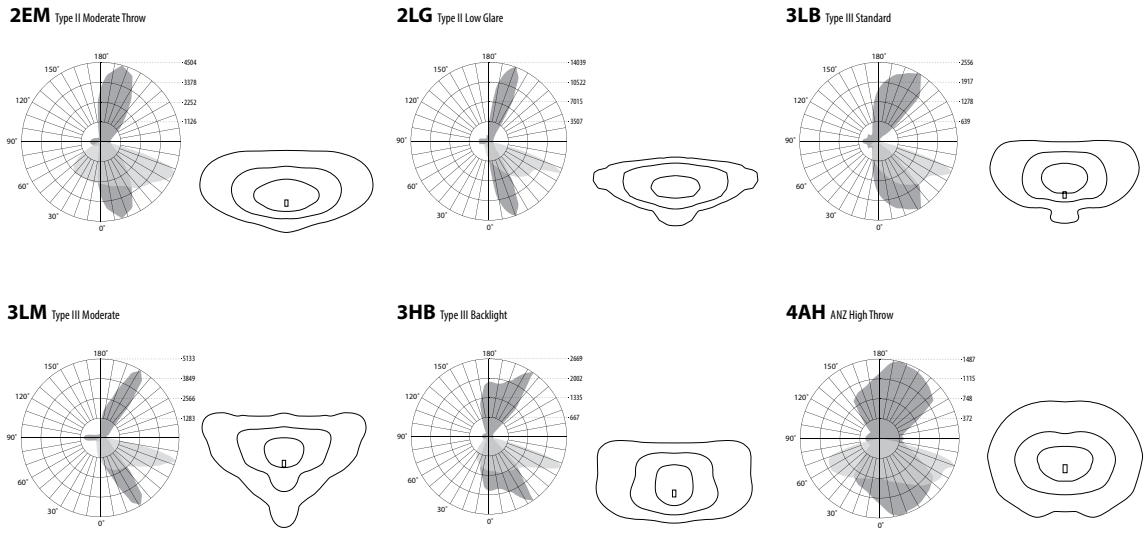


Figure 7: 3LB and 3HB luminaires

Photocells

Photocells are installed on top of the luminaires to sense ambient light levels and automatically turn on station lighting as required.

PHOTOCELL

LRL65223-LF PHOTOCELL SPECIFICATIONS

AMBIENT LIGHT SENSING	
Light Detection Sensor	Silicon-integrated photo-diode and amplifier with spectral and angular response approximating that of an accurate color-corrected cosine photometer.
Directionality	Accurate omni-directional ambient light sensing photocell

MECHANICAL / ELECTRICAL	
Operating Voltage	Operating Voltage: 105 to 305 volts (50/60 Hz)
Load Rating	1800VA, 1000W
Load Current (Continuous)	16 amps, (50/60 Hz AC)
Load Current (Inrush)	168 amps, 60 Hz 1 cycle
Circuitry	Micro-controlled circuitry for control of sensing time delays
Surge Suppression	Surge Protection: 320 volt, 320 joule (2ms) Metal Oxide Varistor (Other MOV ratings incorporated upon request)
Power Consumption	Power Consumption: < 350mW nominal @ 230V AC
Testing/Certification	UL 773, and CSA C22.2 No. 55 Compliant for use in USA and Canada.105-305 Voltage Range CE Certification

SWITCH	
Type	Relay Assisted Triac (RAT)
On Light Level	16 Lux standard, other light levels on request
Switch On: Switch Off Ratio	1:1.5 (inverse ratio) standard, other ratios on request
On Time Delay	15 seconds standard, other time delay settings on request
Off Time Delay	15 seconds standard, other time delay settings on request
Failure Mechanism	Fail-On Protection

ENVIRONMENTAL	
IP Rating	IP67 sealed enclosure
Temperature Range	-40°F to +158°F (-40°C to + 70°C)
Enclosure Material	DIAKON™ acrylic conical cover

PRODUCT LIFE	
Life Rating and Warranty	A proven lifetime expectancy of 25 years with a full 10 year manufacturer's limited warranty.

Other photocell models are available including those with side-facing window. Please contact your sales representative for details and specifications.

Figure 8: Photocell installed at BC Hydro EV charging stations

Wayfinding beacon

Wayfinding beacons are typically installed on top of our light poles to help EV drivers visually locate our charging stations. Wayfinding beacons can also be installed on top of the DC fast chargers.

The figure below represents our wayfinding beacon set–up.

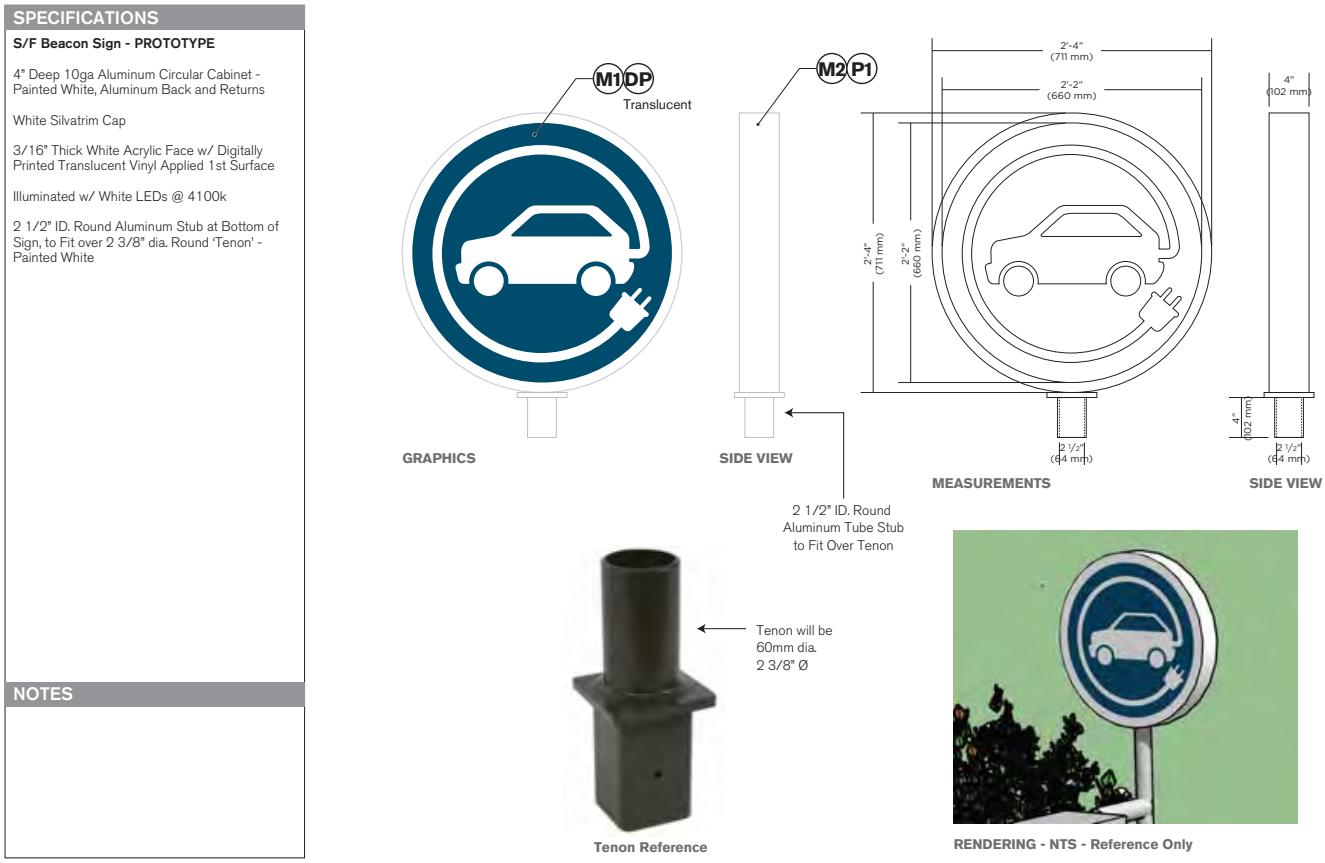


Figure 9: BC Hydro wayfinding beacon at an EV charging station

Informational signage

Station signage can provide important information to EV drivers such as charging etiquette, local amenities, a map of the area, and information about the host and funding partners.

We use two types of signage housings at our stations: side–by–side and back–to–back pole–mounted. Side–by–side is more expensive since it requires a separate concrete pad, while the back–to–back can be installed directly on the light pole. Back–to–back pole mounted signage is also good fit where real estate is limited.

SIDE–BY–SIDE

SPECIFICATIONS

S/F Help/Info Sign - PROTOTYPE

Single Face Post & Panel Sign

Two 2' x 4' Alupanel Signs Supplied by Others

Sign Supports - KS Supply
Two 2" x 3"x 0.25" Aluminum Posts w/ Aluminum Base Plates

1 1/2" x 1 1/2" Aluminum Angle Frame, Screwed to Aluminum Posts

Panels Mounted Face over Frame w/ SS Screws through Face

All Painted White

As Discussed w/ BP

NOTES

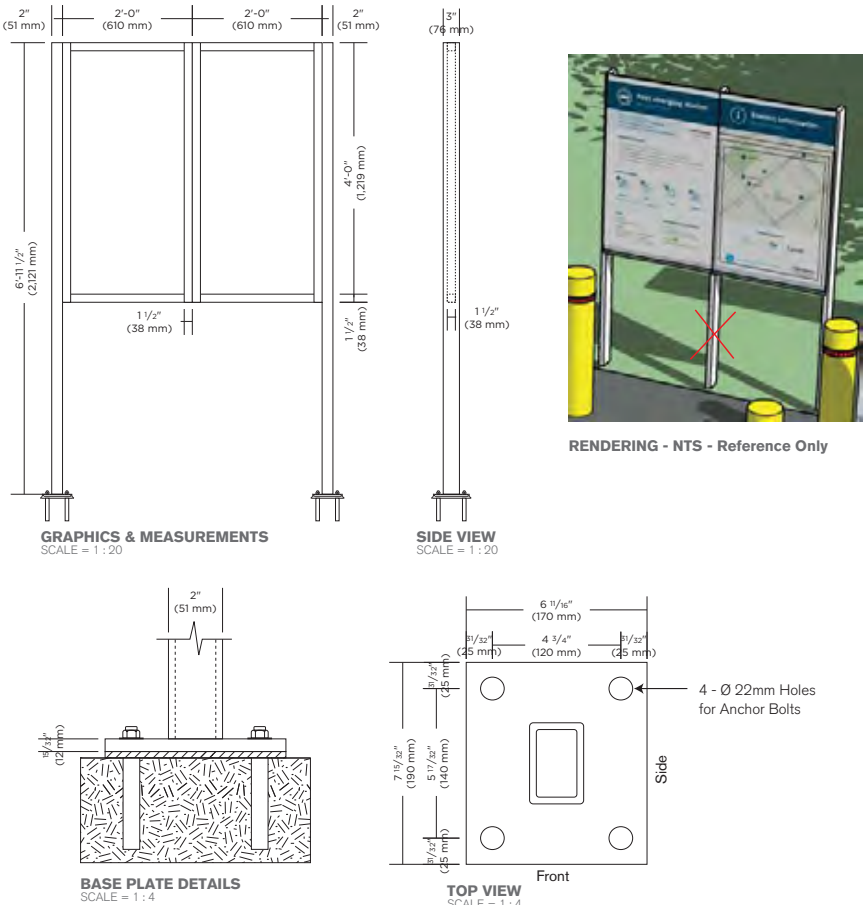


Figure 10: BC Hydro side–by–side informational signage at an EV charging station

BACK-TO-BACK POLE-MOUNTED

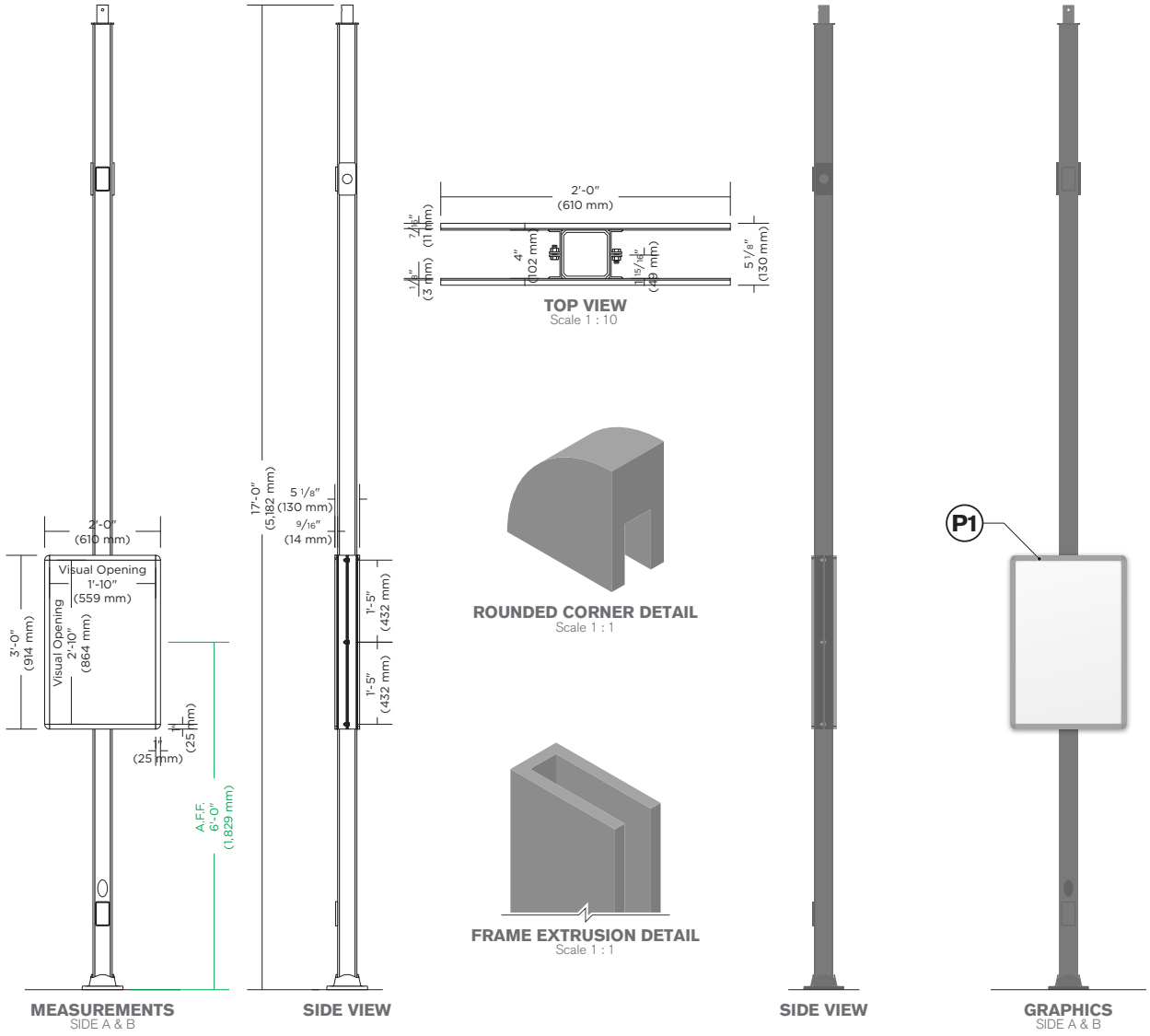


Figure 11: BC Hydro back-to-back pole-mounted informational signage at an EV charging station

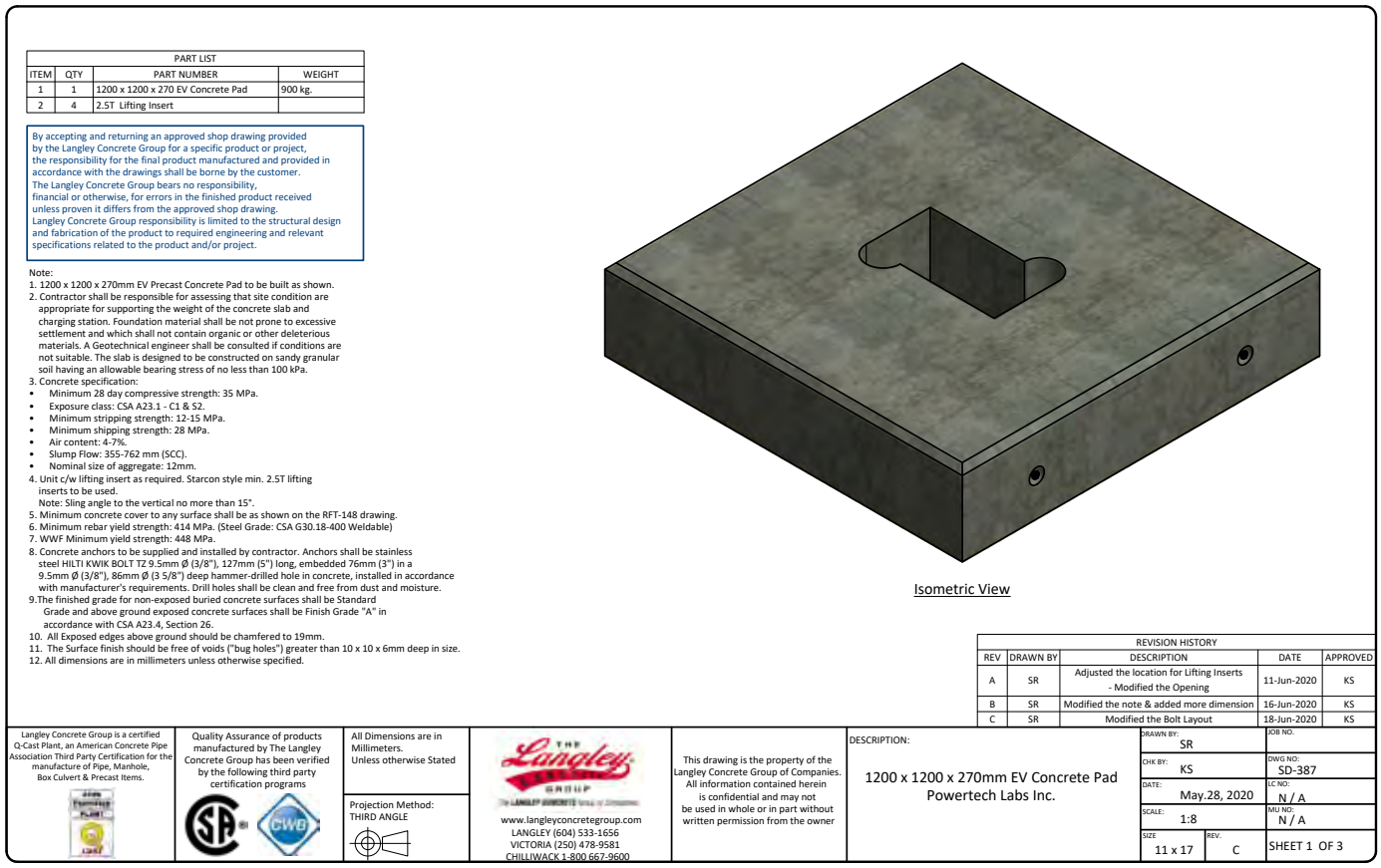
Precast concrete pads

Precast concrete pads are designed to hold the weight and structure of charging infrastructure such as the DC fast charger, kiosk and light pole. When building a concrete pad, several factors are considered such as maximum weight of equipment, seismic zone, soil condition, wind load, etc. Precast pads are built in a controlled environment and are inspected before shipping to the charging station site. They come with the advantage of economies-of-scale, consistent manufacturing quality, and lower manufacturing costs. Conversely, precast pads are expensive to ship and are not customizable.

An alternative option to precast pads is pour-in-place foundation. The pour-in-place foundation is constructed on-site and must be custom-engineered based on site-specific conditions such as layout, equipment weight, drainage, soil, seismic zone and wind conditions. Rebar installation and concrete pour are done on-site and the concrete should be left to properly cure before equipment is placed on the slab. Design and manufacturing costs for pour-in-place pads are typically more than precast pads, however, pour-in-place can be a good solution for sites where a custom transition between the sidewalk and the rest of the parking lot is required.

DC FAST CHARGER PRECAST PAD — SHALLOW DESIGN

BC Hydro's DC fast charger precast pad is designed to be compact and relatively easy to manufacture and ship. The asymmetrical pass-through is designed to accommodate incoming wireways for several different DCFC models.



PART LIST			
ITEM	QTY	PART NUMBER	WEIGHT
1	1	1200 x 1200 x 270 EV Concrete Pad	900 kg.
2	4	2.5T Lifting Insert	

By accepting and returning an approved shop drawing provided by the Langley Concrete Group for a specific product or project, the responsibility for the final product manufactured and provided in accordance with the drawings shall be borne by the customer. The Langley Concrete Group bears no responsibility, financial or otherwise, for errors in the finished product received unless proven it differs from the approved shop drawing. Langley Concrete Group responsibility is limited to the structural design and fabrication of the product to required engineering and relevant specifications related to the product and/or project.

Note:
1. 1200 x 1200 x 270mm EV Precast Concrete Pad to be built as shown.
2. Contractor shall be responsible for assessing that site condition are appropriate for supporting the weight of the concrete slab and charging station. Foundation material shall be not prone to excessive settlement and which shall not contain organic or other deleterious materials. A Geotechnical engineer shall be consulted if conditions are not suitable. The slab is designed to be constructed on sandy granular soil having an allowable bearing stress of no less than 100 kPa.
3. Concrete specification:
   - Minimum 28 day compressive strength: 35 MPa.
   - Exposure class: CSA A23.1 - C1 & S2.
   - Minimum stripping strength: 12-15 MPa.
   - Minimum shipping strength: 28 MPa.
   - Air content: 4-7%.
   - Slump Flow: 355-762 mm (SCC).
   - Nominal size of aggregate: 12mm.
4. Unit c/w lifting insert as required. Starcon style min. 2.5T lifting inserts to be used.
   Note: Sling angle to the vertical no more than 15°.
5. Minimum concrete cover to any surface shall be as shown on the RFT-148 drawing.
6. Minimum rebar yield strength: 414 MPa. (Steel Grade: CSA G30.18-400 Weldable)
7. WWF Minimum yield strength: 448 MPa.
8. Concrete anchors to be supplied and installed by contractor. Anchors shall be stainless steel HILTI KWIK BOLT TZ 9.5mm Ø (3/8"), 127mm (5") long, embedded 76mm (3") in a 9.5mm Ø (3/8"), 86mm Ø (3 5/8") deep hammer-drilled hole in concrete, installed in accordance with manufacturer's requirements. Drill holes shall be clean and free from dust and moisture.
9. The finished grade for non-exposed buried concrete surfaces shall be Standard Grade and above ground exposed concrete surfaces shall be Finish Grade "A" in accordance with CSA A23.4, Section 26.
10. All Exposed edges above ground should be chamfered to 19mm.
11. The Surface finish should be free of voids ("bug holes") greater than 10 x 10 x 6mm deep in size.
12. All dimensions are in millimeters unless otherwise specified.

Isometric View

REVISION HISTORY				
REV	DRAWN BY	DESCRIPTION	DATE	APPROVED
A	SR	Adjusted the location for Lifting Inserts - Modified the Opening	11-Jun-2020	KS
B	SR	Modified the note & added more dimension	16-Jun-2020	KS
C	SR	Modified the Bolt Layout	18-Jun-2020	KS

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Projection Method: THIRD ANGLE

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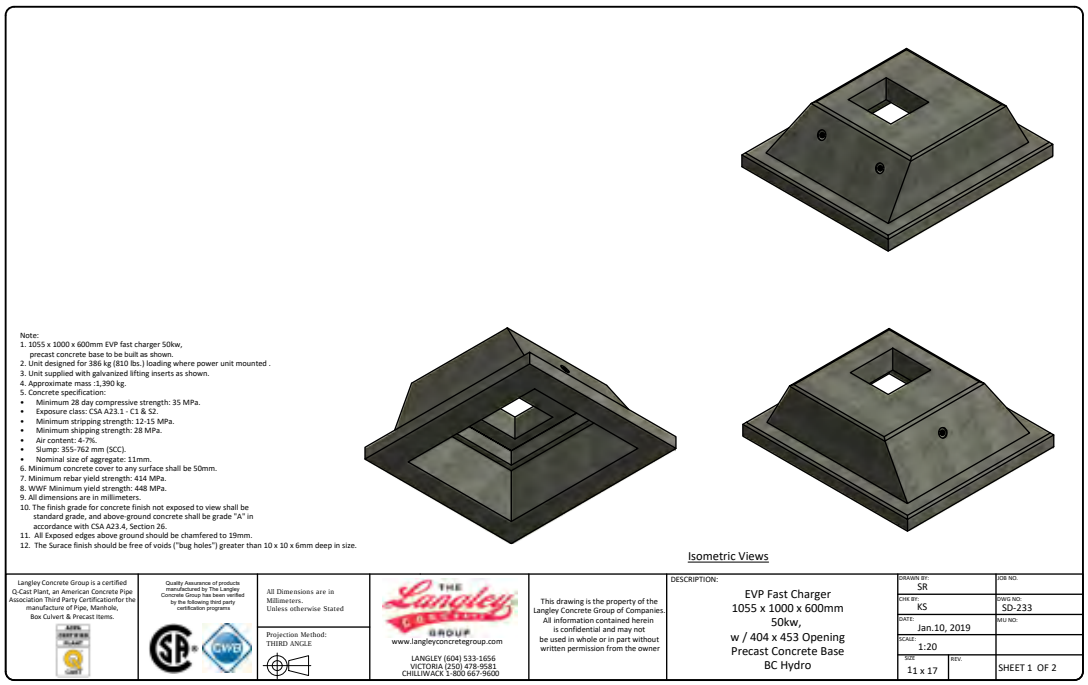
DESCRIPTION: 1200 x 1200 x 270mm EV Concrete Pad Powertech Labs Inc.

DRAWN BY:	SR	JOB NO.	
CHK BY:	KS	DWG NO:	SD-387
DATE:	May.28, 2020	LC NO:	N / A
SCALE:	1:8	MU NO:	N / A
SIZE	11 x 17	REV.	C
		SHEET 1 OF 3	

Figure 12: BC Hydro DC fast charger precast pad — shallow design

DC FAST CHARGER PRECAST PAD — PYRAMID DESIGN

The pyramid DC fast charger pad is designed for areas in B.C. with a high risk of large earthquakes and high levels of spectral acceleration.



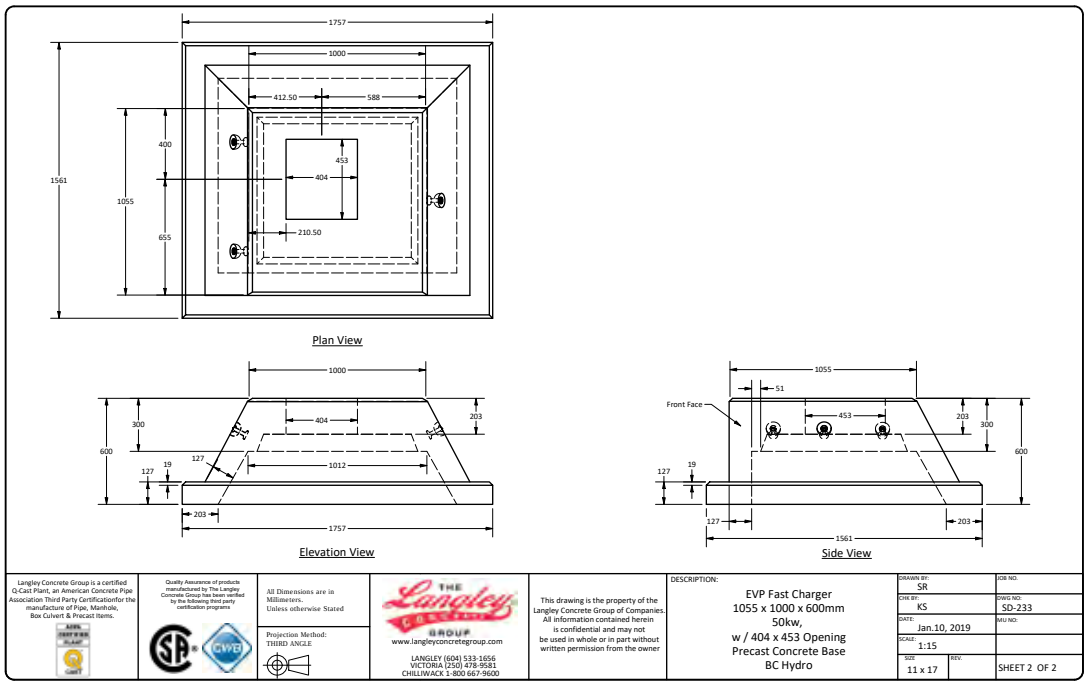
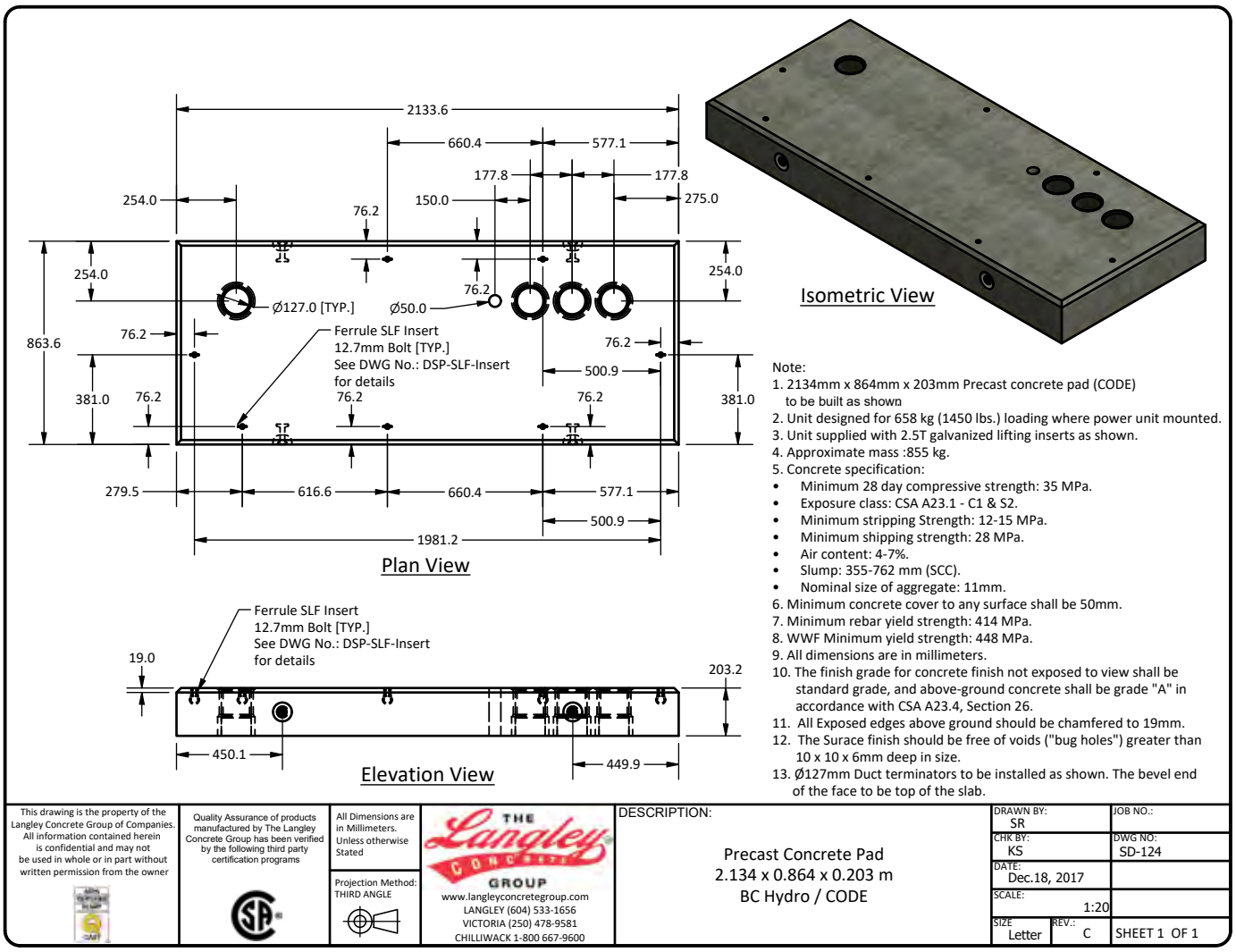


Figure 13: BC Hydro DC fast charger precast pad — pyramid design

KIOSK PRECAST PAD – LOW SEISMIC DESIGN

The kiosk pad is designed to handle the weight and structure of kiosk. The main kiosk pad design has several incoming and outgoing wireways, as illustrated below.



Note:
1. 2134mm x 864mm x 203mm Precast concrete pad (CODE) to be built as shown
2. Unit designed for 658 kg (1450 lbs.) loading where power unit mounted.
3. Unit supplied with 2.5T galvanized lifting inserts as shown.
4. Approximate mass :855 kg.
5. Concrete specification:
   - Minimum 28 day compressive strength: 35 MPa.
   - Exposure class: CSA A23.1 - C1 & S2.
   - Minimum stripping Strength: 12-15 MPa.
   - Minimum shipping strength: 28 MPa.
   - Air content: 4-7%.
   - Slump: 355-762 mm (SCC).
   - Nominal size of aggregate: 11mm.
6. Minimum concrete cover to any surface shall be 50mm.
7. Minimum rebar yield strength: 414 MPa.
8. WWF Minimum yield strength: 448 MPa.
9. All dimensions are in millimeters.
10. The finish grade for concrete finish not exposed to view shall be standard grade, and above-ground concrete shall be grade "A" in accordance with CSA A23.4, Section 26.
11. All Exposed edges above ground should be chamfered to 19mm.
12. The Surace finish should be free of voids ("bug holes") greater than 10 x 10 x 6mm deep in size.
13. Ø127mm Duct terminators to be installed as shown. The bevel end of the face to be top of the slab.

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Projection Method: THIRD ANGLE

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VICTORIA (250) 478-9581
CHILLIWACK 1-800 667-9600

DESCRIPTION:

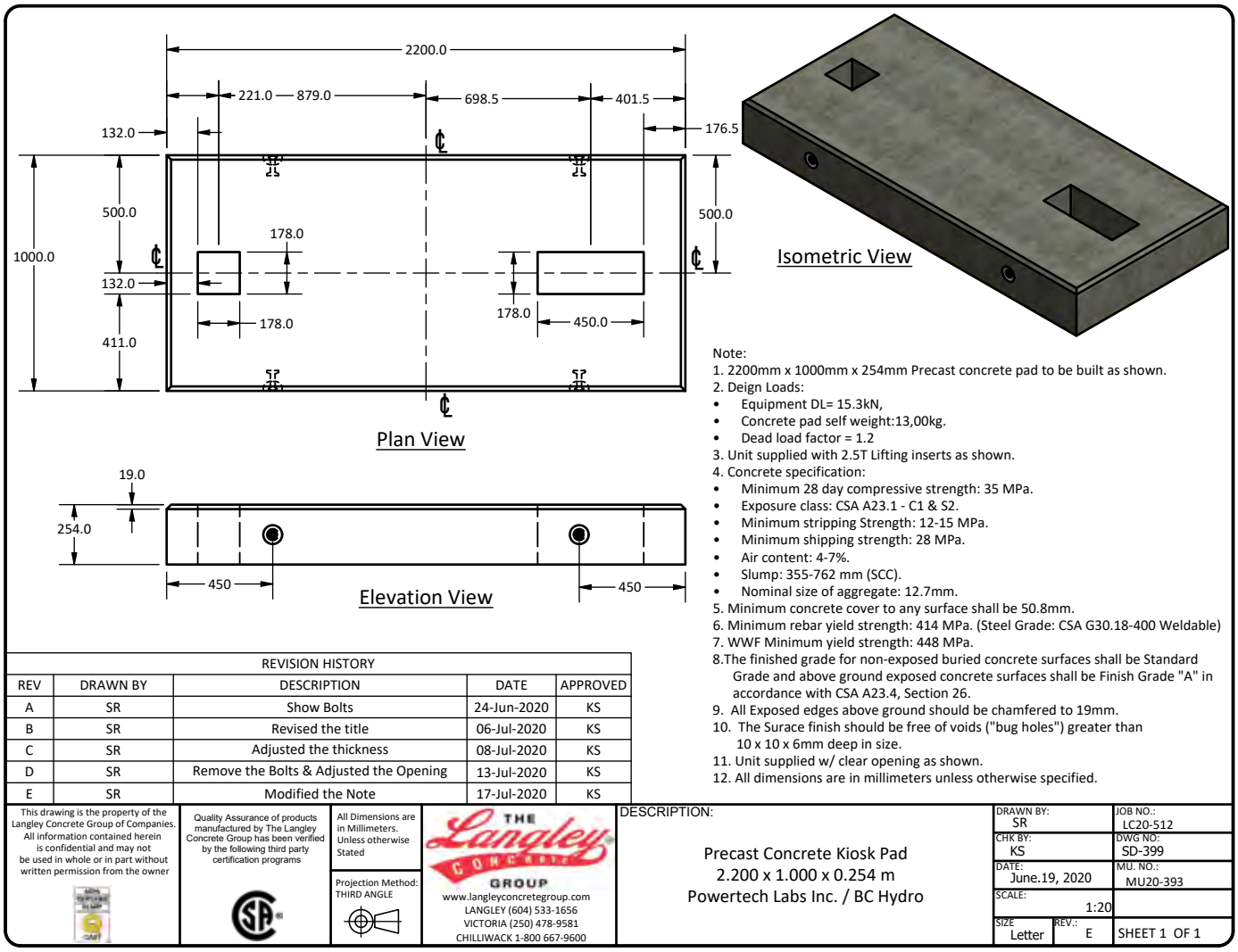
Precast Concrete Pad
2.134 x 0.864 x 0.203 m
BC Hydro / CODE

DRAWN BY: SR	JOB NO.:
CHK BY: KS	DWG NO: SD-124
DATE: Dec.18, 2017	
SCALE: 1:20	
SIZE: Letter / REV.: C	SHEET 1 OF 1

Figure 14: Kiosk precast pad – low seismic design

KIOSK PRECAST PAD — HIGH SEISMIC DESIGN

The modified kiosk pad design will soon be adopted for the installation of larger and heavier kiosks in order to support higher powered charging. The slot holes provide more flexibility for incoming and outgoing conduit placement.



Note:
1. 2200mm x 1000mm x 254mm Precast concrete pad to be built as shown.
2. Deign Loads:
   - Equipment DL= 15.3kN,
   - Concrete pad self weight:13,00kg.
   - Dead load factor = 1.2
3. Unit supplied with 2.5T Lifting inserts as shown.
4. Concrete specification:
   - Minimum 28 day compressive strength: 35 MPa.
   - Exposure class: CSA A23.1 - C1 & S2.
   - Minimum stripping Strength: 12-15 MPa.
   - Minimum shipping strength: 28 MPa.
   - Air content: 4-7%.
   - Slump: 355-762 mm (SCC).
   - Nominal size of aggregate: 12.7mm.
5. Minimum concrete cover to any surface shall be 50.8mm.
6. Minimum rebar yield strength: 414 MPa. (Steel Grade: CSA G30.18-400 Weldable)
7. WWF Minimum yield strength: 448 MPa.
8. The finished grade for non-exposed buried concrete surfaces shall be Standard Grade and above ground exposed concrete surfaces shall be Finish Grade "A" in accordance with CSA A23.4, Section 26.
9. All Exposed edges above ground should be chamfered to 19mm.
10. The Surace finish should be free of voids ("bug holes") greater than 10 x 10 x 6mm deep in size.
11. Unit supplied w/ clear opening as shown.
12. All dimensions are in millimeters unless otherwise specified.

REVISION HISTORY				
REV	DRAWN BY	DESCRIPTION	DATE	APPROVED
A	SR	Show Bolts	24-Jun-2020	KS
B	SR	Revised the title	06-Jul-2020	KS
C	SR	Adjusted the thickness	08-Jul-2020	KS
D	SR	Remove the Bolts & Adjusted the Opening	13-Jul-2020	KS
E	SR	Modified the Note	17-Jul-2020	KS

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LANGLEY (604) 533-1656
VICTORIA (250) 478-9581
CHILLIWACK 1-800 667-9600

DESCRIPTION:

Precast Concrete Kiosk Pad
2.200 x 1.000 x 0.254 m
Powertech Labs Inc. / BC Hydro

DRAWN BY: SR	JOB NO.: LC20-512
CHK BY: KS	DWG NO: SD-399
DATE: June.19, 2020	MU. NO.: MU20-393
SCALE: 1:20	
SIZE: Letter / REV.: E	SHEET 1 OF 1

Figure 15: Kiosk precast pad — high seismic design

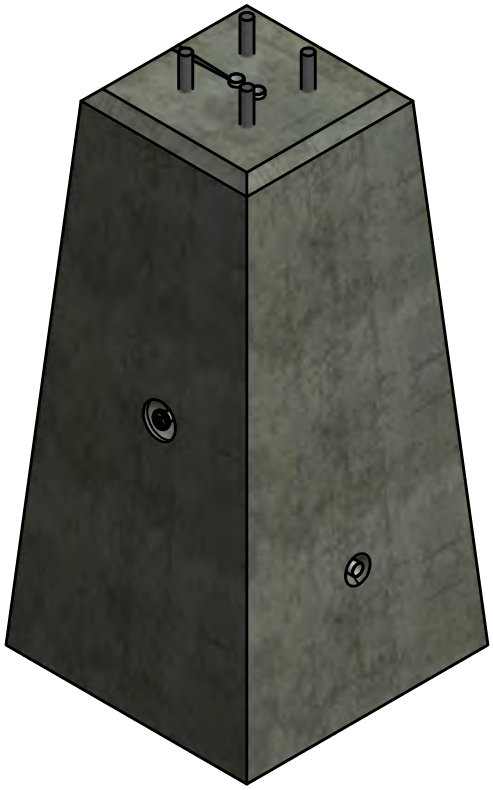
LIGHT POLE PADS

Figures 16 through to 19 illustrate the different light pole precast pad designs available to us. The height and base size of the pads differ based on seismic, soil and wind conditions and different sites. The most common design is the pyramid design with a height of 1.2 metres (see Figure 17). If soil conditions are unstable, deeper and wider pole base designs are available as shown below.

The light pole base includes 4 anchor bolts to connect and hold the light pole on top of the base.

PART LIST			
ITEM	QTY	PART NUMBER	WEIGHT
1	1	1200 Sq Base	800 kg.
2	2	27mm PVC Conduit	
3	2	2.5T Lifting Insert	
4	4	19 x 610 J Rod	

By accepting and returning an approved shop drawing provided by the Langley Concrete Group for a specific product or project, the responsibility for the final product manufactured and provided in accordance with the drawings shall be borne by the customer. The Langley Concrete Group bears no responsibility, financial or otherwise, for errors in the finished product received unless proven it differs from the approved shop drawing. Langley Concrete Group responsibility is limited to the structural design and fabrication of the product to required engineering and relevant specifications related to the product and/or project.



Isometric View

Notes:
1. 1200 mm Precast Parking Lot Pole Base as shown.
2. Unit Supplied with Required Anchor bolts, spacing & PVC Conduits as required.
3. Minimum concrete strength: 30 MPa.
4. Welded wire mesh min. yield strength: 448 MPa.
5. Minimum rebar yield strength: 414 MPa.
6.All dimensions are in millimeters unless otherwise specified.

REVISION HISTORY				
REV	DRAWN BY	DESCRIPTION	DATE	APPROVED
A	SR	Revise the Bolt & Conduits Location	Apr.16, 2019	KS
B	SR	Revised Bolts	29-Nov-2019	KS
C	SR	Revised the Note & Title	06-Jul-2020	KS
D	SR	Revised the Bolt	08-Jul-2020	KS

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LANGLEY (604) 533-1656
VICTORIA (250) 478-9581
CHILLIWACK 1-800 667-9600

DESCRIPTION:
Precast Concrete Pole Base
(NON-MMCD)
1200 Parking Lot Pole
Powertech Labs

DRAWN BY: SR	JOB NO.: LC19-210
CHK BY: KS	DWG NO: DWG19-379
DATE: Apr.11, 2019	MU NO: MU19-204
SCALE: 1:10	
SIZE Letter / REV.: D	SHEET 1 OF 2

Figure 16: Light pole precast pad

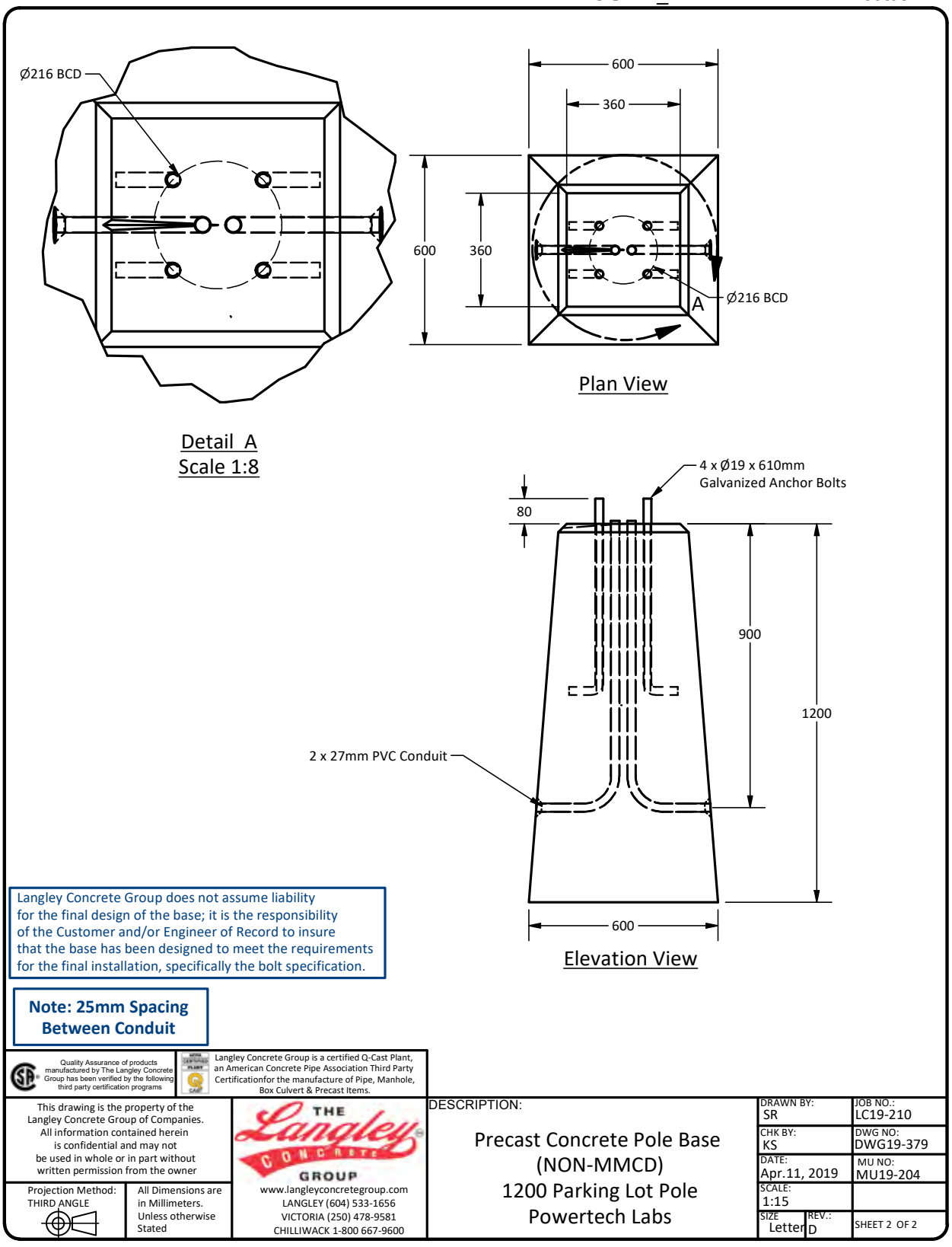


Figure 17: Light pole precast pad – 1.2 metres

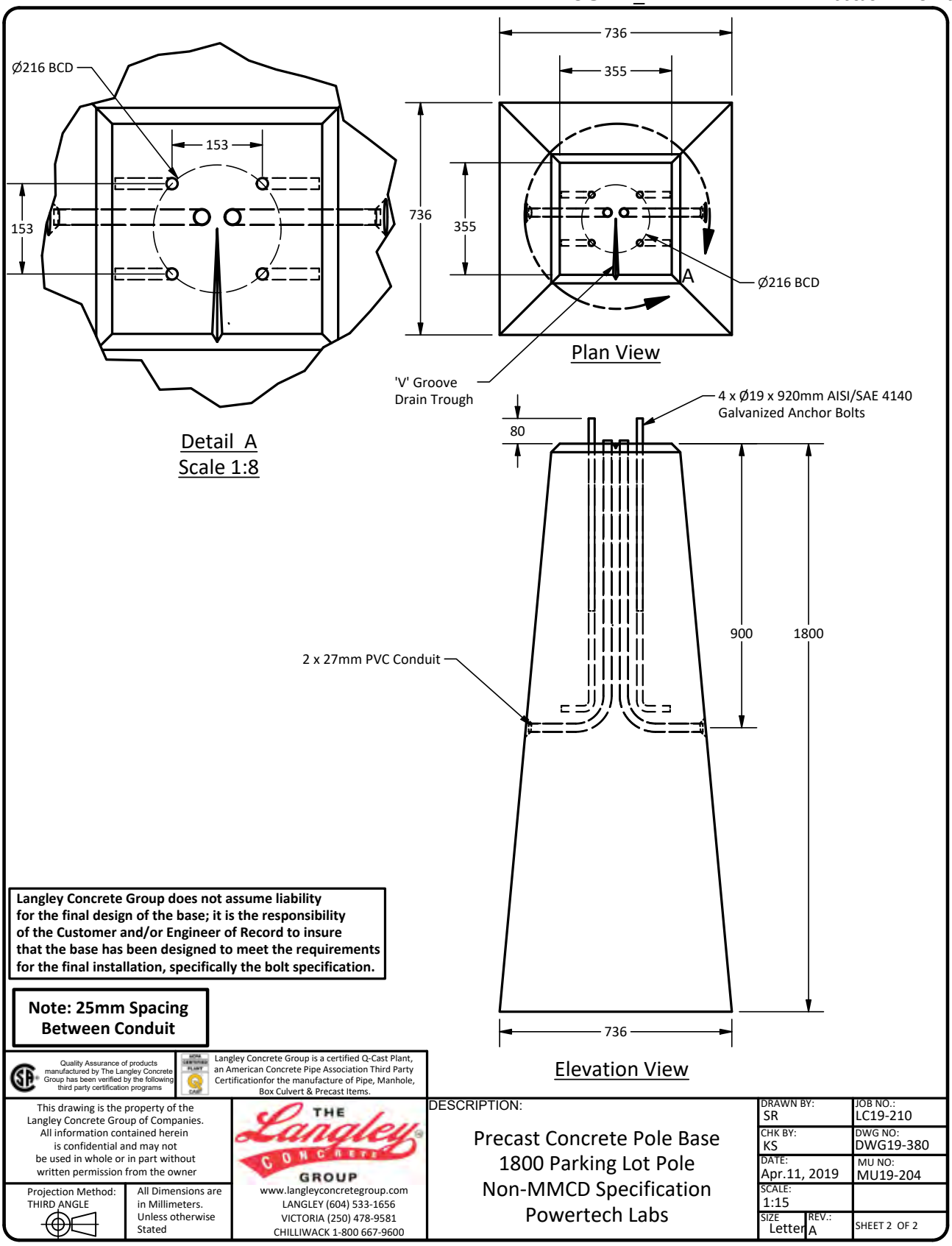


Figure 18: Light pole precast pad – 1.8 metres

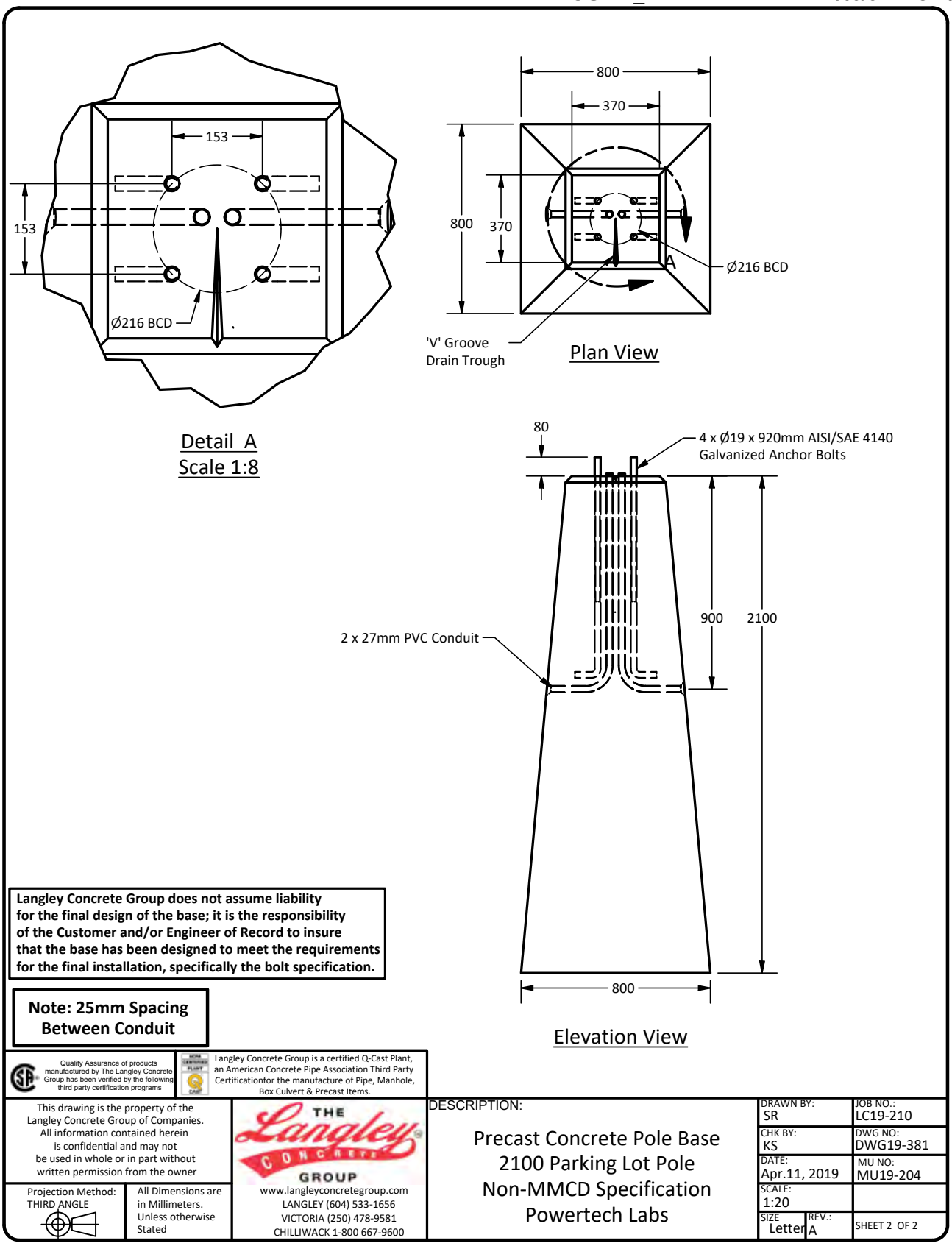


Figure 19: Light pole precast pad – 2.1 metres

Bollards

Bollards protect the charger and main switch kiosk against damage from vehicular traffic. There are two types of bollards: precast and pour-in-place.

Precast bollards are pre-constructed and shipped to the site (see figure below). Like precast concrete pads, precast bollards are associated with a more consistent manufacturing quality and lower manufacturing costs, and are more expensive to ship. Pour-in-place bollards are built on-site by filling galvanized pipes with concrete. If the site requires a pour-in-place concrete pad, it is more cost-effective to install pour-in-place bollards since the concrete is already available on-site.

To enhance visibility, paint the bollard yellow or cover it with a yellow sleeve.

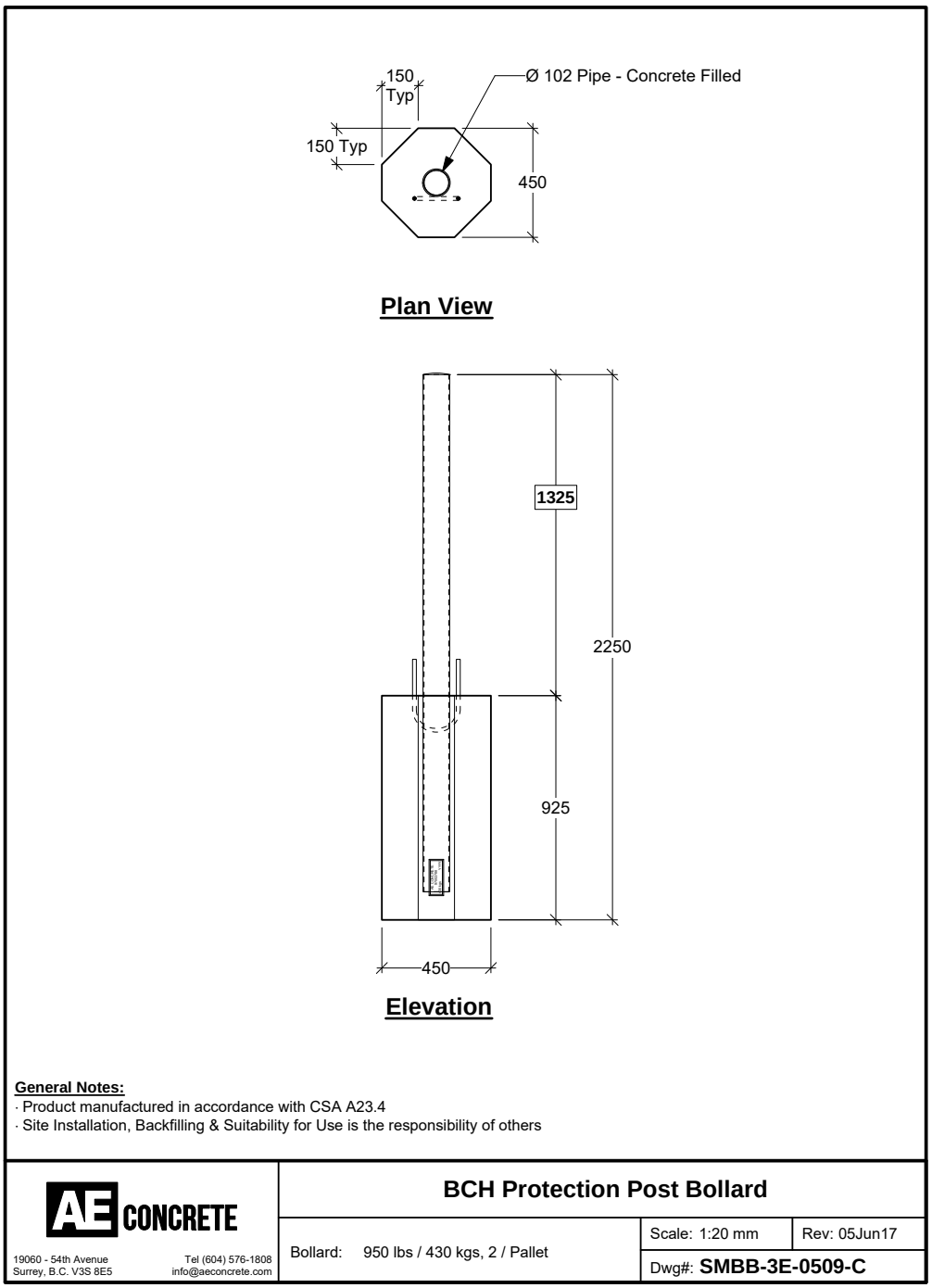


Figure 20: BC Hydro precast bollard

Putting it all together

Our EV charging stations have a similar layout, dimensions, and components to enhance interoperability. Since our DC fast chargers are connected to a few networks with different authentication requirements, we worked with network providers to reduce the number of apps or RFID cards needed to authenticate. This allows drivers to be able to use one app or RFID card to activate chargers at all our site locations.

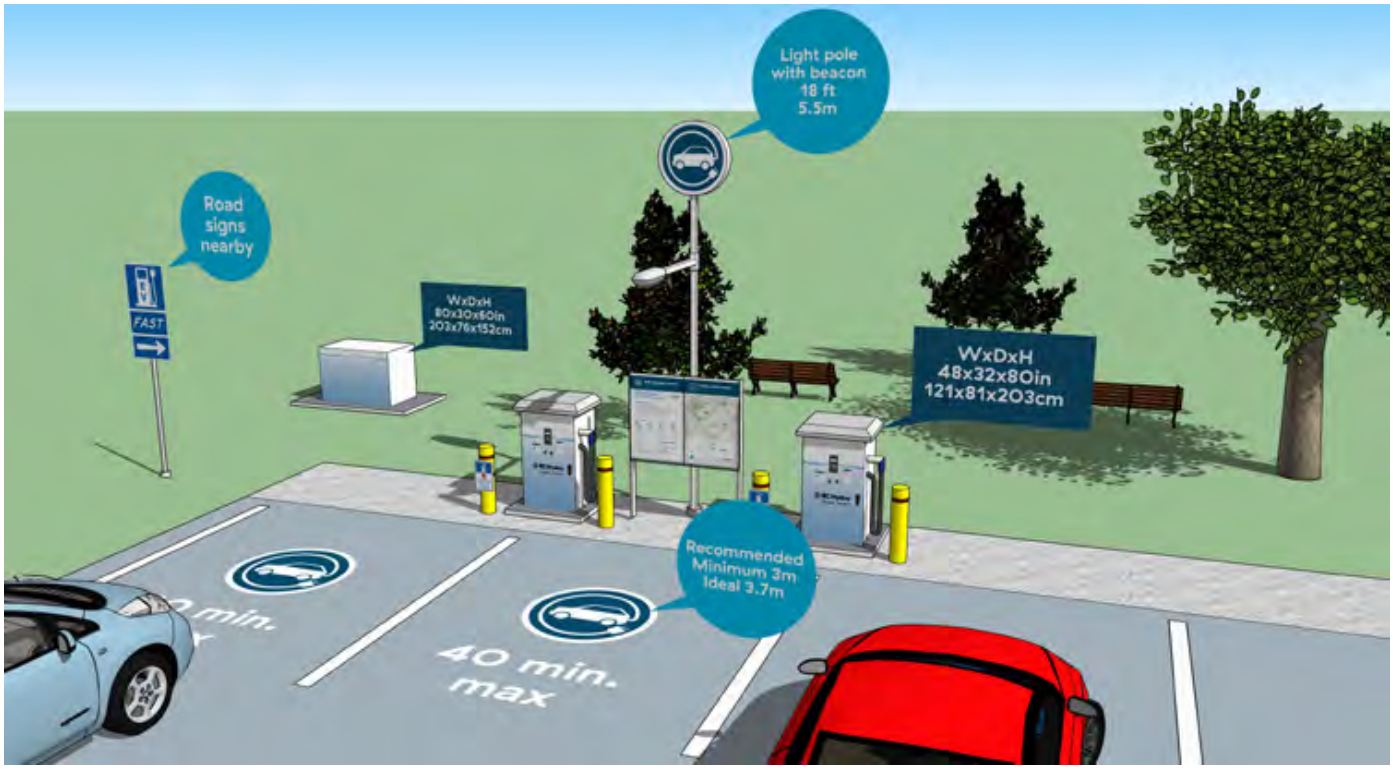


Figure 21: 3D view of a sample charging station

6. Wayfinding signage

The B.C. Ministry of Transportation (MOTI) maintains signage standards for B.C. highways and roads. Currently, highway EV charging signage is permitted for fast charging stations 50kW and above. Contact the Traffic and Engineering group regarding wayfinding signage for fast charging stations.

Signage standards are available the **Ministry of Transportation website**:

- Local road size: 230 x 230mm
- Arterial road size: 600 x 600mm
- Expressway size: 900 x 900m

Samples:

7. Overview of common charging station layouts

In addition to the recommended layouts described in the guidelines document, we've added other potential layouts along with some considerations and challenges for each.

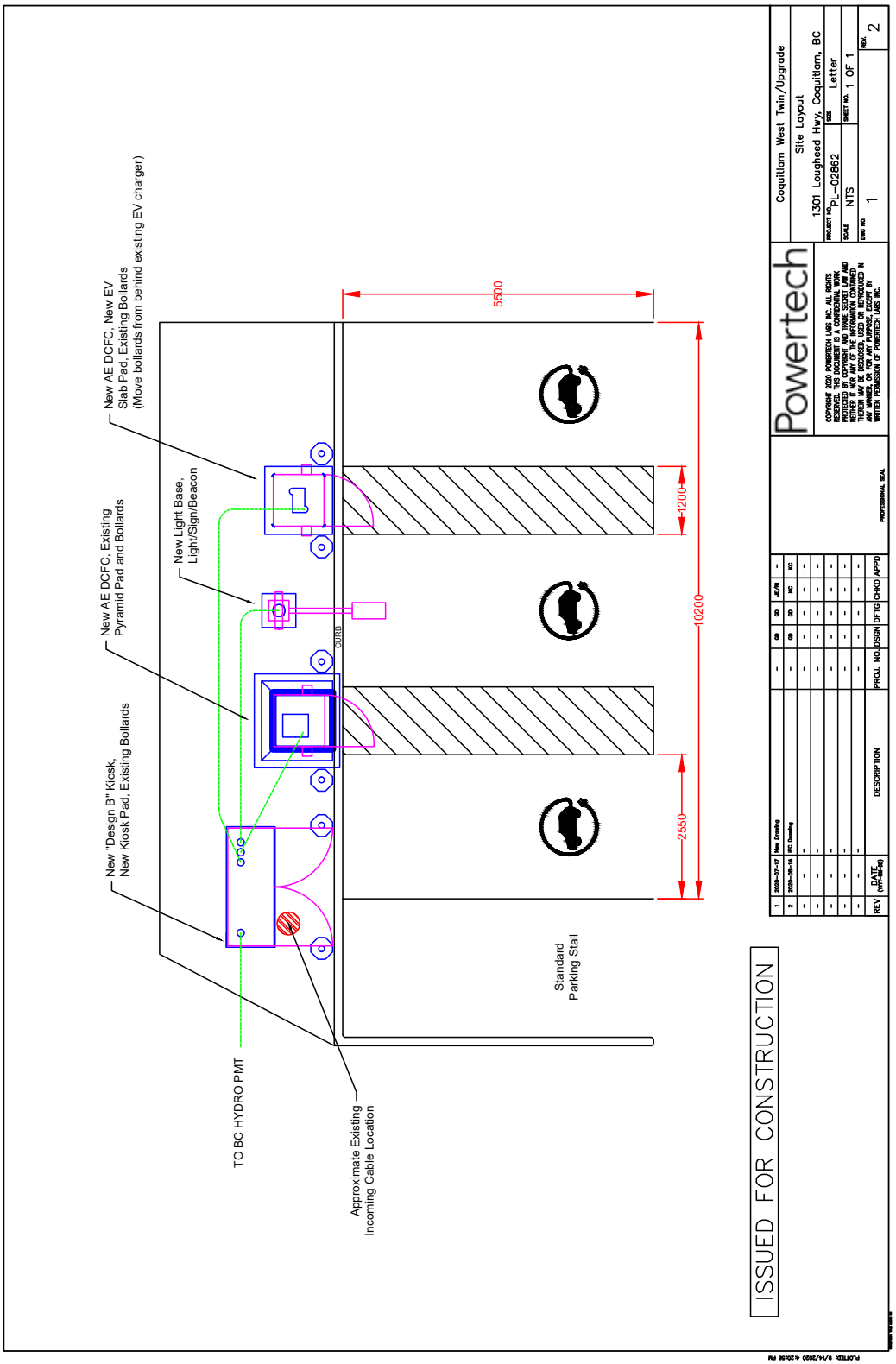
Attributes	Considerations	Challenges
Recommended layouts		
Pull–in, charger in front	○ This is the most common design and can be supported in most existing parking lots ○ Ensure a sufficient number of stalls are leveraged to increase accessibility and provide room for expansion	○ Drivers are exposed to the elements without weather protection ○ If the charging station is on a curb, be sure to provide a ramp or a roll–over curb to allow for accessibility
Pull–in, charger between stalls	○ Easier to design for accessibility ○ Drivers can easily park on the side where the EV charge port is closest to the charger (much like a gas station layout)	○ Drivers are exposed to elements without weather protection
Pull–through	○ Accommodates larger EVs like pickup trucks and EVs pulling trailers ○ Easiest to design for accessibility ○ Drivers can easily park on the side where the EV charge port is closest to the charger (much like a gas station layout)	○ Allocation of more stalls are required as well as ingress and egress space ○ Drivers are exposed to the elements without weather protection
Other layouts		
Curbside – parallel	○ Curbside is a reasonable option for urban environments where there are no parking lots with space for charging stations ○ Consider using a curb bulge or indentation to protect the station and EV drivers from vehicular traffic	○ Safety issues – Depending on the location of the charge port, drivers may be forced to plug–in on the side that exposes them to vehicles and cyclists ○ Accessibility – Drivers with mobility issues may be prevented from using these stations due to limited space and difficulties in getting onto a curb (if it has not been changed to a roll–out curb) ○ Damage to cord – If the charge port is located on the opposite side of the curb, this puts undue stress on the connector and the connector interface with the charge port

Attributes	Considerations	Challenges
Curbside – angled	○ Similar to Curbside – parallel, Curbside – angled is an option for urban environments ○ This option may have the capability to provide better safety and accessibility design compared to Curbside – parallel stations	○ Some municipal bylaws might prevent backing into a stall which makes it difficult to charge a car with a charge port located in the rear of the EV (e.g. Tesla vehicles)
Parkade	○ Can provide weather protection ○ Ground level is preferred in order to avoid any structural or roof deck membrane issues ○ Easier to plan for in a brand-new build versus a retrofit	○ Parkades are a more complex install ○ Will need to hire a structural engineer ○ Will need to consider a separately metered service ○ Depending on the location may create some safety issues

8. Detailed layout—Pull-in, charger in front

This design is a typical EV charging station layout where space is limited, stalls are perpendicular to the curb, or the stalls are extra-wide. The driver can nose-in or back-in based on the location of the charging port. Two stalls in front of each charger provide one space for charging and one space for waiting.

Here is a sample "pull-in, charger in front" design drawing.



Technical specification recommendations

SPACING

- Install chargers as close to the curb as possible to maximize effective cable reach.
- Allocate space between the two bollards to allow access to the cable/HMI (human machine interface) and for maintenance.
- Allocate enough space between the chargers and light pole to allow for accessibility.
- Install information signage and parking signage in visible locations such as on the bollards, light pole or dedicated sign pole(s).

LIGHTING

- Install the light pole in the centre of the charging station. Position the light pole base so that the lighting fixture is over the stalls for proper lighting.
- Provide lighting that balances user experience (safety, security, visibility and usability) with energy consumption and keeps light pollution to a minimum. Fixtures capable of dimming are recommended. Consider occupancy sensing dimming where appropriate. Lights should be on from dusk to dawn.

BEACON

- Install a beacon on top of the light pole for maximum visibility or on a short arm if there are overhead hazards or obstructions. If neither of these are feasible, consider installing the beacon on top of the DC fast charger. To ensure visibility at night, the beacon lights up from dusk to dawn.

ACCESSIBILITY

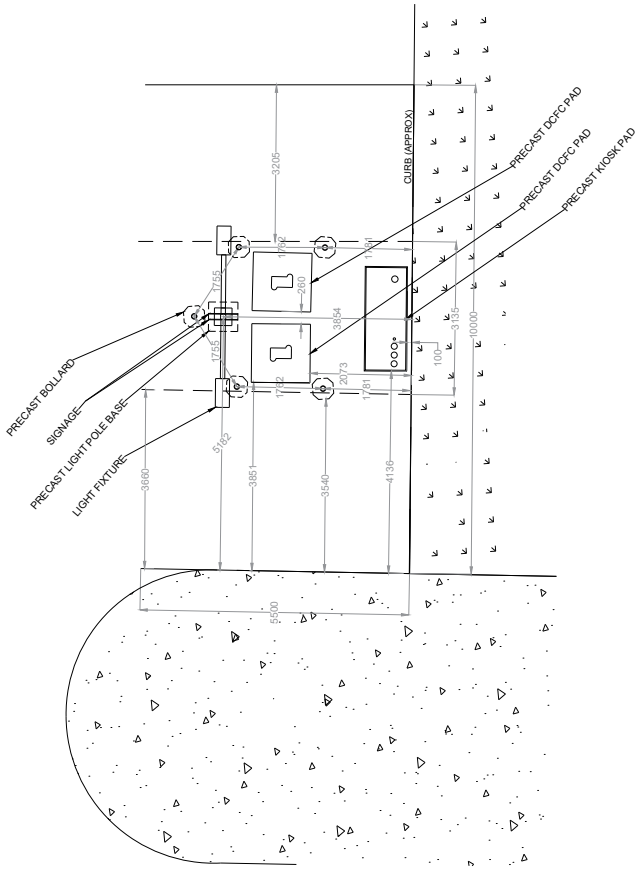
- If there is a curb, install a roll–over curb or ramp to meet accessibility needs.
- Minimize, or remove wheel stops to provide accessibility corridors around the vehicle.

Here is a photograph of one of our stations using the “pull–in, charger in front” design.

9. Detailed layout—Pull-in, charger between stalls

While this layout requires extra space to accommodate the charger and kiosk, it works well from an accessibility perspective. And since the charger is between stalls, cable reach is less of an issue. The driver can nose-in or back-in based on the EV charging port location. A stall on either side of the charger provides a space for charging and a space for waiting. The charging equipment is installed at the same grade as the parking lot to enhance accessibility.

Here is a sample of a "pull-in, charger between stalls" design drawing.



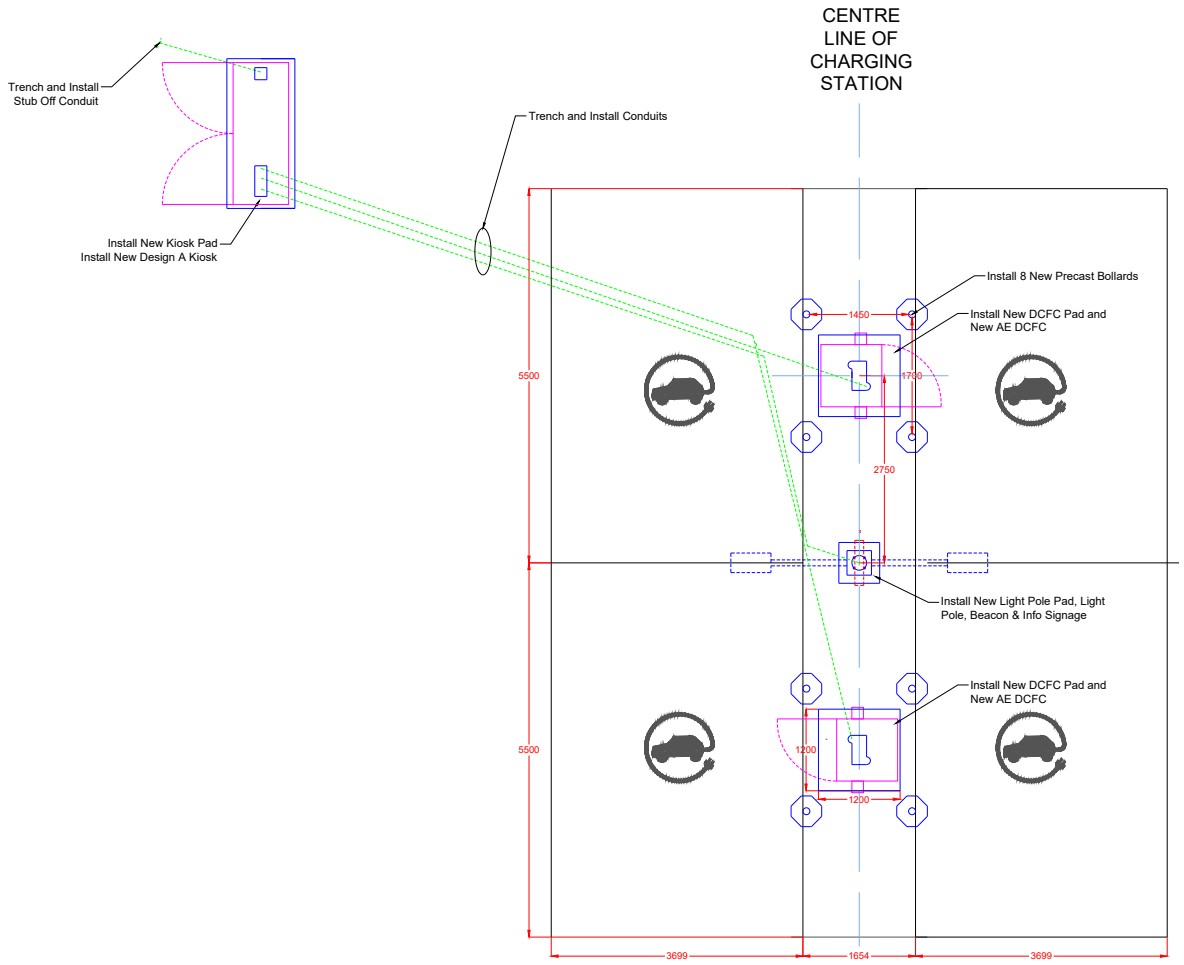
See **Appendix 8** for a list of recommendations around technical specifications.

Here is a photograph of one of our stations using the "pull-in, charger between" design.

10. Detailed layout—Pull-through

This design has many advantages such as being able to accommodate larger EVs like pickup trucks and EVs pulling trailers. It is also the easiest to design for accessibility. Since the charger is located in an open area, the driver can easily align the EV's charging port with the charging cable. If the charger is in use, this design provides space for EVs to wait around the island until it becomes available.

Here is a sample of a "pull-through" design drawing. For this design, the kiosk is typically installed away from the chargers.



See **Appendix 8** for a list of recommendations around technical specifications.

Here is a photograph of one of our stations using the "pull-through" design.

11. Equipment procurement requirements example

BC Hydro follows a standard competitive sourcing process for all major equipment purchases. Tender documents are prepared and uploaded to the public BC Bid website for all suppliers to access.

Providing a well-defined set of specifications is critical to allow for the objective scoring of bids. Transparent evaluation criteria will help ensure suppliers submit quality bids and minimize the number of follow-up questions. The evaluation team should understand that the lowest unit price doesn't always offer the best overall long-term value. Reliability, support, maintenance and other operating costs should always be factored into the evaluation.

This section outlines examples of procurement requirements you may want to consider when selecting equipment vendors for chargers, switchgear, etc. Note that some of the items listed below are examples and your own requirements may be different.

TECHNICAL SPECIFICATIONS

- Power output: 50kW
- Input Voltage Specification: 480 VAC, 60Hz, 3-phase, 4-wire
- Charge cable connector type: CCS and CHAdeMO
- Required safety standard testing and certification: CSA or other applicable technical safety authority, lead-free, asbestos-free

DATA NETWORK SPECIFICATIONS

- Communication network standard: OCPP compliant, wireless cellular/LTE connection
- Required remote troubleshooting features: firmware update, hard reset, performance statistics, etc.
- Support for billing/payment processes

OPERATING ENVIRONMENT SPECIFICATIONS

- Temperature range: -40 °C to +40 °C
- Required enclosure specification: NEMA 3R or equivalent

QUALITY REQUIREMENTS

- Required supplier ISO certification
- Required supplier quality assurance processes

SUPPORT QUESTIONS TO EVALUATE

- Warranty details: What parts are covered under warranty and what is considered normal wear and tear?
- Extended warranty terms
- Recommended spare parts inventory
- Maintenance and repair processes, local manufacturer or contractor support network

PROCUREMENT DETAILS TO INCLUDE

- Required cost breakdown including volume discount quantities and product variants
- Estimated quantities and timeline
- Required delivery schedule
- Bid evaluation criteria
- Required form of submission to ensure objective evaluation
- Required proof of supplier experience and references
- Required supplier interaction guidelines such as Code of Conduct, Ethical Sourcing, etc.

12. Powertech Labs and electric vehicle infrastructure

Powertech is an industry leader in the research, development and testing of EV charging infrastructure and networks. As BC Hydro's prime consultant for their Electric Vehicle Program, Powertech has pioneered the EV charging industry in B.C. assisting with early assessments of customer needs, technology, and operations. Powertech has also assisted several municipalities, large organizations, and institutions with planning for EV deployments, fleet options and GHG benefit estimation. Powertech led the design and installation of B.C.'s first ever direct current fast-charger (DCFC) station has now deployed more than 100 DCFCs around the Province and continues to support BC Hydro in all aspects of DCFC deployment including planning, design, construction, operation, trouble response and interoperability.

Aside from BC Hydro, Powertech has leveraged its expertise to support several other organizations with EV strategy and deployment, including Electrify Canada, The Township of Langley, YVR, Metro Vancouver and Federated Co-Operatives Limited.

Taking advantage of Powertech's unique EV Demo Park which hosts a wide selection of EV technologies, Powertech has also developed and tested innovative EV technologies including high- powered DCFCs (100kW+), demand response, vehicle-2-grid and smart power sharing.

Our EV-related expertise and services include:

- EV DCFC deployment planning and operations
- Energy management systems
- Interoperability/roaming
- Technology upgrades to keep pace with the changing EV market
- Smart charging solutions for workplaces and MURBs
- Testing of battery storage systems, EV charger connectivity and accuracy measurements
- Technical consulting and strategy development
- Research and development

We pride ourselves on adhering to the highest testing (ISO 17025), quality (ISO 9001) and environmental management (ISO 14001) standards. Safety is our top priority and we recently surpassed a milestone of 1,000,000 hours worked without a lost-time incident.

We look forward to the opportunity to further discuss possible collaborations.

About Powertech Labs

Powertech Labs Inc. is one of the largest testing and research laboratories in North America, situated in beautiful British Columbia, Canada.

Our 11-acre facility offers 15 different testing labs for a one-stop-shop approach to managing electrical utilities, and testing gas components, pressure vessels and systems.

Outside of the utilities industry, Powertech provides routine testing capabilities, product development, research and consulting services to support an array of industrial-type operations, electrical equipment manufacturers and automotive original equipment manufacturers.

www.powertechlabs.com

FOR MORE INFORMATION, CONTACT:

Randy Cunningham P.Eng. – Engineering Lead, EV Infrastructure Grid Modernization, **randy.cunningham@powertechlabs.com** or **604 590 7500**

Vidya Vankayala – Director, Grid Modernization, **Vidya.Vankayala@powertechlabs.com** or **604 590 7500**

BC Hydro
Power smart

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.2 Would BC Hydro agree that electric vehicles offer a major new mobility opportunity for persons with disabilities and that full accessibility of public fast charging sites is a necessary prerequisite?

RESPONSE:

BC Hydro agrees that providing accessibility to fast charging stations by persons with disabilities is extremely important and it is one of the key objectives BC Hydro tries to achieve when designing a new charging site.

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.3 Can BC Hydro say that each of its current and planned public fast charging sites enables everyone, including persons with disabilities, to access and operate the EV charging stations at the site?

RESPONSE:

Not all existing BC Hydro public fast charging sites are accessible based on our self-assessment.

Please refer to BCOAPO IR 1.1.1 for an updated site table that includes BC Hydro's self-assessment of accessibility attributes.

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.4 Would BC Hydro say that there is room to improve accessibility at some of its public fast charging sites?

RESPONSE:

BC Hydro agrees that there is room to improve accessibility at some of its existing public fast charging sites. Existing stations will be upgraded over time where possible and practical (usually when additional charging stations are added at a site).

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.5 Will BC Hydro commit to take all reasonable steps to address any deficiencies in accessibility at its public fast charging sites? Such steps could include, for example, installing curb ramps and associated level landing areas for operating fast chargers, ensuring parking stalls and landings are paved, configuring some accessibility stalls as drive-through to allow full access, installing sufficient area lighting at charging sites, and installing measures to offset the weight of the charging cables.

RESPONSE:

Please refer to BC Hydro's response to BCSEA-VEVA IR 1.1.1 where we explain our commitments. BC Hydro notes that at this time, BC Hydro is unable to commit to installing measures to offset the weight of charging cables as our current models of fast charging stations do not have counter-weights or booms to carry the weight of the cables. BC Hydro will explore this in the future as part of our procurement process and as fast charging station equipment evolves.

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.6 Would BC Hydro agree that accessibility to persons with disabilities is an important element of service quality when BC Hydro provides public fast-charging service?

RESPONSE:

BC Hydro agrees that providing accessibility to our fast charging stations to persons with disabilities is an important element of EV fast charging service quality. Please refer to BC Hydro's response to BCSEA VEVA IR 1.1.1 for our plan guidelines that incorporate accessibility.

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.7 Please describe BC Hydro's past and intended future engagement with persons with disabilities regarding the design, implementation and upgrade of BC Hydro's public fast charging sites and stations.

RESPONSE:

BC Hydro's designers, customer experience team, and construction teams have worked closely with a disability advocate and also Vancouver Electric Vehicle Association members to incorporate accessibility guidelines into our public fast charging station deployments. Activities have included interviews, a ride along to multiple charging stations, a review of barriers in both past and current station designs, and a discussion of new guidelines. These learnings informed the guidelines which is included as attachment to BC Hydro's response to BCSEA_VEVA IR 1.1.1.

BC Hydro will continue to work with groups representing and advocating for persons with disabilities to test and assess new infrastructure and station attributes to further enhance site accessibility.

1.0 A. Accessibility

Topic: Accessibility to Persons with Disabilities

Reference: Exhibit B-1, Application

1.1.8 Does BC Hydro have a table or spreadsheet showing compliance with accessibility measures for each of BC Hydro's public fast charging sites? If so, please provide a copy. If not, would BC Hydro agree to develop such a tool for engagement with stakeholders regarding accessibility and for use in the development of the evaluation report proposed to be filed with the BCUC by March 31, 2024?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for a site list table that includes site accessibility information.

2.0 A. Accessibility

Topic: Accessibility

Reference: Exhibit B-1, Application; Exhibit A-3, BCUC staff IR 7.9 to BC Hydro

BCUC IR 7.9 asks: "Do the capital costs include the costs to make the stations wheelchair accessible? Are all current and future stations wheelchair accessible?"

1.2.1 Further to BC Hydro's response to BCUC IR 7.9, if all of BC Hydro's current and future public fast charging sites are not wheelchair accessible, does BC Hydro have a plan and funding to make them wheelchair accessible?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.1.1 where BC Hydro explains its plan for wheelchair accessibility for new and existing fast charging stations.

3.0 A. Accessibility

Topic: **Accessibility**

Reference: **BC Hydro's "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia, Version 1.1"1**

BC Hydro's March 21, 2021 document "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia" provides the following summary of guidelines to create a barrier-free and accessible station:

> "Focus on barrier-free and accessible station design elements
>
> Here is a summary of guidelines to create a barrier-free and accessible station*:
>
> - **Bollards** A distance of about 1.2 metres (4 feet) to 1.7 metres (5.5. feet) between bollards should protect the charger from damage and allow for access to station. Also ensure there is enough space around the charger to be able to manoeuvre a wheelchair, for example.
> - **Surface** The parking stall surface and the area around the charger should have a firm, slip-resistant and level surface using concrete or asphalt. Do not use gravel.
> - **Concrete pad** When using a precast concrete pad for a fast charger, the pad should be elevated flush with grade so as to not make it difficult to reach the screen or charging cables. If the concrete pad cannot be flush with the grade, consider an access ramp.
> - **Signage** All signage and instructions for using the charger should use a clear and easy-to-read font.
> - **Accessible stall dimensions** If you have the space, ensure the stall is at least 3.7 metres (12 feet) wide which includes at least 1.5 metres (5 feet) for entering and leaving a vehicle. This will provide adequate space for parking and an access aisle for reaching the charger. Even if your stall is an accessible one, it is not necessary to paint an "accessibility parking space marking" in the stall. This way, the charging stall will remain open to all drivers wanting to charge.
> - **Charger Purchase** a charger that meets US ADA [*Americans With Disabilities Act*] requirements of placing the screen, holster and cables at a more accessible height.

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1 https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/electric-vehicles/BCHydro-EV-Fast-Charging-Guidelines.pdf

* Our list is not an exhaustive one so be sure to take the time to consult any relevant municipal, provincial or federal accessibility codes and guidelines as they are being updated regularly." [p.16]

1.3.1 Please confirm, or otherwise explain, that BC Hydro applies the Design & Operational Guidelines to its own public fast charging sites and stations.

RESPONSE:

During 2020, BC Hydro began applying the Design & Operational Guidelines to its public fast charging sites and stations where it was reasonably practicable. In general, it is more straightforward to align with these guidelines when building new sites than when looking at options to re-design existing sites.

The guidelines were developed by working with multiple parties (including Vancouver Electric Vehicle Association) to document a vision for fast charging stations in B.C. The guidelines are not meant to be standards and should be viewed as design objectives which can be considered together with other factors (e.g., budget constraints).

3.0 A. Accessibility

Topic: **Accessibility**

Reference: **BC Hydro's "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia, Version 1.1"1**

BC Hydro's March 21, 2021 document "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia" provides the following summary of guidelines to create a barrier-free and accessible station:

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> - **Concrete pad** When using a precast concrete pad for a fast charger, the pad should be elevated flush with grade so as to not make it difficult to reach the screen or charging cables. If the concrete pad cannot be flush with the grade, consider an access ramp.
> - **Signage** All signage and instructions for using the charger should use a clear and easy-to-read font.
> - **Accessible stall dimensions** If you have the space, ensure the stall is at least 3.7 metres (12 feet) wide which includes at least 1.5 metres (5 feet) for entering and leaving a vehicle. This will provide adequate space for parking and an access aisle for reaching the charger. Even if your stall is an accessible one, it is not necessary to paint an "accessibility parking space marking" in the stall. This way, the charging stall will remain open to all drivers wanting to charge.
> - **Charger Purchase** a charger that meets US ADA [*Americans With Disabilities Act*] requirements of placing the screen, holster and cables at a more accessible height.

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1 https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/electric-vehicles/BCHydro-EV-Fast-Charging-Guidelines.pdf

* Our list is not an exhaustive one so be sure to take the time to consult any relevant municipal, provincial or federal accessibility codes and guidelines as they are being updated regularly." [p.16]

1.3.2 Has BC Hydro conducted an evaluation of the extent to which the design and operation of its own public fast charging sites and stations is consistent with the Guidelines? If so, please provide a copy.

RESPONSE:

BC Hydro has not conduced a full self-assessment against the guidelines. Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for an updated site table plus additional accessibility columns that can be considered a BC Hydro self-assessment of those attributes.

3.0 A. Accessibility

Topic: **Accessibility**

Reference: **BC Hydro's "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia, Version 1.1"[1]**

BC Hydro's March 21, 2021 document "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia" provides the following summary of guidelines to create a barrier-free and accessible station:

> "Focus on barrier-free and accessible station design elements
>
> Here is a summary of guidelines to create a barrier-free and accessible station*:
>
> - **Bollards** A distance of about 1.2 metres (4 feet) to 1.7 metres (5.5. feet) between bollards should protect the charger from damage and allow for access to station. Also ensure there is enough space around the charger to be able to manoeuvre a wheelchair, for example.
> - **Surface** The parking stall surface and the area around the charger should have a firm, slip-resistant and level surface using concrete or asphalt. Do not use gravel.
> - **Concrete pad** When using a precast concrete pad for a fast charger, the pad should be elevated flush with grade so as to not make it difficult to reach the screen or charging cables. If the concrete pad cannot be flush with the grade, consider an access ramp.
> - **Signage** All signage and instructions for using the charger should use a clear and easy-to-read font.
> - **Accessible stall dimensions** If you have the space, ensure the stall is at least 3.7 metres (12 feet) wide which includes at least 1.5 metres (5 feet) for entering and leaving a vehicle. This will provide adequate space for parking and an access aisle for reaching the charger. Even if your stall is an accessible one, it is not necessary to paint an "accessibility parking space marking" in the stall. This way, the charging stall will remain open to all drivers wanting to charge.
> - **Charger Purchase** a charger that meets US ADA [*Americans With Disabilities Act*] requirements of placing the screen, holster and cables at a more accessible height.

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[1] https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/electric-vehicles/BCHydro-EV-Fast-Charging-Guidelines.pdf

* Our list is not an exhaustive one so be sure to take the time to consult any relevant municipal, provincial or federal accessibility codes and guidelines as they are being updated regularly." [p.16]

1.3.3 Please provide a copy of BC Hydro's "EV Fast Charging: Design & Operational Guidelines For Public DCFC Stations In British Columbia, Version 1.1".

RESPONSE:

Version 1.1 replaced Version 1.0 in March 2021 and is attached to BC Hydro's response to BCSEA VEVA IR 1.1.1, and is also available at the following link:

https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/electric-vehicles/BCHydro-EV-Fast-Charging-Guidelines.pdf

4.0 B. Existing BC Hydro Public Fast Charging Sites and Stations

Topic: Existing DCFC Sites and Stations

Reference: Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

Information on BC Hydro's Fast Charging Stations is set out in table form in Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

1.4.1 Please file an updated version of Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings."

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for an updated Appendix C.

4.0 B. Existing BC Hydro Public Fast Charging Sites and Stations

Topic: Existing DCFC Sites and Stations

Reference: Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

Information on BC Hydro's Fast Charging Stations is set out in table form in Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

1.4.2 Please confirm, or otherwise explain, that unless otherwise indicated, each of the criteria of section 5 of the GGRR applies to each charging station at the respective site.

RESPONSE:

Confirmed that all the electric vehicle charging stations in operation or to be in operation listed in Appendix C meet the criteria of section 5 of the Greenhouse Gas Reduction (Clean Energy) Regulation to be prescribed undertakings.

BC Hydro has provided a submission to the question asked in its Fiscal 2022 Revenue Requirements Application proceeding, which is pending before another Commission Panel. For ease of reference, the submission can be found at https://www.bcuc.com/Documents/Arguments/2021/DOC_61686_2021-03-18-BCH-Final-Argument-Public.pdf, and the relevant parts are from paragraph 146 to paragraph 158 of the submission.

4.0 B. Existing BC Hydro Public Fast Charging Sites and Stations

Topic: Existing DCFC Sites and Stations

Reference: Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

Information on BC Hydro's Fast Charging Stations is set out in table form in Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

1.4.3 Please confirm, or otherwise explain, that BC Hydro expects that all of its existing and future public fast charging sites and stations will meet the criteria of a prescribed undertaking under section 5 of the GGRR and section 18(2) of the Clean Energy Act.

RESPONSE:

Confirmed.

4.0 B. Existing BC Hydro Public Fast Charging Sites and Stations

Topic: Existing DCFC Sites and Stations

Reference: Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

Information on BC Hydro's Fast Charging Stations is set out in table form in Appendix C, "Electric Vehicle Charging Stations as Prescribed Undertakings," in the BC Hydro F2022 Revenue Requirement Application, Exhibit B-2-2

1.4.4 Please provide photos of a sampling of BC Hydro's existing public fast charging sites, to give a sense of the range of situations.

RESPONSE:

The pictures below provide a range of locations and site designs.

Prince Rupert:

Burns Lake:

Hixon:

Blue River:

Rogers Pass:

Manning Park:

Coquitlam East:

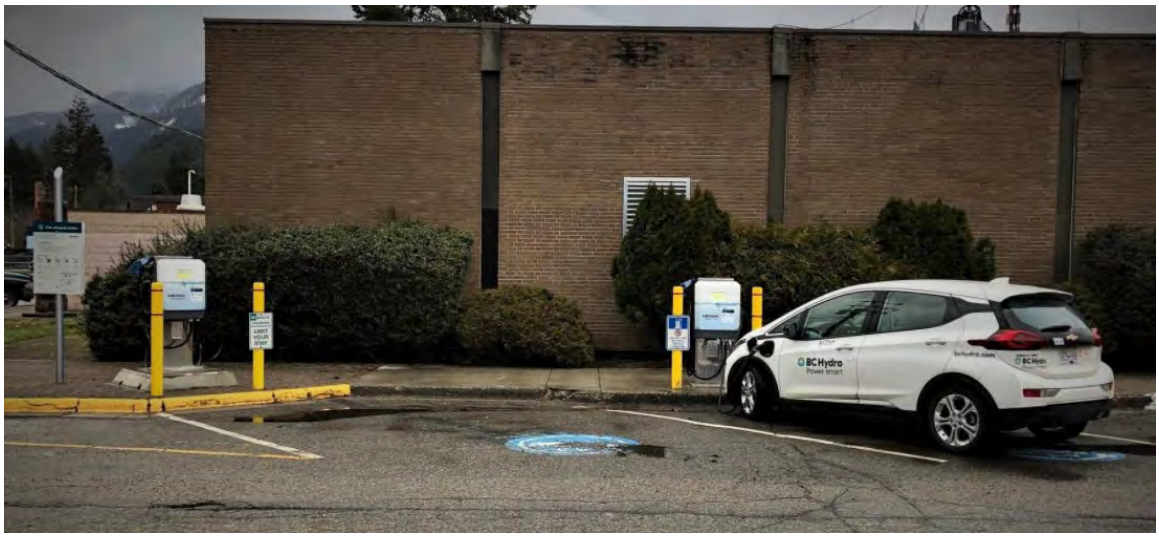
Downtown Vancouver:

Downtown Victoria:

Port McNeill:

Cloverdale:

Hope (2 x 25kW):



5.0 C. BC Hydro Public Fast Charging Planning

Topic: Planning Process

Reference: Exhibit B-1, Application

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.1 Please provide any corrections or additions to the preamble.

RESPONS:

The above preamble appears to be factually correct. BC Hydro has no corrections or additions to make but notes that the Electrification Plan is still under development.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: Planning Process

Reference: Exhibit B-1, Application

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.2 Please describe how BC Hydro currently plans the development of its public fast charging service.

RESPONSE:

BC Hydro plans and builds its fast charging network of stations to support the adoption of electric vehicles. Fast charging stations on primary and major secondary highway corridors make travel between cities using an EV feasible. In urban and suburban areas fast charging stations serve drivers who do not have access to home or workplace charging or require a charging rate faster than that provided by Level 1 (120 volt AC) or Level 2 (240 volt AC) charging.

For highway corridor locations, BC Hydro develops its EV fast charging deployment plans with reference to the following two studies which were funded by the Government of B.C:

1. **A Gap Analysis for B.C.'s Electric Vehicle Direct Current Fast Charging Network (2015); and**
2. **British Columbia Direct Current Fast Charging (DCFC) Network Study: Core Network for Geographic Connectivity (2018);**

Both of these studies can be found at the following link:

https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/clean-energy-vehicle-program/dcfc-program

BC Hydro develops its deployment plans in consultation with representatives from the Ministry of Energy, Mines and Low Carbon Innovation and the Ministry of Transportation and Infrastructure.

BC Hydro's urban and suburban stations are generally spaced more densely than those on highway corridors and are generally placed in areas with significant population living in multi-unit residential buildings.

With regard to the selection of specific sites within a geographic location, Appendix 4 in BC Hydro's "EV Fast Charging – Design & Operational Guidelines - For Public DCFC Stations in British Columbia (2021)" provides a

guide to site attributes that should be considered when siting an EV fast charging station.

The guidelines are included as Attachment 1 to BC Hydro's response to BCSEA VEVA IR 1.1.1.

The decision to expand an existing site beyond two EV fast charging stations will be dependent on station utilization and the incidence of station congestion. Excessive queuing can lead to a poor customer experience and may inhibit the adoption of electric vehicles.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: **Planning Process**

Reference: **Exhibit B-1, Application**

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.3 How does the planning of the deployment of BC Hydro's public fast charging service relate to the BC Hydro Electrification Plan? Is BC Hydro's deployment of public fast charging entirely with the Electrification Plan?

RESPONSE:

The deployment of EV fast charging stations will be a component of the BC Hydro's Electrification Plan currently under development and to be submitted with BC Hydro's Fiscal 2023 to Fiscal 2025 Revenue Requirements Application.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: Planning Process

Reference: Exhibit B-1, Application

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.4 What is the role of the Ministry of Energy, Mines and Low Carbon Innovation (as it is now called) in the planning of BC Hydro's public fast charging service?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding the role of the Ministry of Energy, Mines and Low Carbon Innovation in BC Hydro's deployment planning process.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: Planning Process

Reference: Exhibit B-1, Application

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.4 What is the role of the Ministry of Energy, Mines and Low Carbon Innovation (as it is now called) in the planning of BC Hydro's public fast charging service?

1.5.4.1 Has there been a change in the Ministry's role, for example following the GGRR amendment in 2020?

RESPONSE:

The role of the Ministry of Energy, Mines and Low Carbon Innovation (EMLI) in BC Hydro's deployment planning process has not changed following the amendment to the Greenhouse Gas Reduction (Clean Energy) Regulation in 2020. Please also refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding the role of EMLI in BC Hydro's EV fast charging deployment planning process.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: **Planning Process**

Reference: **Exhibit B-1, Application**

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.5 What are the opportunities for public engagement in the planning of BC Hydro's public fast charging service?

RESPONSE:

BC Hydro is taking a broader engagement approach in 2021 through the BC Hydro Electrification Plan public engagement process. BC Hydro's public fast charging service is included in our Electrification Plan.

BC Hydro often receives requests from municipalities, Indigenous communities, and private sector entities (e.g., grocers and gasoline filling stations) that would like to host a BC Hydro fast charging station. BC Hydro will be providing more information on bchydro.com to inform the public of our fast charging network deployment plan and planning process. This will include providing a web form to allow municipalities and site owners to submit their site for consideration.
BC Hydro will also develop a web form or standing survey to allow the public to provide their input. These suggestions and recommendations will be noted and considered in the overall planning process.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: Planning Process

Reference: Exhibit B-1, Application

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

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At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.6 Would BC Hydro be willing to expand the opportunities for public engagement in the planning of BC Hydro's public fast charging service if there was interest from EV drivers and other stakeholders?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.5 regarding its engagement activities underway in 2021 with respect to the Electrification Plan.

Yes, BC Hydro will be expanding the opportunities for public engagement in the planning of BC Hydro's public fast charging service in future years. Please also refer to BC Hydro's response to BCSEA VEVA IR 1.5.5 regarding the expanded approach to collecting public and stakeholder input into fast charging network planning.

5.0 C. BC Hydro Public Fast Charging Planning

Topic: **Planning Process**

Reference: **Exhibit B-1, Application**

In November 2018, the BCUC issued its report on phase one of its inquiry into the regulation of EV charging services.

In June 2019, the BCUC issued the phase two report, focused on EV charging service provided by regulated utilities such as BC Hydro and FortisBC (electric):. Among other things, the BCUC indicated that a government regulation would be necessary if BC Hydro and FBC were to provide public fast charging service supported financially to any degree by their regular utility customers.

Later in 2019 and in early 2020, the Ministry of Energy, Mines and Petroleum Resources (as it was then called) consulted with the public on how the Government should respond to the BCUC's inquiry reports. The Ministry observed that additional investment in EV charging infrastructure by BC Hydro and FBC would be required in order to achieve the EV sales targets mandated in BC's 2019 *Zero-Emission Vehicles Act*. The Ministry sought and received feedback on whether and if so how to enable BC Hydro and FBC to expand their public fast charging services with the costs (net of revenue from EV drivers) being backstopped by the utilities' regular customers.

In June 2020, the BC Government amended the Greenhouse Gas Reduction (Clean Energy) Regulation regarding EV charging service by BC Hydro and FBC, more or less along the lines suggested in the Ministry's consultation process. Briefly, the amendment to the GGRR requires the BCUC to allow BC Hydro and FBC to recover their costs of public fast charging investments that meet certain criteria (net of revenue from EV drivers) from regular customers. The GGRR does not specify what price BC Hydro or FBC should charge for public fast charging service. Nor does the GGRR say how many fast charging sites and chargers the utilities should implement. However, the GGRR does put a limit on the number of eligible charging sites in municipalities with a population of 9,000 or more.

BC Hydro is developing an Electrification Plan to be included in BC Hydro's next Revenue Requirements Application scheduled to be filed with the BCUC in August 2021. The Electrification Plan covers three areas: industry, transportation, and homes/buildings.

At a public on-line engagement workshop on April 13, 2021, BC Hydro outlined the current status of development of the transportation component of the Electrification Plan. BC Hydro's provision of public fast charging sites and

stations is one component of the transportation section of BC Hydro's Electrification Plan.

1.5.7 Please summarize the legal and policy support for BC Hydro's role in providing public fast charging service. Has BC Hydro's Low Carbon Electrification mandate affected how BC Hydro sees its role in providing public fast charging services?

RESPONSE:

Section 18 of the *Clean Energy Act* and the Greenhouse Gas Reduction (Clean Energy) Regulation provides the legal support for BC Hydro to provide the public electric vehicle fast charging service. Section 18(2) of the *Clean Energy Act* clearly states that a public utility carrying out a prescribed undertaking is able to recover costs in rates with respect to the prescribed undertaking. The Government of B.C. has added section 5 to the GGRR to make certain EV charging stations prescribed undertakings.

Additionally, the *Zero-Emission Vehicles Act,* which was enacted on May 30, 2019, also provides support for BC Hydro to provide the electric vehicle fast charging service. The Act codifies the Government of B.C.'s CleanBC plan to reduce greenhouse gas emissions, by stipulating percentage targets for new light-duty vehicle sales in B.C. that must have zero emissions, as follows: 10 per cent of sales by 2025; 30 per cent of sales by 2030; and 100 per cent of sales by 2040. BC Hydro is building a network of direct current, fast charging EV charging stations across the province to support the reduction of greenhouse gas ("GHG") emissions. A robust, reliable charging network is important for encouraging electric vehicle adoption, as it will address concerns around range anxiety and is essential for customers who do not have access to home or workplace charging.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.1 What are BC Hydro's plans for deploying additional public fast charging sites beyond those identified in Appendix C of the F2022 Revenue Requirement Application?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.2 to the Fiscal 2022 Revenue Requirements Application. This articulates BC Hydro's plans for deploying additional public fast charging sties beyond those identified in Appendix C of the Fiscal 2022 Revenue Requirements Application.

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding how BC Hydro currently plans the development of its public fast charging service.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.2 What are BC Hydro's plans for deploying additional fast charging units (charging stations as the GGRR calls them) at its existing or future fast charging sites?

RESPONSE:

Please refer to BC Hydro's responses to BCSEA VEVA IRs 1.5.2 and 1.6.1.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.3 What is BC Hydro's current thinking about a future transition out of its current role of providing public fast charging services in favour of exempt providers of public fast charging services operating in an unregulated market?

RESPONSE:

BC Hydro is currently focused on building out a network of public fast charging stations to support the increased adoption of electric vehicles in British Columbia and at a price that does not inhibit exempt service providers from also offering similar services in BC Hydro's service territory.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.4 Please confirm, or otherwise explain, that BC Hydro has no plans to implement public Level 2 charging service.

RESPONSE:

BC Hydro's public Level 2 charging service is currently limited to providing backup charging at BC Hydro's public fast charging sites. Currently there are BC Hydro-operated Level 2 chargers operating at four sites along with EV fast charging stations.

At this time BC Hydro has no plans to implement public Level 2 charging service except where it may be necessary as backup for BC Hydro's public fast charging sites.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.5 What criteria or formula does BC Hydro use to determine the locations of its existing or future public fast charging sites, the number of stations (chargers) at each site, and the power of the stations (e.g., 50 kW or 100 kW)?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding BC Hydro's fast charging stations site selection and planning process in general.

BC Hydro's primary focus has ben on the deployment of 50 kW charging stations with two fast charging stations at each site. While 50 kW charging stations will continue to be the primary deployment power level through fiscal 2022, BC Hydro is currently reassessing this approach mindful of new and upcoming EV models that are capable of a charge rate higher than 50 kW. BC Hydro has not yet established criteria for deploying 100 kW charging stations.

Four 25 kW stations have been deployed to sites where electrical constraints makes them more suitable relative to 50 kW stations. 25 kW charging stations will be deployed where there are electrical or other constraints that limit the ability to deploy BC Hydro's standard 50 kW charging stations.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.5.1 In planning its public fast charging network, does BC Hydro distinguish the needs of local EV drivers and away-from-home EV drivers? Is there a priority on providing service to one over the other?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding BC Hydro's fast charging stations site selection and planning process in general.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.6 Does BC Hydro have a commitment and a plan to position BC Hydro public fast charging sites along all numbered highways in the province, including in remote areas?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding the locations of its public fast charging stations.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.7 In BC Hydro's view, should all numbered highways be treated equally with respect to BC Hydro fast charging stations so EV drivers have access to all regions of the province?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding how BC Hydro's currently plans its fast charging network.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.8 Please describe whether and how BC Hydro's deployment of its public fast charging sites and stations takes into account public fast charging services (existing or potential) operated by entities other than BC Hydro.

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IRs 1.5.2 and 1.6.1 where we explain BC Hydro's fast charging station deployment planning process.

Please also refer to BC Hydro's response to BCSEA VEVA IR 1.6.5 where we explain fast charging station deployment by power level.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.9 In choosing specific locations for its public fast charging sites, how does BC Hydro take into account features such the proximity of highways, shopping malls, washrooms, convenience stores, lighting or other existing or planned public fast charging stations?

RESPONSE:

BC Hydro follows its own published guidelines with regard to site selection (i.e., sites within a close proximity to amenities are prioritized).

Please refer to page 34 of these published guidelines (also attached to BC Hydro's response to BCSEA VEVA IR 1.1.1):

https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/electric-vehicles/BCHydro-EV-Fast-Charging-Guidelines.pdf

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.10 What measures does BC Hydro use to evaluate its public fast charging network as a whole?

RESPONSE:

Customer satisfaction has been used to evaluate our public fast charging network. Overall customer satisfaction provides visibility into overall customer perception of reliability and other service and experience factors.

Please refer to BC Hydro's response to BCUC IR 1.4.2 regarding the BC Hydro electric vehicle charging network 2019 and 2020 customer satisfaction survey.

Please also refer to section 5 of the Application for our monitoring and evaluation plan.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.11 Does BC Hydro monitor congestion at its public fast charging sites?

RESPONSE:

Yes, BC Hydro monitors station congestion.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.11.1 Please discuss the options for addressing congestion at BC Hydro's public fast charging sites.

RESPONSE:

In BC Hydro's view, the options for addressing station congestion (if existing) may include the following:

- **Expanding the number of fast charging stations per site;**
- **Improving the reliability of fast charging stations at each site;**
- **Increasing the power level available at each site to reduce average session time; and**
- **Increasing the number of sites within a geographical area.**

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.11.2 Does BC Hydro consider that it has an adequate supply of information about the use of its public fast charging sites to be able to determine when steps to address congestion are necessary?

RESPONSE:

Since the interim rate was only effective on May 1, 2021, BC Hydro does not currently have adequate data nor information regarding any potential congestion at its fast charging sites after a rate is introduced.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.12 Is BC Hydro monitoring its current public fast charging sites with a view to assessing how appropriately they are sited to meet EV drivers' needs?

RESPONSE:

Yes, BC Hydro is monitoring its public fast charging sites and will collect customer feedback as described section 5 of the Application.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.13 Does BC Hydro consider that the improving range capabilities of BC's EV fleet over time may render some of its current DCFC sites less than optimally located? If so, does BC Hydro have a way to assess this?

RESPONSE:

BC Hydro does not have sufficient data to address this question.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: **Plans for BC Hydro Public Fast Charging**

Reference: **Exhibit B-1, Application**

1.6.14 Is it feasible for BC Hydro to relocate one of its DCFC sites if it is not optimally located to serve EV customers?

RESPONSE:

BC Hydro has relocated electric vehicle fast charging sites in the past. Generally, relocations were due to technical constraints, lease termination, or inability to expand the number of charging stations at a site.

6.0 C. BC Hydro Public Fast Charging Planning

Topic: Plans for BC Hydro Public Fast Charging

Reference: Exhibit B-1, Application

1.6.15 Please confirm, or otherwise explain, that section 5 of the GGRR would cover more stations and/or more sites than BC Hydro proposes to implement at the present time.

RESPONSE:

Section 5 of the GGRR makes an eligible electric vehicle charging station a prescribed undertaking, if, among other things, the public utility reasonably expects, on the date the public utility decides to construct or purchase the eligible charging station, that:

(i) The station will come into operation by December 31, 2025, and

(ii) If the station will be located in a limited municipality, the number of eligible charging sites in the municipality on the date the station will come into operation will not exceed the site limit for the municipality on that date.

December 31, 2025 is still a few years away, and BC Hydro's existing stations do not exceed any site limits. Thus, it is reasonable to conclude that BC Hydro can have more electric vehicle charging stations that will meet the requirements of section 5 of the GGRR.

Please refer to BC Hydro's responses to BCSEA VEVA IRs 1.5.2 and 1.6.1 where BC Hydro provides information on its deployment plans.

7.0 C. BC Hydro Public Fast Charging Planning

Topic: Impact on Other EV Charging

Reference: Exhibit B-1, Application, page 10

BC Hydro says that "fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work." [p.10]

1.7.1 What information does BC Hydro have on whether its fast charging stations in urban and suburban locations inhibit the development of EV charging infrastructure in homes, MURBs or workplaces?

RESPONSE:

BC Hydro does not have any data that would suggest that fast charging stations in urban and suburban locations would inhibit development of EV charging infrastructure in homes, MURBs, or workplaces.

7.0 C. BC Hydro Public Fast Charging Planning

Topic: Impact on Other EV Charging

Reference: Exhibit B-1, Application, page 10

BC Hydro says that "fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work." [p.10]

1.7.2 In BC Hydro's view, will pricing BC Hydro's public fast charging service at the low end of the 20 to 30 cents/minute range for 50 kW charging inhibit the development of charging infrastructure in homes, MURBs and workplaces?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.7.1.

7.0 C. BC Hydro Public Fast Charging Planning

Topic: Impact on Other EV Charging

Reference: Exhibit B-1, Application, page 10

BC Hydro says that "Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible..."

1.7.3 In BC Hydro's view, do other entities already provide adequate public fast charging service along highway corridors in BC? Are they on track to do so in the future?

RESPONSE:

Based on the following study, there is still an opportunity to provide more public fast charging service along highway corridors in B.C:

https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/clean-energy-vehicle-program/dcfc-program

8.0 C. BC Hydro Public Fast Charging Planning

Topic: "nowhere else to charge"

Reference: Exhibit B-1, Application, pages 14-19; Appendix D, "Electric Vehicle Charging Stations Survey – Section B Results," pfd p.68

BC Hydro provides Leger's results of a survey questionnaire focused on users of BC Hydro's public fast charging sites. The survey was undertaken in August and September of 2020, when BC Hydro's public fast charging service was free. Leger reports that "One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge." [p.15]

1.8.1 Can BC Hydro provide any further insight into the circumstances of the users of BC Hydro's public fast charging sites who indicate that "public charging service is critical to them and they have nowhere else to charge"?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.4.3 regarding respondents indicating they have nowhere else to charge.

9.0 C. BC Hydro Public Fast Charging Planning

Topic: 100 kW Charging Station

Reference: Exhibit B-1, Application, page 11

"BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites." [p.11]

1.9.1 Please discuss the role of 100 kW or greater charging stations in BC Hydro's public fast charging deployment plan.

RESPONSE:

BC Hydro continues to consider and adjust its EV fast charging deployment plan, including the role of 100 kW and above stations in the future.

9.0 C. BC Hydro Public Fast Charging Planning

Topic: 100 kW Charging Station

Reference: Exhibit B-1, Application, page 11

"BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites." [p.11]

1.9.2 If government funding and suitable sites were available would BC Hydro deploy additional 100 kW fast charging stations?

RESPONSE:

Yes.

9.0 C. BC Hydro Public Fast Charging Planning

Topic: 100 kW Charging Station

Reference: Exhibit B-1, Application, page 11

"BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites." [p.11]

1.9.3 Would the 100 kW fast charging stations be allocated to sites that particularly serve inter-city highway travelers?

RESPONSE:

BC Hydro has not yet finalized its plans for the deployment of 100 kW fast charging stations. Please refer to BC Hydro's responses to BCSEA VEVA IRs 1.5.2 and 1.6.1 for its deployment plan.

9.0 C. BC Hydro Public Fast Charging Planning

Topic: 100 kW Charging Station

Reference: Exhibit B-1, Application, page 11

"BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites." [p.11]

1.9.4 As other providers of public fast charging service implement more 100 kW chargers and chargers even higher than 100 kW, does BC Hydro see itself adopting a similar trend?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.9.1 where we explain that BC Hydro continues to consider and adjust its EV fast charging deployment plan, including the role of 100 kW and above stations in the future.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

"The Proposed Rates are time based. Each charging station has a built-in timing device, which will measure the charging time by the second. The total time for each charging session will be displayed in minutes and seconds shown on the billing receipt at the end of each charging session.

Although customer and stakeholder support for an electricity-based or a combination electricity-and-time-based rate was expressed during BC Hydro's public and stakeholder consultations as discussed in section 3 below, only a time-based rate is possible at this time due to the lack of a Measurement Canadian approved standard to measure direct current (DC) power. While the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle." [underline added]

1.10.1 Can it be said that the nub of the problem is that while the fast charging equipment can provide the driver with an estimate of the number of kW-hours delivered in a charging session this estimate has not been shown to Measurement Canada's satisfaction to be sufficiently accurate for billing purposes?

RESPONSE:

While the embedded metering in a direct current fast charging station provides an estimate of the kWh delivered in a charging session, the kWh recorded by an embedded meter in a DC fast charging station is not currently approved as a legal unit of measurement. There is currently no DC metering standard that has been adopted by Measurement Canada outlining the performance requirements for DC fast charging stations. Since the accuracy of kWh delivered measured by the DC fast charging station is not currently a defined requirement in an approved/adopted standard, it is not appropriate to conclude that the accuracy of currently deployed DC fast charging stations is not to Measurement Canada's satisfaction. The accuracy requirements that must be met for billing purposes, will be defined as part of the proposed 18-month consultation process that was initiated in early 2021.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

"The Proposed Rates are time based. Each charging station has a built-in timing device, which will measure the charging time by the second. The total time for each charging session will be displayed in minutes and seconds shown on the billing receipt at the end of each charging session.

Although customer and stakeholder support for an electricity-based or a combination electricity-and-time-based rate was expressed during BC Hydro's public and stakeholder consultations as discussed in section 3 below, only a time-based rate is possible at this time due to the lack of a Measurement Canadian approved standard to measure direct current (DC) power. While the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle." [underline added]

1.10.2 For greater certainty, please confirm that it would not be legal for BC Hydro to charge EV drivers on a $/kWh basis at its public fast charging sites at the present time.

RESPONSE:

Confirmed.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

BC Hydro states on page 12 of the Application:

> "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." [underline added]

1.10.3 Please describe how the ANSI metering working group's development of a DC metering standard relates to Measurement Canada's public consultation process.

RESPONSE:

The ANSI (American National Standards Institute) C12 series of standards define the physical aspects and performance criteria of electricity meters. Measurement Canada has specified the minimum accuracy class rating for electricity meters used in trade according to the ANSI C12 standard accuracy class ratings. Since Measurement Canada historically defined the standards developed by the ANSI, we expect that for DC metering, Measurement Canada would similarly base the accuracy requirements on the DC metering standard (i.e., ANSI C12.32) that is now published by the ANSI working group. Accuracy is one of the performance requirements in addition to other requirements that we expect will be defined during the Measurement Canada public consultation process.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

BC Hydro states on page 12 of the Application:

> "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." [underline added]

1.10.4 Does the 18-month expected timeline for the Measurement Canada public consultation process mean that at the end of 18 months Measurement Canada will approve standards for revenue metering for DC EV charging equipment? Or is there an expectation that following the 18-month public consultation period there will be an additional period of time for Measurement Canada to go through the approval process and to actually approve standards for revenue metering for DC EV charging equipment in Canada?

RESPONSE:

Based on BC Hydro's understanding, the currently published 18-month timeline from Measurement Canada is to formally publish the performance requirements to measure the amount of electricity supplied to an EV. Similar to how AC revenue meters are approved today for billing energy usage at various premises, Measurement Canada would also likely have an approval process to evaluate compliance of DC fast charging stations with the established technical standards.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

BC Hydro states on page 12 of the Application:

> "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." [underline added]

1.10.5 Does BC Hydro expect that after Measurement Canada approves standards for revenue metering for DC EV charging equipment in Canada there will be an additional period of time for the providers of DC EV charging equipment to obtain certification that their fast charging equipment meets the Measurement Canada standard for revenue metering, or to develop and obtain certification of such equipment?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.10.4.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

BC Hydro states on page 12 of the Application:

> "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." [underline added]

1.10.6 Does BC Hydro have any insight into whether its existing and soon-to-be-installed DC EV charging equipment will meet future Measurement Canada standards for revenue metering? Does BC Hydro expect that after Measurement Canada eventually approves standards for revenue metering in fast charging equipment BC Hydro would need to implement new fast charging equipment that meets the new standards before BC Hydro would be allowed to charge on a $/kWh basis for its public fast charging service?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.13.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

BC Hydro states on page 12 of the Application:

> "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." [underline added]

1.10.6 Does BC Hydro have any insight into whether its existing and soon-to-be-installed DC EV charging equipment will meet future Measurement Canada standards for revenue metering? Does BC Hydro expect that after Measurement Canada eventually approves standards for revenue metering in fast charging equipment BC Hydro would need to implement new fast charging equipment that meets the new standards before BC Hydro would be allowed to charge on a $/kWh basis for its public fast charging service?

1.10.6.1 Put another way, does BC Hydro expect that its existing and soon-to-be-installed fast charging equipment will meet the revenue metering standards when the standards are eventually adopted?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.13.

10.0 D. Rate Design

Topic: $/minute v. $/kWh

Reference: Exhibit B-1, Application, pages 11-12.

BC Hydro states on page 12 of the Application:

> "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." [underline added]

1.10.7 Does BC Hydro expect that there will be clarity about revenue metering standards for DCFC in Canada by the time BC Hydro prepares the evaluation report it proposed to file with the BCUC by March 31, 2024 [Application, p.34]?

RESPONSE:

With the recent announcement by the federal government below, and the 18 months consultation process initiated by Measurement Canada, there is an expectation that a standard will be in place by March 31, 2024.

The federal parliamentary environment committee has just formally recommended that the Measurement Canada Electricity and Gas Inspection Act and Regulations be modernized to support electric vehicles. Please refer to the report at the following link for further details.

https://www.ourcommons.ca/DocumentViewer/en/43-2/ENVI/report-3

Specifically, Recommendation 10 states

> **"The Committee recommends that the Government of Canada consider revising the Electricity and Gas Inspection Act, the Weights and Measures Act, and their associated regulations to remove barriers to innovative vehicle charging technologies and to improve transparency for electricity providers and users."**

As well, the Federal Budget 2021 proposes to allocate $56.1 million over five years to Measurement Canada to support a number of zero emission vehicle (ZEV) initiatives including the required DC metering standards. The information can be found at the following link:

https://electricity.ca/news-events/news/cea-reacts-to-budget-2021-clean-energy-investments-continue-to-play-a-vital-role-in-canadas-climate-change-commitments/

11.0 D. Rate Design

Topic: Postage Stamp Rate Approach

Reference: Exhibit B-1, Application

1.11.1 The rates for which BC Hydro seeks approval are the same at each of the public fast charging sites throughout BC Hydro's service territory. Can this be described as an application of the postage stamp rate approach?

RESPONSE:

BC Hydro confirms the Proposed Rate can be considered as postage stamp rates.

11.0 D. Rate Design

Topic: Postage Stamp Rate Approach

Reference: Exhibit B-1, Application

1.11.2 Did BC Hydro consider having different rates for public fast charging in different areas with BC Hydro's service territory? (Not suggesting necessarily, just asking.) If not, why not? If BC Hydro did consider the possibility of different rates in different areas, why did BC Hydro reject the idea?

RESPONSE:

BC Hydro considered the possibility of different rates in different areas, however for simplicity, ease of understanding and administration, we believe that the postage stamp approach is appropriate at this time.

12.0 D. Rate Design

Topic: Peak/Off-Peak Rates

Reference: Exhibit B-1, Application

1.12.1 The rates for which BC Hydro seeks approval are the same at all times of day and at all days of the year. Did BC Hydro consider having different rates during peak and off-peak periods? If not, why not? If BC Hydro did consider the possibility of peak/off-peak rates for its public fast charging service, why did BC Hydro reject the idea?

RESPONSE:

BC Hydro did consider the possibility of peak/off peak rates for its public fast charging service; however, for simplicity and ease of understanding, BC Hydro views the simple time-based rate design as being appropriate at this time.

Time varying rates would improve economic efficiency relative to a simple time-based rate. If appropriate, BC Hydro may further consider and apply to the BCUC for a time varying rate design for public fast charging service based on the finding of our planned evaluation in 2024.

12.0 D. Rate Design

Topic: Peak/Off-Peak Rates

Reference: Exhibit B-1, Application

1.12.2 Would BC Hydro agree that peak/off-peak rates for BC Hydro's public fast charging service would help spread out the use of the stations and reduce congestion at peak times?

RESPONSE:

BC Hydro does not have enough information at this time to conclude whether or not time varying rates would help spread out the use of the stations and reduce congestion at peak times. We suggest that this issue be considered in the scope of our planed evaluation in 2024.

12.0 D. Rate Design

Topic: Peak/Off-Peak Rates

Reference: Exhibit B-1, Application

1.12.3 Will BC Hydro examine the merits of peak/off-peak rates in the evaluation report proposed to be filed with the BCUC by March 31, 2024?

RESPONSE:

Yes, BC Hydro will examine the merits of peak/off-peak rates in the evaluation report proposed to be filed with the BCUC by March 31, 2024.

13.0 D. Rate Design

Topic: Alternative Rate Designs

Reference: Exhibit B-1, Application

A VEVA member says it might be possible to adjust the $/minute billing rate to correspond to the amount of power (kW) being dispensed during a charging session rather than basing the $/minute rate on the charger's nameplate power rating (e.g., 50 kW or 100 kW). They are interested in this approach as a work-around until Measurement Canada approves standards for a DC energy revenue meter and fast charging can be billed on a $/kWh basis.

1.13.1 Has BC Hydro considered a rate design in which the price per minute varies according to the power (kW) being dispensed during the charging session utilizing software within the DCFC unit?

RESPONSE:

BC Hydro has not considered rate design in which the price per minute varies according to the power (kW) being dispensed during the charging session. This rate design is a form of an electricity-based rate, which is not feasible for BC Hydro to implement at this time, as further described in section 2.2 of the Application.

14.0 E. Rates

Topic: Need for BC Hydro Public Fast Charging Rates

Reference: Exhibit B-1, Application, page 2

In the Application, BC Hydro states:

> "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below.
>
> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. ..." [p.2, underline added]

1.14.1 What has BC Hydro said to EV drivers in the past regarding whether the free service at BC Hydro's public fast charging stations would be temporary or permanent? Has BC Hydro led customers to believe that its public fast charging service would be free indefinitely?

RESPONSE:

Rates charged by BC Hydro to its customers are set by the British Columbia Utilities Commission. BC Hydro does not have the authority to provide assurances to any customers that rates will be set to a specific level indefinitely.

Signage at BC Hydro fast charging stations specifically communicated "Free *introductory* charging" prior to early April 2021, when this statement was replaced with the interim rates that became effective May 1, 2021.

The first communications regarding potential rates were sent to BC Hydro EV network customers in August 2020 along with the first rate-related survey. This gave customers over 10 months notice before rates came into effect.

14.0 E. Rates

Topic: Need for BC Hydro Public Fast Charging Rates

Reference: Exhibit B-1, Application, page 2

In the Application, BC Hydro states:

> "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below.
>
> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. ..." [p.2, underline added]

1.14.2 Please specify the reasons why BC Hydro rejects continuation of the status quo in which "the entire cost for providing the fast charging service is recovered from all ratepayers."

RESPONSE:

BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs. This objective is consistent with Bonbright rate design criteria regarding fair apportionment of costs and economic efficiency.

The Proposed Rates are intended to collect revenue from the users of the fast charging service which will help minimize cost impact on all ratepayers. This supports our goal to help keep electricity bills affordable for our customers

14.0 E. Rates

Topic: Need for BC Hydro Public Fast Charging Rates

Reference: Exhibit B-1, Application, page 2

In the Application, BC Hydro states:

> "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below.
>
> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. ..." [p.2, underline added]

1.14.3 BC Hydro says that about half of the EV drivers surveyed indicated they would stop using the BC Hydro public fast charging service if a rate is introduced [p.14]. Why does BC Hydro apparently not consider that a sufficient reason to continue with free service?

RESPONSE:

BC Hydro recognizes and has considered customer feedback indicating that usage will decrease if a rate is charged; however, BC Hydro must also consider the economic interests of all ratepayers. The Proposed Rates are expected to provide benefits to all ratepayers as described in section 1.3.2 of the Application.

14.0 E. Rates

Topic: Need for BC Hydro Public Fast Charging Rates

Reference: Exhibit B-1, Application, page 2

In the Application, BC Hydro states:

> "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below.
>
> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. ..." [p.2, underline added]

1.14.4 What is BC Hydro's response to suggestions that its public fast charging service should be free in order to promote EV sales and use in BC?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.14.3.

14.0 E. Rates

Topic: Need for BC Hydro Public Fast Charging Rates

Reference: Exhibit B-1, Application, page 2

In the Application, BC Hydro states:

> "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below.
>
> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. ..." [p.2, underline added]

1.14.5 Has BC Hydro considered a phased approach to introducing pricing for its public fast charging service, such as a very low price initially followed by one or more increases at scheduled intervals? (Not suggesting necessarily, just asking.)

RESPONSE:

BC Hydro has proposed a phased approach to introducing pricing for its public fast charging service. As described in sections 4.1 and 4.2 of the Application, BC Hydro has determined that as utilization rate of the fast charging stations increase over time, the rate required to recover costs under three differing scenarios of cost recovery, as shown in Table 3 of the application, will be less than the rates that BC Hydro has requested for approval at this time. BC Hydro is proposing to revisit its pricing, if warranted, by March 31, 2024 after it has filed an evaluation report that will reflect two full years of utilization and financial data.

BC Hydro also notes that, as shown in Table 2 of the Application, our jurisdictional review indicates that our Proposed Rate is within the range of charging rates already in place in British Columbia as of February 2, 2021.

14.0 E. Rates

Topic: Need for BC Hydro Public Fast Charging Rates

Reference: Exhibit B-1, Application, page 2

In the Application, BC Hydro states:

> "As shown in the F2022 RRA, BC Hydro will have approximately 96 fast charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below.
>
> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. ..." [p.2, underline added]

1.14.6 Why has BC Hydro chosen not to delay its application for approval of rates for its public fast charging service due to the current COVID-19 pandemic? (Not suggesting necessarily, just asking.)

RESPONSE:

BC Hydro did not see any reason to delay the filing of the Application due to the COVID-19 pandemic.

15.0 E. Rates

Topic: Rate Setting Objective

Reference: Exhibit B-1, Application, pages 3, 25-26

BC Hydro states:

> "The Proposed Rates, will allow BC Hydro to collect revenue to recover as much as practical of the cost of providing the fast charging service from users of the service, which will reduce costs that must be recovered from all ratepayers." [p.3, underline added]

1.15.1 Does this imply that the size of the proposed rates is aimed at maximizing the net revenue from EV drivers (i.e., revenue net of variable costs)?

RESPONSE:

The Proposed Rates are not aimed at maximizing the net revenue from EV drivers (i.e., revenue net of variable costs). As described on page 2 of the Application, the Proposed Rates are designed to minimize cost impact on all ratepayers (i.e., the contribution of non-electric vehicle fast charging service customers to the cost of the service).

15.0 E. Rates

Topic: Rate Setting Objective

Reference: Exhibit B-1, Application, pages 3, 25-26

BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis.
>
> However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery." [pp.25-26]

1.15.2 What is BC Hydro's estimate of the station utilization rates at which fast charging service rates would collect sufficient revenues from the users of the service to recover the full costs of service?

RESPONSE:

As shown in Table 3 of the Application, BC Hydro expects that utilization would need to reach approximately 20 per cent in order for revenues to be sufficient to recover the full cost of service, assuming the Proposed Rates are approved as filed.

15.0 E. Rates

Topic: Rate Setting Objective

Reference: Exhibit B-1, Application, pages 3, 25-26

BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis.
>
> However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery." [pp.25-26]

1.15.3 Does BC Hydro have an estimate of how long it will be until these station utilization rates are achieved?

RESPONSE:

At this time BC Hydro does not have a forecast of how long it will be until station utilization rates are high enough to result in revenue sufficient to recover the full cost of service from the customers of fast charging service.

16.0 E. Rates

Topic: Price Point

Reference: Exhibit B-1, Application, page 23.

BC Hydro says that typical rates for a 50 kW fast charging station service are between 20 to 30 cents per minute. BC Hydro proposes a price of 21 cents/minute for 50 kW fast charging service.

1.16.1 Is it fair to say that BC Hydro's proposed price point is at the low end of the range?

RESPONSE:

Yes, it is fair to say that BC Hydro's Proposed Rates are at the low end of the range of rates fast charging station operators, as reflected in Table 2 of the Application.

16.0 E. Rates

Topic: Price Point

Reference: Exhibit B-1, Application, page 23.

BC Hydro says that typical rates for a 50 kW fast charging station service are between 20 to 30 cents per minute. BC Hydro proposes a price of 21 cents/minute for 50 kW fast charging service.

1.16.2 In proposing a rate of 21 cents/minute for 50 kW service, does BC Hydro anticipate drawing customers away from other providers of public fast charging service? If so, please reconcile this with the level playing field objective articulated by the BCUC in its Phase Two Report of the Inquiry into the Regulation of EV Charging Service. If not, why not?

RESPONSE:

BC Hydro does not anticipate drawing customers away from other providers of public fast charging service in its service territory as currently there is limited public fast charging services available.

BC Hydro supports the development of additional public fast charging services by other operators. We believe that additional investments in public fast charging services by a range of operators will support the adoption of electric vehicles in BC, which will support the Province's CleanBC goals.

16.0 E. Rates

Topic: Price Point

Reference: Exhibit B-1, Application, page 23.

BC Hydro says that typical rates for a 50 kW fast charging station service are between 20 to 30 cents per minute. BC Hydro proposes a price of 21 cents/minute for 50 kW fast charging service.

1.16.3 Is BC Hydro concerned that a price point at the low end of the range will exacerbate congestion at times of peak usage of its public fast charging sites?

RESPONSE:

BC Hydro is not concerned that a price point at the low end of the range will exacerbate congestion at times of peak usage of its public fast charging sites. As shown by the customer research presented in section 3.1 of the Application, almost half of BC Hydro's fast charging stations users indicate that they will stop using the stations once the rate is introduced. If this outcome arises, utilization will drop, and congestion will not be an issue.

BC Hydro will monitor congestion as part of the monitoring and evaluation plan presented in section 5 of the Application. If congestion becomes an issue, that may inform a repricing application that could use price signals to manage the timing of when customers use BC Hydro's public fast charging stations.

17.0 E. Rates

Topic: 100 kW Price

Reference: Exhibit B-1, Application, page 1

BC Hydro seeks approval of a final rate of 27 cents per minute for 100 kW service. FortisBC (electric) has applied to the Commission for approval of a final rate of 54 cents per minute for 100 kW service (decision pending at the time of writing).

1.17.1 Does BC Hydro see a problem with having a final rate of 27 cents per minute for 100 kW service if the FBC rate is substantially higher at 54 cents per minute for 100 kW service?

RESPONSE:

BC Hydro notes that both BC Hydro's and FortisBC's proposed rates are still subject to BCUC approval. Although the respective proposed rates are significantly different, the utilities serve different service territories and have also used their own methodologies and assumptions to determine their proposed rates.

18.0 E. Rates

Topic: Labour costs for EV Infrastructure

Reference: Exhibit B-1, Application, page 30; Exhibit A-3, BCUC IR 7.5

BC Hydro refers to labour costs of approximately $800,000 per year associated with electric vehicle infrastructure that are not included in station maintenance and capital costs for the costs analysis. BCUC asks why the $800,000 per year is not included in the calculation of the full cost of service.

1.18.1 Pleases explain the labour costs of approximately $800,000 per year associated with electric vehicle infrastructure. Does this relate to EV infrastructure more broadly than BC Hydro's own public fast charging service?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.5 which explains the labor costs relate to a team in Customer Service who lead the development of transportation electrification activities within BC Hydro including electric vehicles adoption and promotion. Supporting electric vehicle fast charging infrastructure implementation is only a portion of their responsibilities.

19.0 F. Regulatory Context

Topic: Regulatory Context

Reference: Exhibit B-1, Application

1.19.1 If BC Hydro's public fast charging sites and stations meet the criteria in section 5 of the GGRR, in BC Hydro's view does the BCUC have the authority to reject the proposed rates in light of section 18(2) of the Clean Energy Act?

RESPONSE:

The BCUC has discretion to set rates under sections 59 to 60 of the *Utilities Commission Act*.

However, please refer to BC Hydro's response to BCUC IR 1.15.1.1 where we explain that the Proposed Rates are for fast charging service stations that are "prescribed undertakings" under section 5 of the Greenhouse Reduction (Clean Energy) Regulation and that by virtue of section 18(2) of the *Clean Energy Act*, the BCUC must allow BC Hydro to recover the cost of service from all ratepayers. If the rates for electric vehicle fast charging service approved by the BCUC do not allow BC Hydro to collect revenues in each fiscal year sufficient to recover all costs of service with respect to its fast charging stations, the remaining costs will be recovered in rates from all ratepayers as allowed by section 18(2) of the *Clean Energy Act*. This is done through the revenue requirements application proceeding.

20.0 G. Marketing

Topic: Advertising DCFC services

Reference: Exhibit B-1, Application, page 31.

BC Hydro indicates that improving the recovery of its costs of providing public fast charging service depends on increased utilization rates, but that it lacks information to estimate expected utilization rates at this time. BC Hydro states:

> "In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station." [footnote removed]

1.20.1 What is BC Hydro doing to advertise its public fast charging services and to otherwise promote utilization of its stations?

RESPONSE:

BC Hydro promotes our public fast charging network primarily through BC Hydro owned and earned media channels, with a small investment in paid advertising. Promotions include:

- **Third party applications and websites that connect EV drivers with available chargers (e.g., PlugShare and ChargeHub);**
- **A dedicated EV website: http://electricvehicles.bchydro.com;**
- **Monthly email and newsletter communications;**
- **BC Hydro YouTube channel with a variety of EV related videos: https://www.youtube.com/user/BChydro;**
- **Social media channels: Facebook, Twitter, Instagram and Linkedin;**
- **Traditional earned media: several proactive media releases and reports each year, which receive extensive coverage;**
- **Community events and partnerships (e.g., Vancouver International Auto Show); and**
- **Digital paid advertising campaign, with a focus on EV road trips and public charging.**

21.0 H. Evaluation Report

Topic: Evaluation Report

Reference: Exhibit B-1, Application, pages 32-33, 36

BC Hydro states:

> "We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024. This timeline will allow for the collection and analysis of two full fiscal years of utilization and financial data (fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation."

1.21.1 Order G-89-21 approves the interim rates for BC Hydro's public fast charging service effective May 1, 2021. Please confirm, or otherwise explain, that the interim rates were implemented on May 1, 2021.

RESPONSE:

Confirmed.

21.0 H. Evaluation Report

Topic: Evaluation Report

Reference: Exhibit B-1, Application, pages 32-33, 36

BC Hydro states:

> "We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024. This timeline will allow for the collection and analysis of two full fiscal years of utilization and financial data (fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation."

1.21.2 In BC Hydro's view, does missing one month of data (April) from F2022 affect the proposed timing of filing the evaluation report by March 31, 2024?

RESPONSE:

BC Hydro does not expect that the May 1, 2021 implementation date will impact the proposed timing of filing the evaluation report by March 31, 2024. We expect that sufficient data will be available by that time to produce a reliable and robust evaluation.

21.0 H. Evaluation Report

Topic: Evaluation Report

Reference: Exhibit B-1, Application, pages 32-33, 36

BC Hydro states:

> "We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024. This timeline will allow for the collection and analysis of two full fiscal years of utilization and financial data (fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation."

1.21.3 Please confirm, or otherwise explain, that apart from general rate increases the final rates for which BC Hydro requests approval would remain in effect unless and until changed by the BCUC. In other words, filing the evaluation report by March 31, 2024 would not automatically cause a change in the rates for BC Hydro's public fast charging service.

RESPONSE:

Confirmed.

As shown in Appendix B, there is no fixed termination date specified in Rate Schedules 1360, 1560 or 1561. BC Hydro's view is that in the interest of rate stability and regulatory efficiency, the rate schedules should stay in effect until such time as BC Hydro applies to change them and the BCUC approves a change based on review of that future application.

21.0 H. Evaluation Report

Topic: Evaluation Report

Reference: Exhibit B-1, Application, pages 32-33, 36

BC Hydro elaborates about the evaluation report on page 36 of the Application, as follows:

> "BC Hydro proposes to monitor several aspects of the fast charging service, including station utilization (at different power levels), revenue collected under the applicable Rate Schedules, costs incurred, and customer feedback, and provide to the BCUC by March 31, 2024 an evaluation report and recommendations for fast charging service rates going forward.
>
> The March 2024 report will include the evaluation of the following:
> - Station utilization at different power level stations and factors that impact it;
> - Customer satisfaction and experience;
> - Implementation effectiveness including billing, payments and special conditions;
> - Comparison of BC Hydro fast charging service rates with other operators;
> - Collection of data on the electricity use characteristics (e.g., load profile, load factor, and peak demand) of the fast charging service and determination of whether General Service remains appropriate or a new rate class should be developed specific to electric vehicle fast charging service;
> - Technological advancements in metering and billing for fast charging services;
> - Customer and stakeholder engagement on the results of the evaluation report and industry developments; and
> - The potential need for repricing or redesign of the rates."

1.21.4 Would BC Hydro agree to including accessibility to persons with disabilities within the evaluation report?

RESPONSE:

Yes, BC Hydro agrees to include consideration of accessibility to persons with disabilities within the evaluation report.

21.0 H. Evaluation Report

Topic: Evaluation Report

Reference: Exhibit B-1, Application, pages 32-33, 36

BC Hydro elaborates about the evaluation report on page 36 of the Application, as follows:

> "BC Hydro proposes to monitor several aspects of the fast charging service, including station utilization (at different power levels), revenue collected under the applicable Rate Schedules, costs incurred, and customer feedback, and provide to the BCUC by March 31, 2024 an evaluation report and recommendations for fast charging service rates going forward.
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> The March 2024 report will include the evaluation of the following:
> - Station utilization at different power level stations and factors that impact it;
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> - Comparison of BC Hydro fast charging service rates with other operators;
> - Collection of data on the electricity use characteristics (e.g., load profile, load factor, and peak demand) of the fast charging service and determination of whether General Service remains appropriate or a new rate class should be developed specific to electric vehicle fast charging service;
> - Technological advancements in metering and billing for fast charging services;
> - Customer and stakeholder engagement on the results of the evaluation report and industry developments; and
> - The potential need for repricing or redesign of the rates."

1.21.5 For greater certainty, will BC Hydro include an assessment of peak/off-peak pricing in the evaluation report?

RESPONSE:

Yes, BC Hydro will include an assessment of peak/off peak pricing in the evaluation report.

21.0 H. Evaluation Report

Topic: Evaluation Report

Reference: Exhibit B-1, Application, pages 32-33, 36

BC Hydro elaborates about the evaluation report on page 36 of the Application, as follows:

> "BC Hydro proposes to monitor several aspects of the fast charging service, including station utilization (at different power levels), revenue collected under the applicable Rate Schedules, costs incurred, and customer feedback, and provide to the BCUC by March 31, 2024 an evaluation report and recommendations for fast charging service rates going forward.
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> The March 2024 report will include the evaluation of the following:
> - Station utilization at different power level stations and factors that impact it;
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> - Collection of data on the electricity use characteristics (e.g., load profile, load factor, and peak demand) of the fast charging service and determination of whether General Service remains appropriate or a new rate class should be developed specific to electric vehicle fast charging service;
> - Technological advancements in metering and billing for fast charging services;
> - Customer and stakeholder engagement on the results of the evaluation report and industry developments; and
> - The potential need for repricing or redesign of the rates."

1.21.6 Will BC Hydro include in the evaluation report an examination of the impact of the public fast charging rates on the development and use of other types of EV charging (i.e., other than fast charging) such as charging service in multiple unit residential buildings (MURBs)?

RESPONSE:

At this time, it isn't clear to BC Hydro that an examination on the development and use of other types of EV charging other than public fast charging, such as charging in multiple unit residential buildings (MURBs) is entirely relevant to the public fast charging rate.

Public fast charging has fundamental difference from charging in multi-unit residential buildings, such as:

- **BC Hydro's public fast charging is available to any member of the public, not just residents of a specific building; and**
- **BC Hydro's public fast charging is available on travel corridors to support long distance travel, whereas charging at home is more for local travel only.**

BC Hydro receives ongoing customer feedback on public fast charging. We will further consider whether the other types of EV charging other than public fast charging such as charging service in multiple unit residential buildings (MURBs) should be included in the evaluation scope based on that feedback. If customers raise this matter as an issue, we are open to including it in the scope of the evaluation.

1.0 Reference: Exhibit B-1, page 2 and 3

> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. Under section 18 of the *Clean Energy Act*, BC Hydro is allowed "to collect sufficient revenue in each fiscal year to enable it to recover its costs incurred with respect to
>
> the prescribed undertaking."[3] The Proposed Rates, will allow BC Hydro to collect revenue to recover as much as practical of the cost of providing the fast charging service from users of the service, which will reduce costs that must be recovered from all ratepayers. How this is achieved is further described in section 4 below.

1.1.1 For how long has BC Hydro been providing fast charging and not collecting revenue from the users?

RESPONSE:

BC Hydro deployed the first demonstration fast charging station at a site at Powertech Labs Inc. in Surrey on July 13, 2013. BC Hydro has been providing fast charging service free of charge since then to May 1, 2021 when the interim rate was implemented.

BC Hydro notes that between 2013 and 2020, there were 13 sites where the municipal site host leased the fast charging equipment from BC Hydro, collected the revenue from end-users and paid BC Hydro all electricity charges (including demand changes) incurred at the sites and owing to BC Hydro pursuant to BC Hydro's Electric Tariff in accordance with the applicable terms and conditions thereof.

1.0 Reference: Exhibit B-1, page 2 and 3

> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. Under section 18 of the *Clean Energy Act*, BC Hydro is allowed "to collect sufficient revenue in each fiscal year to enable it to recover its costs incurred with respect to
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> the prescribed undertaking."[3] The Proposed Rates, will allow BC Hydro to collect revenue to recover as much as practical of the cost of providing the fast charging service from users of the service, which will reduce costs that must be recovered from all ratepayers. How this is achieved is further described in section 4 below.

1.1.2 Please explain why BC Hydro did not bring an application forward prior to this in order to collect revenue.

RESPONSE:

BC Hydro did not bring an application forward until the filing of this Application in order to collect revenue for the following reasons.

Initially, BC Hydro required time to ensure the fast charging technology was stable and that the supporting processes were in place to provide for reliable fast charging service and the ability to process payments.

BC Hydro anticipated filing a rate application for fast charging service in 2018 but delayed its plan after the BCUC initiated in January 2018 its inquiry into the regulation of EV charging service in BC. The inquiry was established to explore potential regulatory issues related to EV charging services in BC, including rates for electric vehicle fast charging service. BC Hydro expected that the outcome of the inquiry would have an impact on its application for a fast charging service rate.

In addition, BC Hydro's timing for its rate application was also determined by amendments to the Greenhouse Gas Reduction (Clean Energy) Regulation, which guarantee recovery of costs in rates with respect to costs incurred for EV fast charging stations that qualify as prescribed undertakings. These amendments were made in June 2020.

1.0 Reference: Exhibit B-1, page 2 and 3

> First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers. Under section 18 of the *Clean Energy Act*, BC Hydro is allowed "to collect sufficient revenue in each fiscal year to enable it to recover its costs incurred with respect to
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> the prescribed undertaking."[3] The Proposed Rates, will allow BC Hydro to collect revenue to recover as much as practical of the cost of providing the fast charging service from users of the service, which will reduce costs that must be recovered from all ratepayers. How this is achieved is further described in section 4 below.

1.1.3 Please explain what BC Hydro means above by 'as much as practical'.

RESPONSE:

"As much as practical" refers to the fact that higher rates will reduce utilization and revenue. BC Hydro's Proposed Rates are intended to encourage station utilization and revenue.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
>
> 1. It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments.
> 2. Regulatory oversight can help mitigate ratepayer risk and potential impact on exempt utilities.
> 3. Non-exempt public utilities should develop a separate rate and tariff (or a separate class of service) for any operators utilizing any level of charging, other than Level 1 or 2.
> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1 Please explain how BC Hydro's proposed rates 'keep the playing field as level as possible' and provide quantification of any differences in costs and opportunities to recover costs between BC Hydro's EV charging rates and the competitive market.

RESPONSE:

BC Hydro's costs and cost recovery calculations are provided in section 4.2 of the Application. BC Hydro does not have information on the cost structure of other operators of public fast charging and is unable to provide the requested quantification of differences.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.1 Can private sector EV charging investors compete effectively against BC Hydro on price or geographic location or other important metrics? Please explain.

RESPONSE:

BC Hydro is unable to provide submissions on the business models or metrics of other fast charging operators.

BC Hydro supports the development of additional public fast charging services by other operators. We believe that additional investment in public fast charging services by a range of operations will support the adoption of electric vehicles in B.C. and the Government of B.C.'s CleanBC goals and benefit all BC Hydro's ratepayers through additional electricity sales. Further, the Proposed Rates fall within the range of prices offered by other EV fast charging service providers in our service territory as shown in Table 2 of the Application.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging
>
> facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.1.1 Please compare the BC Hydro proposed leveling of the playing field with the Commission approved process for TES competition.

RESPONSE:

BC Hydro does not believe that the comparison as suggested by the information request is appropriate.

Based on the Thermal Energy Systems Framework accompanying BCUC Order No. G-27-15, BC Hydro's understanding is that regulation or exemption from regulation by the BCUC of the providers of the thermal energy system (TES) is a "scaled" approach depending on size and scope of the TES.

As stated in Phase Two Report of An Inquiry into the Regulation of Electric Vehicle Charging Service, the BCUC states (at page i) that "While there are opportunities for the participation of non-exempt public utility [e.g., BC Hydro] participation in the EVCS, regulatory oversight can help to mitigate ratepayer risk and potential impact on exempt utilities…. It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments don't have the end effect of crowding out exempt utility investment." Thus, in BC Hydro's view, the "leveling the playing field" concept is not related to the "scale" or "size" of the charging asset.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2 Please elaborate on how regulatory oversight can help mitigate ratepayer risk.

RESPONSE:

The second item in the preamble is explained in the BCUC EV Inquiry Phase 2 Report (June 24, 2019), Executive Summary, page i and was made in the context of the risk of EV infrastructure investments on non-exempt utility ratepayers.

In this application, the Commission should consider whether BC Hydro's Proposed Rates will encourage station utilization and revenue recovery so that they partially recover the cost of fast charging service, thereby mitigating ratepayer risk over the next several years when the EV market is still developing.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 3. Non-exempt public utilities should develop a separate rate and tariff (or a separate class of service) for any operators utilizing any level of charging, other than Level 1 or 2.
> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging
>
> facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2.1 What factors should the Commission consider in mitigating ratepayer risk?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.2.1.2.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2.2 How would BC Hydro define 'ratepayer risk'? Please provide quantification of what would be considered high, medium, and low risk.

RESPONSE:

Ratepayer risk in the context of this application is defined as the remaining costs of electric vehicle fast charging service covered by all ratepayers. The following risk categories are subjective and illustrative.

High risk would be considered if ratepayers bear the full cost of electric vehicle fast charging service.

Medium risk would be considered if ratepayers bear the capital and operating cost of electric vehicle fast charging service.

Low risk would be considered if ratepayers do not bear the cost of electric vehicle fast charging service.

BC Hydro notes that the level of risk is tied to how the EV market develops. If station utilization rates increase over time the level of ratepayer risk decreases.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging
>
> facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2.3 How would BC Hydro characterize the risk arising from this application? Please explain and provide quantification of the risk.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.2.1.2.2.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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>
> facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2.4 Please explain why BC Hydro incorporated its EV charging rates into existing rate classes instead of developing an entirely separate rate class.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.1.1.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging
>
> facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2.4.1 Please explain how the incorporation of BC Hydro's EV charging rates would be expected to impact the Revenue to Cost ratios of the 3 rate classes which are including EV charging. Please provide range of estimates quantitatively assuming differing levels of EV uptake.

RESPONSE:

Please refer to BC Hydro's responses to BCUC IRs 1.1.3 and 1.1.3.1.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 1. It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments.
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> 3. Non-exempt public utilities should develop a separate rate and tariff (or a separate class of service) for any operators utilizing any level of charging, other than Level 1 or 2.
> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.2.4.1.1 How will BC Hydro handle the incorporation of EV charging into the 3 rate classes during its next Cost of Service analysis?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.1.3.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 1. It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments.
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.3 Please describe what is meant by a transparent, wholesale pricing mechanism.

RESPONSE:

The term "transparent, wholesale pricing mechanism" was used in the Phase 2 EV Inquiry Report (page 43). BC Hydro understands it to mean the transparent pricing mechanism by which the non-exempt public utility charges for electricity supplied to exempt public utilities providing EV charging services, which in BC Hydro's case is the applicable General Service Rate Schedule.

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> 1. It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments.
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> 4. It is in the public interest for non-exempt public utilities to provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.3 Please describe what is meant by a transparent, wholesale pricing mechanism.

1.2.1.3.1 How does BC Hydro's application meet this objective?

RESPONSE:

BC Hydro understands this question to be asking about how the Application meets the objective of a transparent, wholesale pricing mechanism.

As described on page 27 of the Application, other fast charging operators (i.e., exempt utilities) in BC Hydro's service territory take General Service and are

charged under the applicable General Service Rate Schedule based on their electricity Demand.

Adopting General Service rates as the basis for the Proposed Rates in the Application ensures that BC Hydro's rate for fast charging service is not lower than the Energy and Demand rates BC Hydro charges to other fast charging station operators. In this respect the Proposed Rates reflect the BCUC's recommendation in the Phase 2 EV Inquiry Report that "non-exempt public utilities provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities…, including the non-exempt public utility itself".

2.0 Reference: Exhibit B-1, page 5 and 6

> Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry[7] that BC Hydro has considered in the design of the Proposed Rates include:
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> facilities other than Level 1[8] and Level 2,[9] including the non-exempt public utility itself.

1.2.1.4 Is this a complete list, the four items above, of findings, or are there any other findings that BC Hydro did not believe needed to be addressed in this application? Please explain.

RESPONSE:

Section 1.3.1 of the Application, which includes the list shown in the preamble, describes the elements of the BCUC Inquiry into the Regulation of Electric Vehicle Charging Service that BC Hydro views as being directly relevant to this Application.

2.0 Reference: Exhibit B-1, page 5 and 6

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> 1. It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments.
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1.2.1.4 Is this a complete list, the four items above, of findings, or are there any other findings that BC Hydro did not believe needed to be addressed in this application? Please explain.

1.2.1.4.1 If there are other findings that were not addressed, please identify and explain why there were not considered to be relevant, and how they will be addressed in the future.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.2.1.4.

3.0 Reference: Exhibit B-1, page 7

> In the F2022 RRA BC Hydro did not forecast any revenues from service related to electric vehicle stations because BC Hydro has no approved rates for providing the service. Only costs are included in BC Hydro's F2022 RRA. Accordingly, there were no revenue amounts recorded in the Electric Vehicle Costs Regulatory Account for fiscal 2020 and fiscal 2021.
>
> Any revenues collected under the Proposed Rates for public electric vehicle fast charging service will be captured in BC Hydro's Cost of Energy Variance Accounts, (to the extent that they contribute to an overall variance compared to planned revenues in the year), such that ratepayers will get the benefit of these revenues in future periods.

1.3.1 Why does BC Hydro not capture revenue amounts in the EV Costs Regulatory Account or amend the terms of the account if necessary?

RESPONSE:

Please refer to BC Hydro's response to BCUC IRs 1.2.2 and 1.2.3, in which we describe the reasons why we believe deferral to the Load Variance Regulatory Account is preferable as compared to deferral to another regulatory account such as the Electric Vehicle Costs Regulatory Account.

3.0 Reference: Exhibit B-1, page 7

> In the F2022 RRA BC Hydro did not forecast any revenues from service related to electric vehicle stations because BC Hydro has no approved rates for providing the service. Only costs are included in BC Hydro's F2022 RRA. Accordingly, there were no revenue amounts recorded in the Electric Vehicle Costs Regulatory Account for fiscal 2020 and fiscal 2021.
>
> Any revenues collected under the Proposed Rates for public electric vehicle fast charging service will be captured in BC Hydro's Cost of Energy Variance Accounts, (to the extent that they contribute to an overall variance compared to planned revenues in the year), such that ratepayers will get the benefit of these revenues in future periods.

1.3.2 Please explain and quantify the different impacts that would occur if BC Hydro were to capture revenue in the Electric Vehicle Costs Regulatory Account instead of the Cost of Energy Variance Accounts.

RESPONSE:

Please refer to BC Hydro's response to BCUC IRs 1.2.2 and 1.2.3.

3.0 Reference: Exhibit B-1, page 7

> In the F2022 RRA BC Hydro did not forecast any revenues from service related to electric vehicle stations because BC Hydro has no approved rates for providing the service. Only costs are included in BC Hydro's F2022 RRA. Accordingly, there were no revenue amounts recorded in the Electric Vehicle Costs Regulatory Account for fiscal 2020 and fiscal 2021.
>
> Any revenues collected under the Proposed Rates for public electric vehicle fast charging service will be captured in BC Hydro's Cost of Energy Variance Accounts, (to the extent that they contribute to an overall variance compared to planned revenues in the year), such that ratepayers will get the benefit of these revenues in future periods.

1.3.3 Please explain whether or not the BC Hydro Cost of Energy Variance Account captures the cost of supplying energy through BC Hydro's EV charging stations and whether or not these energy costs from past delivery of EV charging would be recovered in future revenue.

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to BCUC IR 1.2.3. in which we note that the amounts recorded to the Electric Vehicle Costs Regulatory Account are for fiscal 2020 and fiscal 2021 total costs, including the cost of energy for electric vehicle charging stations that are prescribed undertakings. The forecast balance in that account at the end of fiscal 2021 is being recovered in fiscal 2022 pursuant to BC Hydro's request in that proceeding.

4.0 Reference: Exhibit B-1, page 8

> Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro can recover costs from all ratepayers and not just from those who use the service. The Proposed Rates, if approved, would allow BC Hydro to collect revenues directly from those who use the fast charging service, which will reduce costs that need to be recovered from all ratepayers.
>
> Additionally, the rate setting functions of the BCUC are governed by sections 58 to 61 of the UCA, and the BCUC has considerable discretion in setting rates pursuant to sections 59 and 60 of the UCA. Section 60(1)(b) provides that in setting a rate, the BCUC "must have due regard to the setting of a rate that: (i) is not unjust and unreasonable within the meaning of section 59; (ii) provides the public utility for which the rate is set a fair and reasonable return on any expenditure made by it to reduce energy demand; and (iii) encourages public utilities to increase efficiency, reduce costs and enhance performance". When setting a rate, the BCUC must also "consider all matters that it considers proper and relevant affecting the rate".
> BC Hydro respectfully request that the BCUC approve the Proposed Rates as just and reasonable.

1.4.1 Please confirm, or otherwise explain, that notwithstanding the lack of specification from whom the revenue should be collected, an important aspect of rate design includes the principle of cost causation, such that revenues are best recovered from those customers who cause the costs.

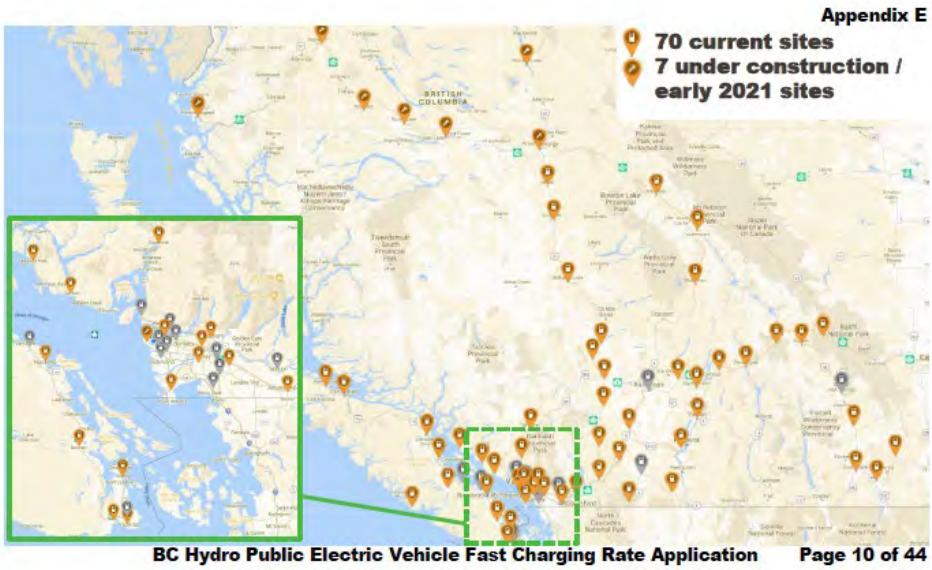
RESPONSE:

The principle of cost causation, such that revenues are best recovered from those customers who cause the costs, is an important aspect of rate design. However, as noted in the Application, (page 26), full cost of service rates from the customers of the fast charging service are not practical at this time due to low station utilization.

5.0 Reference: Exhibit B-1, page 10 and Appendix E page 10 of 44

2.1 BC Hydro's Fast Charging Stations

The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.



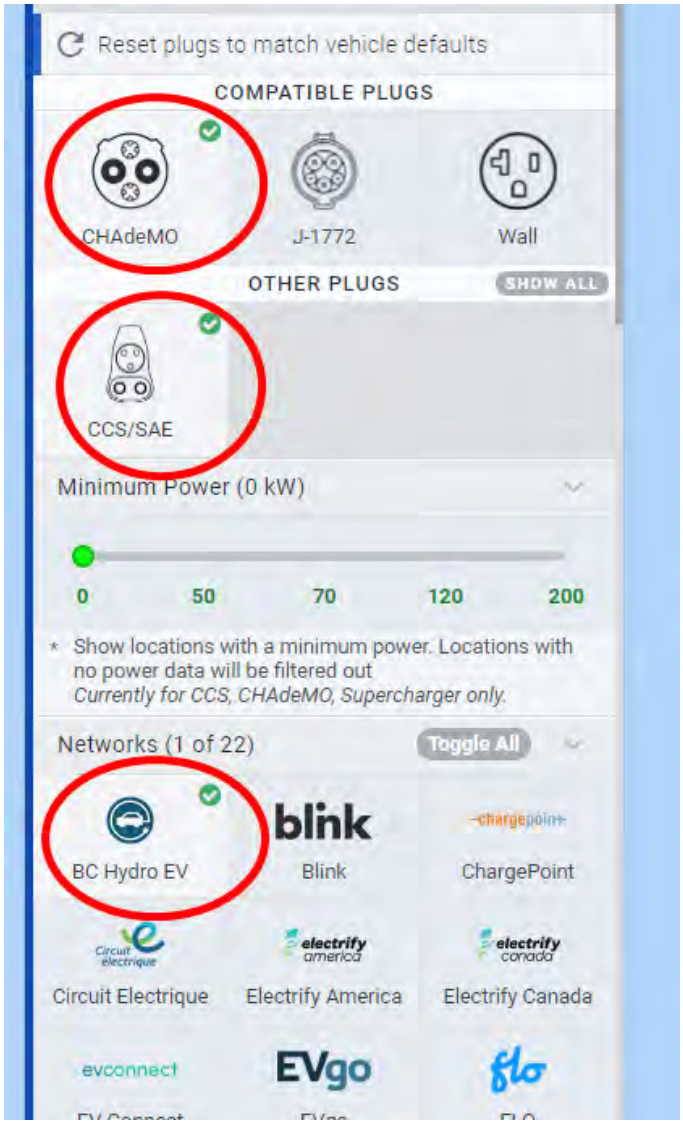
1.5.1 Please provide a map of BC Hydro's current and proposed charging stations, and identify the charging levels for each station.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for an updated list of stations and sites that also identifies the charging levels for each station.

BC Hydro currently does not have these additional granular details presented in a map format. BC Hydro recommends using PlugShare for an "interactive" version of the B.C. fast charging stations map at https://www.plugshare.com/

Use the following PlugShare filters to view only BC Hydro stations:



5.0 Reference: Exhibit B-1, page 10 and Appendix E page 10 of 44

2.1 BC Hydro's Fast Charging Stations

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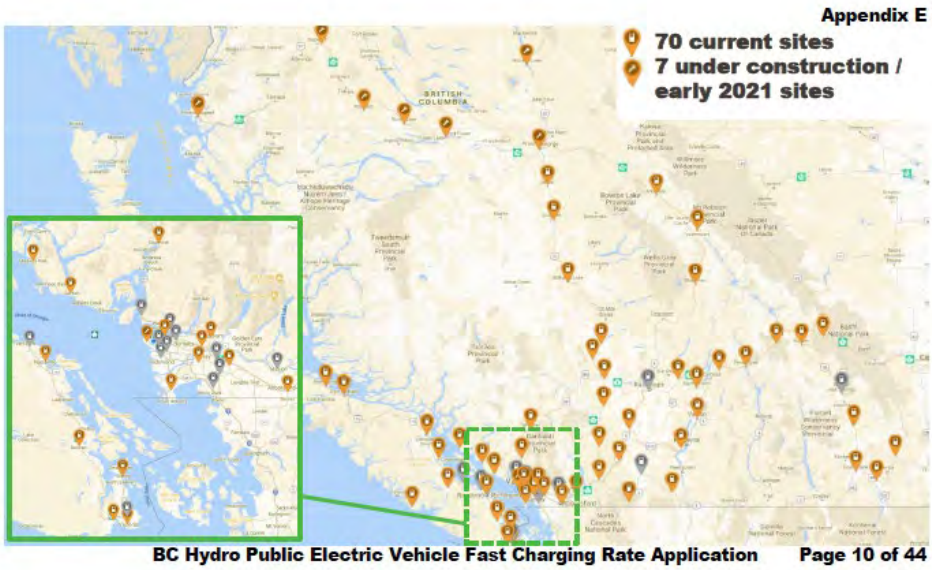


1.5.2 Are any of BC Hydro's charging stations located in the FBC service area? Please explain.

RESPONSE:

Two of BC Hydro's charging stations are located in FortisBC Inc.'s service area: Princeton and Keremeos.

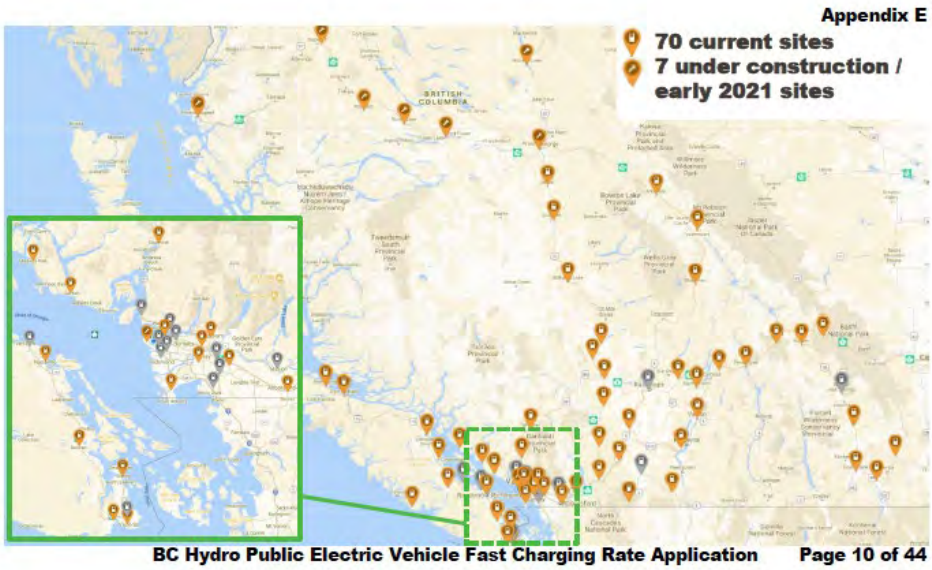
Two of FortisBC's charging stations are located in BC Hydro's service area: Nakusp and New Denver.

BC Hydro and FortisBC are in the planning process to exchange these sites in fiscal 2022. (FortisBC has applied for BCUC approval for the exchange.) Going forward all new stations will be in the respective service areas of BC Hydro and FortisBC, which allows for more effective maintenance and operations given proximity to the staff and crews of BC Hydro and FortisBC, respectively.

5.0 Reference: Exhibit B-1, page 10 and Appendix E page 10 of 44

2.1 BC Hydro's Fast Charging Stations

The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.



1.5.2 Are any of BC Hydro's charging stations located in the FBC service area? Please explain.

1.5.2.1 If yes, please identify any issues that arise as a result of this overlap and discuss how BC Hydro and FBC manage those issues.

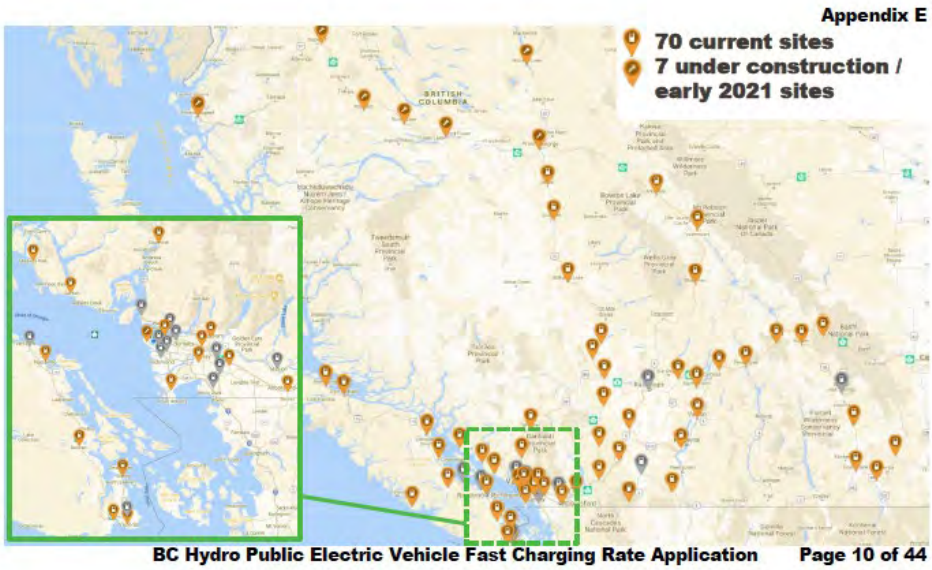
RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.5.2 for a discussion of the plan for the exchanges of stations.

5.0 Reference: Exhibit B-1, page 10 and Appendix E page 10 of 44

2.1 BC Hydro's Fast Charging Stations

The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.



1.5.3 Are any of FBC's charging stations located in the BC Hydro service area? Please explain.

RESPONSE:

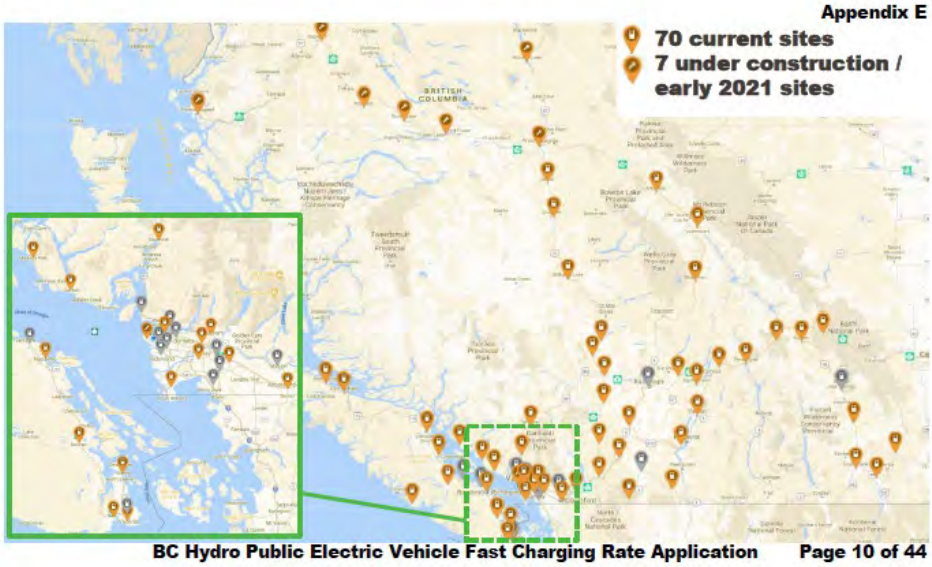
Please refer to BC Hydro's response to CEC IR 1.5.2.

5.0 Reference: Exhibit B-1, page 10 and Appendix E page 10 of 44

2.1 BC Hydro's Fast Charging Stations

The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.

Appendix E



BC Hydro Public Electric Vehicle Fast Charging Rate Application **Page 10 of 44**

1.5.3 Are any of FBC's charging stations located in the BC Hydro service area? Please explain.

1.5.3.1 If yes, please identify any issues that arise as a result of this overlap and discuss how BC Hydro and FBC manage those issues.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.5.2.

6.0 Reference: Exhibit B-1, page 10

> **2.1 BC Hydro's Fast Charging Stations**
>
> The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.
>
> The time required to charge an electric vehicle is dependent on the vehicle battery size, battery charge level when fast charging commences, and the outdoor air temperature. A 50 kW fast charging station can charge an electric vehicle to 80 per cent within 30 to 40 minutes, depending on the size of the battery and how depleted the battery is when charging commences. A 25 kW charging station can take up to twice as long to charge as a 50 kW station, depending on the starting state of charge and the electric vehicle make and model. A 100 kW fast charging station may not double the charging speed of a 50 kW station unless the vehicle is capable of being charged at this higher power level.
>
> The time required to charge an electric vehicle will also be dependent on what the vehicle can accept, and in many cases, a similar amount of electricity is dispensed from a 25 kW, 50 kW or 100 kW charging station once the vehicle battery exceeds 90 per cent capacity.

1.6.1 Are the BC Hydro fast charging stations essentially the same as the FBC fast charging stations? Please identify and comment on any differences in the technology or performance of the fast charging stations.

RESPONSE:

BC Hydro cannot confirm if BC Hydro's fast charging stations are the same as the FortisBC's fast charging stations. Nor can BC Hydro comment on any differences in the technology or performance of its charging stations in comparison to the fast charging stations of FortisBC Inc.

BC Hydro's fast charging stations are built using one or more of the presently available station models from two manufacturers: AddEnergie and ABB. The stations are connected to BC Hydro's distribution system via standard BC Hydro infrastructure and adhere to BC Hydro service connection standards and BC Hydro fast charging station design and layout.

A charging station performance is the result of multiple elements, such as a charger technology, number of charging sessions, number of stations at the same site/location, and preventive maintenance schedule.

6.0 Reference: Exhibit B-1, page 10

> **2.1 BC Hydro's Fast Charging Stations**
>
> The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.
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> The time required to charge an electric vehicle will also be dependent on what the vehicle can accept, and in many cases, a similar amount of electricity is dispensed from a 25 kW, 50 kW or 100 kW charging station once the vehicle battery exceeds 90 per cent capacity.

1.6.1.1 Please identify and quantify any capital cost differences that BC Hydro is aware of between BC Hydro's and FBC's fast charging stations.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.15.7.

6.0 Reference: Exhibit B-1, page 10

> **2.1 BC Hydro's Fast Charging Stations**
>
> The Federal and Provincial Government provided grants to build charging stations, which BC Hydro deployed strategically to meet the needs of potential electric vehicle charging service users. Fast charging stations along highway corridors make inter-city travel in an electric vehicle possible, and fast charging stations in urban and suburban locations provide alternatives for electric vehicle drivers who do not have access to charging stations at home or work. Fast charging service may also be needed if the electric vehicle is in heavy use and a sufficient charge cannot be achieved with the more widely available Level 2 charging. A Level 2 charger with charging capacity of 3.6 kW to 7.2 kW can take six to eight hours to charge an electric vehicle.
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> The time required to charge an electric vehicle is dependent on the vehicle battery size, battery charge level when fast charging commences, and the outdoor air temperature. A 50 kW fast charging station can charge an electric vehicle to 80 per cent within 30 to 40 minutes, depending on the size of the battery and how depleted the battery is when charging commences. A 25 kW charging station can take up to twice as long to charge as a 50 kW station, depending on the starting state of charge and the electric vehicle make and model. A 100 kW fast charging station may not double the charging speed of a 50 kW station unless the vehicle is capable of being charged at this higher power level.
>
> The time required to charge an electric vehicle will also be dependent on what the vehicle can accept, and in many cases, a similar amount of electricity is dispensed from a 25 kW, 50 kW or 100 kW charging station once the vehicle battery exceeds 90 per cent capacity.

1.6.1.2 Please identify and quantify any operational cost differences that BC Hydro is aware of between BC Hydro's and FBC's fast charging stations.

RESPONSE:

BC Hydro cannot comment on the operating costs of other fast charging operators.

Please also refer to BC Hydro's response to BCOAPO IR 1.12.4.

7.0 Reference: Exhibit B-1, page 11

> The majority of BC Hydro's fast charging stations have a nameplate capacity of 50 kW, though BC Hydro will be providing 25 kW and 100 kW stations in some locations. BC Hydro maintains a number of 25 kW stations in inventory, mainly as temporary replacements of 50 kW stations undergoing maintenance and repair, when replacement parts for the 50 kW stations are not readily available or the stations cannot be repaired on-site. A 25 kW station may be temporarily installed to maintain fast charging availability at the site. The 25 kW stations are also useful in locations wherein only single-phase electricity is available or there are other electrical service constraints.

1.7.1 Please provide the number of 25kW, 50kW and 100kW stations that BC Hydro currently has in operation.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for the updated information on stations and sites.

7.0 Reference: Exhibit B-1, page 11

> The majority of BC Hydro's fast charging stations have a nameplate capacity of 50 kW, though BC Hydro will be providing 25 kW and 100 kW stations in some locations. BC Hydro maintains a number of 25 kW stations in inventory, mainly as temporary replacements of 50 kW stations undergoing maintenance and repair, when replacement parts for the 50 kW stations are not readily available or the stations cannot be repaired on-site. A 25 kW station may be temporarily installed to maintain fast charging availability at the site. The 25 kW stations are also useful in locations wherein only single-phase electricity is available or there are other electrical service constraints.

1.7.2 Please provide the number of 25kW, 50kW and 100kW stations that BC Hydro expects to have in operation by the end of 2021, the end of 2022, and the end of 2023.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for the updated information on stations and sites.

7.0 Reference: Exhibit B-1, page 11

> The majority of BC Hydro's fast charging stations have a nameplate capacity of 50 kW, though BC Hydro will be providing 25 kW and 100 kW stations in some locations. BC Hydro maintains a number of 25 kW stations in inventory, mainly as temporary replacements of 50 kW stations undergoing maintenance and repair, when replacement parts for the 50 kW stations are not readily available or the stations cannot be repaired on-site. A 25 kW station may be temporarily installed to maintain fast charging availability at the site. The 25 kW stations are also useful in locations wherein only single-phase electricity is available or there are other electrical service constraints.

1.7.3 How many 25kW stations does BC Hydro currently have available as back-up replacements for those stations undergoing maintenance and repair?

RESPONSE:

As of May 5, 2021, BC Hydro has numerous 50 kW fast charging stations in inventory that would be used to replace any 50 kW fast charging stations that require replacement or more extensive repair.

All BC Hydro ABB 25 kW stations are currently deployed to fast charging station sites. BC Hydro is in the process of ordering additional 25 kW backup units. BC Hydro has a couple older 25 kW Delta units, which are not network capable and would only be used in emergency situations.

7.0 Reference: Exhibit B-1, page 11

> The majority of BC Hydro's fast charging stations have a nameplate capacity of 50 kW, though BC Hydro will be providing 25 kW and 100 kW stations in some locations. BC Hydro maintains a number of 25 kW stations in inventory, mainly as temporary replacements of 50 kW stations undergoing maintenance and repair, when replacement parts for the 50 kW stations are not readily available or the stations cannot be repaired on-site. A 25 kW station may be temporarily installed to maintain fast charging availability at the site. The 25 kW stations are also useful in locations wherein only single-phase electricity is available or there are other electrical service constraints.

1.7.4 What is the capital cost of each 25kW, 50 kW and 100 kW station?

RESPONSE:

BC Hydro estimates the expected future gross capital cost, which excludes third-party contributions, of a dual station site by nameplate capacity to be the following:

- **25 kW dual station site - $165,000;**
- **50 kW dual station site - $235,000; and**
- **100 kW dual station site - $315,000.**

The estimates above include all engineering, site costs, lighting and signage and assume there is no significant underground service required to the site.

8.0 Reference: Exhibit B-1, page 11

> BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites.

1.8.1 When does BC Hydro expect to deploy the 100kW charging station?

RESPONSE:

BC Hydro expects to deploy its first 100 kW charging station in fiscal 2022.

8.0 Reference: Exhibit B-1, page 11

> BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites.

1.8.2 When does BC Hydro expect to finalize its plans for the deploying more 100 kW fast charging stations?

RESPONSE:

Please refer to BC Hydro's responses to BCSEA VEVA IRs 1.5.2 and 1.6.1 for a discussion of BC Hydro's current deployment plan, including the 100 kW fast charging stations.

8.0 Reference: Exhibit B-1, page 11

> BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites.

1.8.3 Please quantify the levels of government funding that BC Hydro expects to have available, and discuss how varying levels of funding will affect BC Hydro's plans.

RESPONSE:

BC Hydro uses current government funding levels in its planning process. This includes both Natural Resources Canada (NRCan) programs and the Provincial (CleanBC) program. If government funding changes, BC Hydro will update its plans to reflect those changes. At this time, it is unclear as to how any changes to funding would impact BC Hydro's deployment plans, and it would depend on the degree to which the funding levels are revised. A reduction to current funding levels would, however, adversely impact station economics and may result in a downward revision to the number of stations deployed.

As of May 5, 2021, government funding contributions per station/charger are as follows:

Power Level	NRCan ZEVIP ($)	CleanBC ($)	TOTAL ($)
25 kW	15,000	5,000	20,000
50 kW	50,000	25,000	75,000
100 kW	75,000	25,000	100,000

8.0 Reference: Exhibit B-1, page 11

> BC Hydro currently has one 100 kW charging station, which is undergoing a period of testing before it is deployed to a site. Plans for deploying more 100 kW fast charging stations have not been finalized and will be subject to availability of government funding and suitability for potential sites.

1.8.4 What factors does BC Hydro consider when assessing suitability of potential sites? Please discuss and provide quantification for items such as usage levels or cost of deployment.

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding how BC Hydro currently plans its public fast charging network.

9.0 Reference: Exhibit B-1, page 11 and 12

2.2 Metering for Fast Charging Station Service

The Proposed Rates are time based. Each charging station has a built-in timing device, which will measure the charging time by the second. The total time for each charging session will be displayed in minutes and seconds shown on the billing receipt at the end of each charging session.

Although customer and stakeholder support for an electricity-based or a combination electricity-and-time-based rate was expressed during BC Hydro's public and stakeholder consultations as discussed in section 3 below, only a time-based rate is possible at this time due to the lack of a Measurement Canadian approved standard to measure direct current (**DC**) power. While the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle.

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.

1.9.1 Does BC Hydro anticipate changing to an electricity-based or electricity and time-based or other rate design if and when measuring equipment is available? Please explain.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.15.

10.0 Reference: Exhibit B-1, pages 12-13

3 Public Engagement, Market Research and Jurisdiction Review

3.1 Customer Research and Insights

BC Hydro conducted a series of personal interviews and an online survey to better understand the public's sentiment around potential rates for fast charging service.

Personal Interviews

From August 20, 2020 to September 15, 2020, BC Hydro conducted nine, one-hour interviews over-the-phone with electric vehicle drivers in B.C. to gather feedback. Interviewees were selected from a pool of electric vehicle drivers who have engaged with BC Hydro in the past, representing organizations such as Vancouver Electric

Vehicle Association, Victoria Electric Vehicle Club, Electric Vehicle Peer Network, Fraser Basin Council, BCIT Smart Microgrid Applied Research Team. Interviewees were also selected to be representative of demographics such as region, housing type, electric vehicle use and length of electric vehicle ownership. Interviewees were asked for their feedback on:

- Preferred charging rates for 50 kW fast charging service (20 cents per minutes, 25 cents per minute or 30 cents per minute);
- Whether rates should vary by station power levels (e.g., 25 kW and 100 kW); and
- Potential future pricing models.

Results

- Most interviewees supported a 20 cents per minute rate, indicating a preference for the lowest rate. They stated that the 30 cents per minute rate was too high, which would influence their decision to not use the fast charging service.
- There was consensus that the rate for fast charging station service should vary correspondingly with the power levels of a charging station. That is, the rate for using a 100 kW fast charging station should be higher than the rate for a 50 kW fast charging station.
- Regarding other potential pricing structures, interviewees overwhelmingly supported an electricity-based rate over a purely time-based rate. There was also support for a time-varying rate whereby the rate is lower overnight.

1.10.1 Why did BC Hydro decide to conduct nine phone interviews, as opposed to any other number such as 20 or 30?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.3.2.

10.0 Reference: Exhibit B-1, pages 12-13

3 Public Engagement, Market Research and Jurisdiction Review

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- Regarding other potential pricing structures, interviewees overwhelmingly supported an electricity-based rate over a purely time-based rate. There was also support for a time-varying rate whereby the rate is lower overnight.

1.10.2 Please explain why BC Hydro did not select a process with a sample size sufficient to represent the views of a specific population being interviewed.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.3.2.

10.0 Reference: Exhibit B-1, pages 12-13

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Results

- Most interviewees supported a 20 cents per minute rate, indicating a preference for the lowest rate. They stated that the 30 cents per minute rate was too high, which would influence their decision to not use the fast charging service.
- There was consensus that the rate for fast charging station service should vary correspondingly with the power levels of a charging station. That is, the rate for using a 100 kW fast charging station should be higher than the rate for a 50 kW fast charging station.
- Regarding other potential pricing structures, interviewees overwhelmingly supported an electricity-based rate over a purely time-based rate. There was also support for a time-varying rate whereby the rate is lower overnight.

1.10.3 Please confirm that EV users and EV user organizations do not necessarily represent the full breadth of 'public sentiment'.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.3.2.

10.0 Reference: Exhibit B-1, pages 12-13

3 Public Engagement, Market Research and Jurisdiction Review

3.1 Customer Research and Insights

BC Hydro conducted a series of personal interviews and an online survey to better understand the public's sentiment around potential rates for fast charging service.

Personal Interviews

From August 20, 2020 to September 15, 2020, BC Hydro conducted nine, one-hour interviews over-the-phone with electric vehicle drivers in B.C. to gather feedback. Interviewees were selected from a pool of electric vehicle drivers who have engaged with BC Hydro in the past, representing organizations such as Vancouver Electric

Vehicle Association, Victoria Electric Vehicle Club, Electric Vehicle Peer Network, Fraser Basin Council, BCIT Smart Microgrid Applied Research Team. Interviewees were also selected to be representative of demographics such as region, housing type, electric vehicle use and length of electric vehicle ownership. Interviewees were asked for their feedback on:

- Preferred charging rates for 50 kW fast charging service (20 cents per minutes, 25 cents per minute or 30 cents per minute);
- Whether rates should vary by station power levels (e.g., 25 kW and 100 kW); and
- Potential future pricing models.

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- Most interviewees supported a 20 cents per minute rate, indicating a preference for the lowest rate. They stated that the 30 cents per minute rate was too high, which would influence their decision to not use the fast charging service.
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- Regarding other potential pricing structures, interviewees overwhelmingly supported an electricity-based rate over a purely time-based rate. There was also support for a time-varying rate whereby the rate is lower overnight.

1.10.4 Please confirm that EV drivers, and organizations representing EV drivers, have a vested interest in securing the lowest rates possible.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.3.2.

10.0 Reference: Exhibit B-1, pages 12-13

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- Regarding other potential pricing structures, interviewees overwhelmingly supported an electricity-based rate over a purely time-based rate. There was also support for a time-varying rate whereby the rate is lower overnight.

1.10.5 To the extent that non-EV users have or could potentially subsidize the cost of EV charging depending on circumstances, and BC Hydro, with BCUC approval, has discretion to propose which customers from whom it will recover its, has BC Hydro at any point conducted any surveys or used any other measures to specifically acquire information from non-EV users as to the appropriate rate and cost recovery levels?

RESPONSE:

BC Hydro has not conducted surveys to specifically targeted non-EV users to acquire information as to the appropriate fast charging rate and cost recovery levels.

10.0 Reference: Exhibit B-1, pages 12-13

3 Public Engagement, Market Research and Jurisdiction Review

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1.10.5.1 If not, why not.

RESPONSE:

BC Hydro has focused its research on the customers most directly impacted by the rate implementation as well as its regular stakeholders of regulatory proceedings.

10.0 Reference: Exhibit B-1, pages 12-13

3 Public Engagement, Market Research and Jurisdiction Review

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1.10.5.2 If yes, please describe the methodology, number of respondents, and results from such measures.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.10.5.1.

10.0 Reference: Exhibit B-1, pages 12-13

3 Public Engagement, Market Research and Jurisdiction Review

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- Regarding other potential pricing structures, interviewees overwhelmingly supported an electricity-based rate over a purely time-based rate. There was also support for a time-varying rate whereby the rate is lower overnight.

1.10.6 Has BC Hydro conducted phone interviews or used other means to solicit information from organizations that could represent potential competitors, either as independent EV stations providers, or ratepayers with commitments to the internal combustion engine such as gasoline station owners? Please explain and provide the results of any such surveys.

RESPONSE:

These types of organizations were represented at the public engagement workshop on December 7, 2020. Please refer to page 41 of Appendix F to the Application for a list of organizations that attended the workshop.

11.0 Reference: Exhibit B-1, page 14

> **Survey**
>
> BC Hydro commissioned Leger[11] to conduct a web survey regarding electric vehicle fast charging service rates. The survey was conducted from August 26, 2020 to September 7, 2020. The survey, which returned 4,196 responses from 11,398 survey invitations, asked respondents for their opinion on paying to use fast charging station services and provided the opportunity to provide general feedback on rates and user experience. The response rate of 37 per cent provides confidence that the results reflect the sentiment of a broad population of potential fast charging station users. Appendix D to the Application provides further information on the survey and detailed results.

1.11.1 Please provide the number of EV vehicles in the province.

RESPONSE:

As of December 2020, there were 54,469 EV's on the road in B.C. based on the following source: https://news.gov.bc.ca/releases/2021EMLI0024-000628.

11.0 Reference: Exhibit B-1, page 14

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1.11.2 Please provide the approximate number of non-EV vehicles.

RESPONSE:

There are approximately 3.9 million non-electric vehicles registered in B.C. based on the following source: https://www.statcan.gc.ca/eng/topics-start/automotive.

11.0 Reference: Exhibit B-1, page 14

> **Survey**
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1.11.3 Please describe how BC Hydro/Leger selected the web-survey invitees.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.4.1.

11.0 Reference: Exhibit B-1, page 14

> **Survey**
>
> BC Hydro commissioned Leger[11] to conduct a web survey regarding electric vehicle fast charging service rates. The survey was conducted from August 26, 2020 to September 7, 2020. The survey, which returned 4,196 responses from 11,398 survey invitations, asked respondents for their opinion on paying to use fast charging station services and provided the opportunity to provide general feedback on rates and user experience. The response rate of 37 per cent provides confidence that the results reflect the sentiment of a broad population of potential fast charging station users. Appendix D to the Application provides further information on the survey and detailed results.

1.11.4 Why did BC Hydro not offer the survey to all BC Hydro customers? Please explain.

RESPONSE:

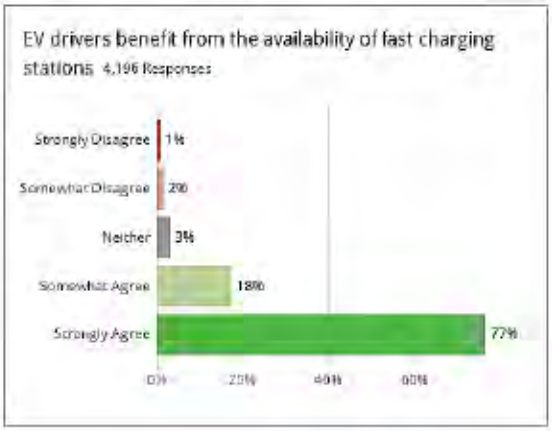
BC Hydro emailed the survey link to those customers who specifically opted-in for electric vehicle related communications, but it was available to any member of the public who had the link.

Please refer to BC Hydro's response to BCUC IR 1.4.1 for more information on distribution of the survey link.

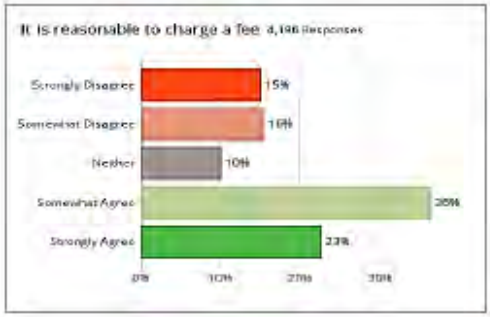
12.0 Reference: Exhibit B-1, pages 14-15

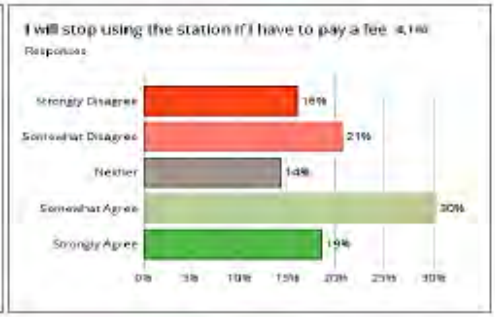
Quantitative Results

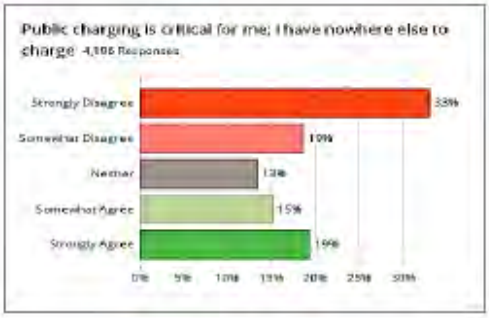
- *General*: Most (94 per cent) respondents agree that electric vehicle drivers benefit from the availability of public fast charging stations.



- *Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge.







1.12.1 Please confirm or otherwise explain that it would be expected that those 49% of customers who would stop using the service if a fee were introduced would presumably charge at home, where they would potentially pay for incremental energy charges, or would charge at non-BC Hydro charging stations, where they may or may not pay for electricity charging.

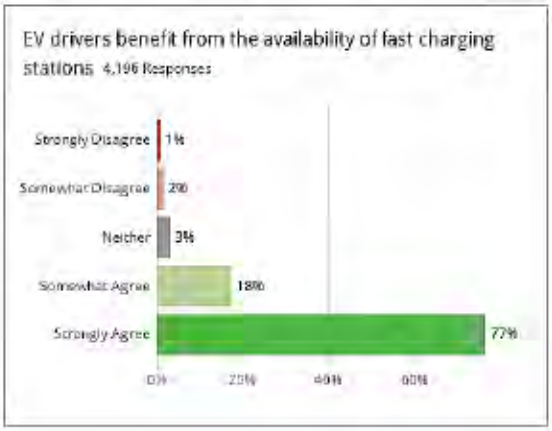
RESPONSE:

Assuming that driving habits remain unchanged following introduction of the interim rate on May 1, 2021, it follows that EV charging by this 49 per cent would likely occur elsewhere.

12.0 Reference: Exhibit B-1, pages 14-15

Quantitative Results

- *General*: Most (94 per cent) respondents agree that electric vehicle drivers benefit from the availability of public fast charging stations.



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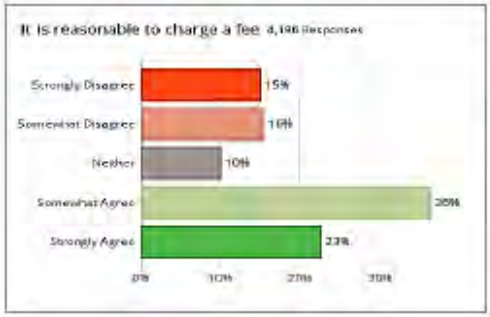
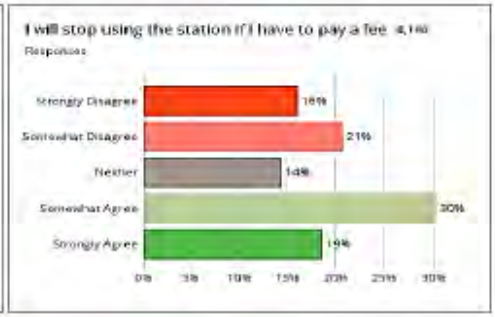
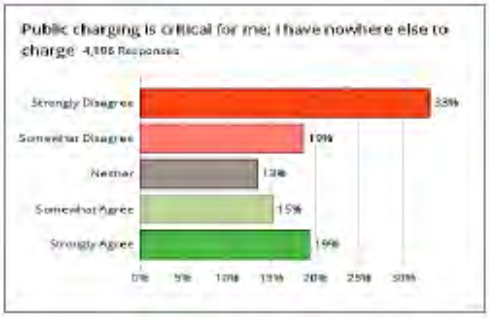






1.12.1.1 Please identify how many free charging stations are in existence in BC that are not operated by BC Hydro.

RESPONSE:

Based on BC Hydro's knowledge, the majority of free fast charging stations in B.C. after May 1, 2021 are operated by B.C. Ministry of Transportation at Highway rest areas (about 34 electric vehicle fast charging stations at 17 sites).

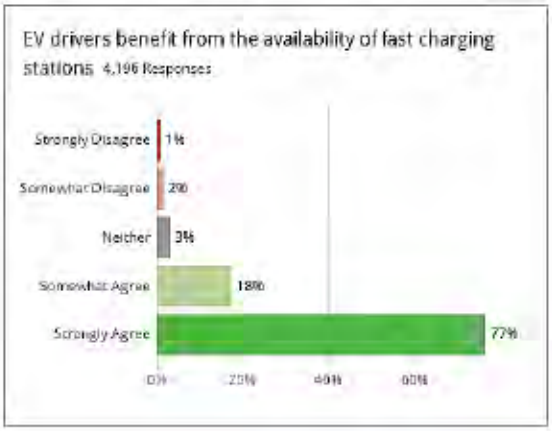
In addition, there are a few fast charging stations offered for free at car dealerships across B.C.

BC Hydro is unable provide the number of free level 2 charging stations.

12.0 Reference: Exhibit B-1, pages 14-15

Quantitative Results

- *General*: Most (94 per cent) respondents agree that electric vehicle drivers benefit from the availability of public fast charging stations.



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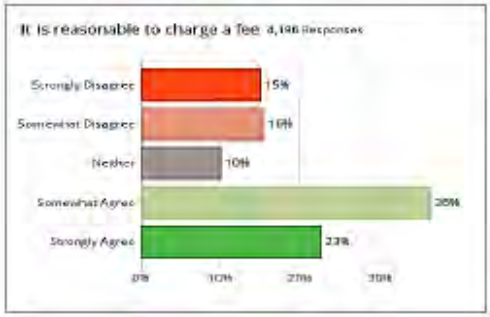
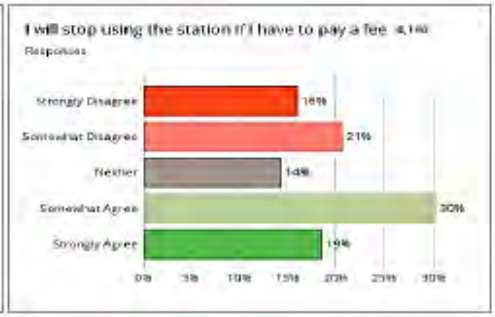
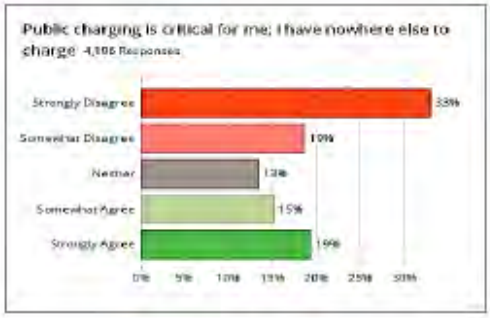






1.12.1.2 Please confirm or otherwise explain that BC Hydro has at no time made a public commitment to offering free EV charging on a permanent basis or for any other period of time.

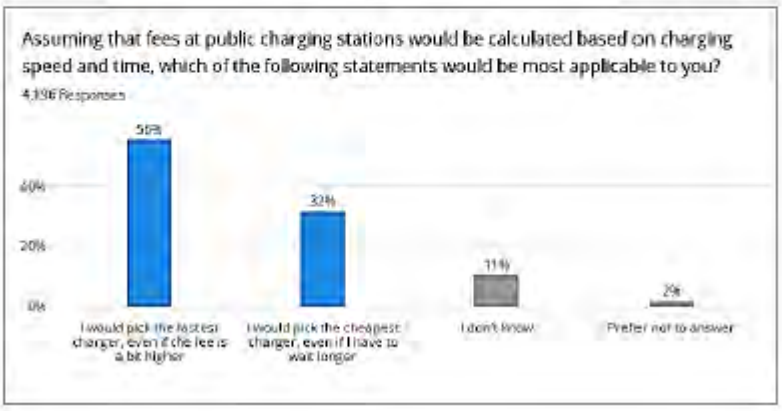
RESPONSE:

Please refer to BC Hydro's response to BCSEA-VEVA IR 1.14.1.

13.0 Reference: Exhibit B-1, page 15 and 16

- *Price*: If a 50 kW charging station service includes most of the features important to them – such as multiple stations per site (to reduce waiting time) and easy-to-find and safe locations that are close to amenities – half (48 per cent) of respondents would be willing to pay less than $5 for a 30-minute charging session and almost one-third (29 per cent) would be willing to pay $5. This translates to most (77 per cent) willing to pay approximately 17 cents per minute or less.

- *Price and power levels*: More than one-half (56 per cent) would pick the fastest charging station even if the fee is a bit higher. One-third (32 per cent) would choose the least expensive charging station even if it means a longer wait time.



1.13.1 Recognizing that vehicles vary significantly in their economics, please provide a comparison of the cost per kilometer of running a high economy vehicle paying a rate of $5/30 minutes of charging, vs a rate of $1.00 per gallon of gasoline.

RESPONSE:

Since vehicles operating characteristics can vary significantly and fast charging rates are significantly impacted by battery size, state of charge, and temperature, BC Hydro is unable to provide this analysis.

On BC Hydro's website, there are EV cost calculator tools available: https://electricvehicles.bchydro.com/learn/costs-of-electric-vehicles

In the example below copied from bchydro.com, the electric vehicle costs are based on home charging. If the customer's charging needs are partially met through fast charging (e.g., four x $5 fast charging sessions per month), then an additional $200 to $240 per year in electricity costs would be added to the examples below since the customer would be using public fast charging instead of home charging at residential rates for those 48 fast charging sessions per year.

Fuel costs

Comparing fuel costs

Fuel costs are the most obvious way an EV can save you money over a gas-powered vehicle. Here's a fuel cost comparison to give you an idea. How much does it roughly cost to drive 20,000 kilometres a year?

- **In a Nissan Leaf S Plus**: around $400 (or $33/month) on electricity.
- **In an equivalent gas-powered vehicle**: around $1,848 (or $154/month) on gas.

You can find and compare figures for specific vehicles using our **fuel savings calculator** but to give you a quick idea, here are comparisons for four different commutes into downtown Vancouver:

CITY	ELECTRICITY COSTS PER YEAR (2020 NISSAN LEAF S PLUS)	GAS COSTS PER YEAR (2020 CHEVY SPARK 1LT)
Richmond	$156.00	$721.05
Surrey	$343.30	$1,586.30
Coquitlam	$322.40	$1,409.17
Abbotsford	$780.00	$3,605.24

Fuel prices based on 2019 annual average for Vancouver from Statistics Canada.

13.0 Reference: Exhibit B-1, page 15 and 16

- *Price*: If a 50 kW charging station service includes most of the features important to them – such as multiple stations per site (to reduce waiting time) and easy-to-find and safe locations that are close to amenities – half (48 per cent) of respondents would be willing to pay less than $5 for a 30-minute charging session and almost one-third (29 per cent) would be willing to pay $5. This translates to most (77 per cent) willing to pay approximately 17 cents per minute or less.

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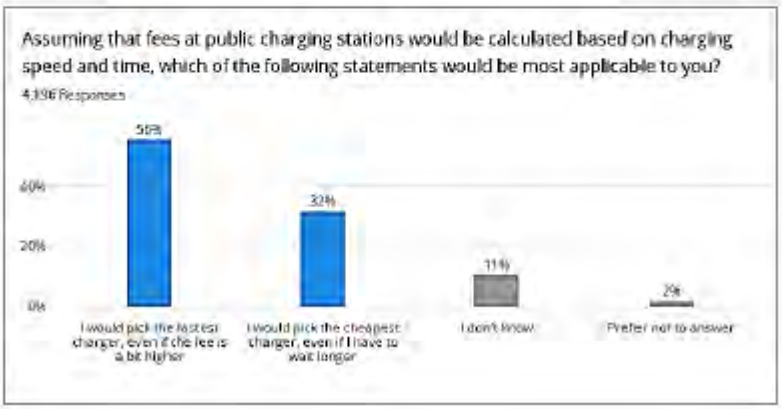

1.13.2 Approximately how far can an economy EV or hybrid vehicle travel on a highway on a 30-minute charge? Please provide a range of distances by EV vehicle efficiency.

RESPONSE:

BC Hydro is unable to complete the requested analysis as there is variability in the amount of electricity dispensed from a charger arising from factors such as electric vehicles make and model and the outside air temperatures.

To be responsive, BC Hydro notes that Chevrolet's website for 2020 and 2021 Bolt states that "DC Fast Charging Offers up to an estimated 145 km of range in around 30 minutes of charge time".[1]

[1] **Chevrolet Bolt website: https://www.chevrolet.ca/en/electric/previous-year-bolt-ev**

13.0 Reference: Exhibit B-1, page 15 and 16

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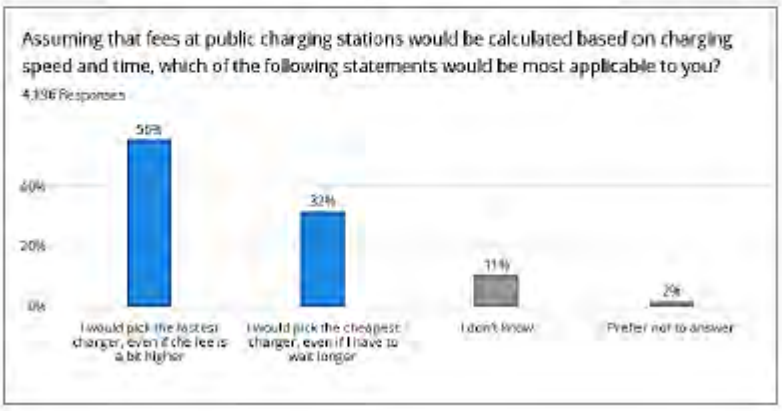


1.13.3 Please confirm or otherwise explain that $0.17/minute would equate to about $5.10/30 minutes.

RESPONSE:

Confirmed, a time-based fast charging station with a rate of 17 cents per minute charging for 30 minutes would equate to a charge of $5.10.

= (Fast charging station rate) x (charging session length)

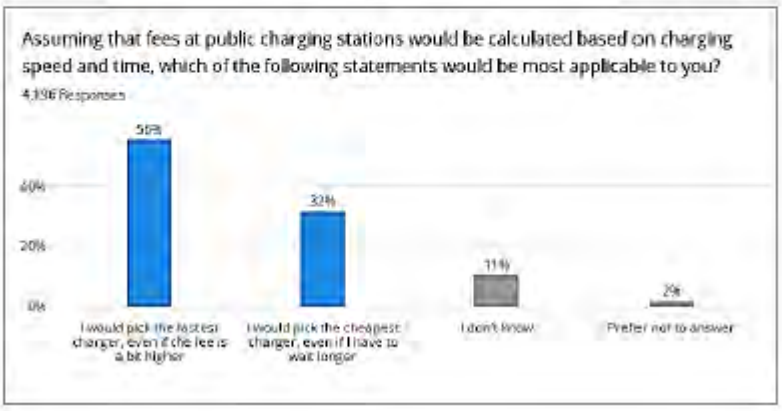
= (17 cents per minute) x (30 minutes)

= $5.10

13.0 Reference: Exhibit B-1, page 15 and 16

- *Price*: If a 50 kW charging station service includes most of the features important to them – such as multiple stations per site (to reduce waiting time) and easy-to-find and safe locations that are close to amenities – half (48 per cent) of respondents would be willing to pay less than $5 for a 30-minute charging session and almost one-third (29 per cent) would be willing to pay $5. This translates to most (77 per cent) willing to pay approximately 17 cents per minute or less.

- *Price and power levels*: More than one-half (56 per cent) would pick the fastest charging station even if the fee is a bit higher. One-third (32 per cent) would choose the least expensive charging station even if it means a longer wait time.



1.13.4 Of the 34% of customers who have nowhere else to charge other than public charging stations, please identify what percentage would support a price of $5 for a 30 minute charging session.

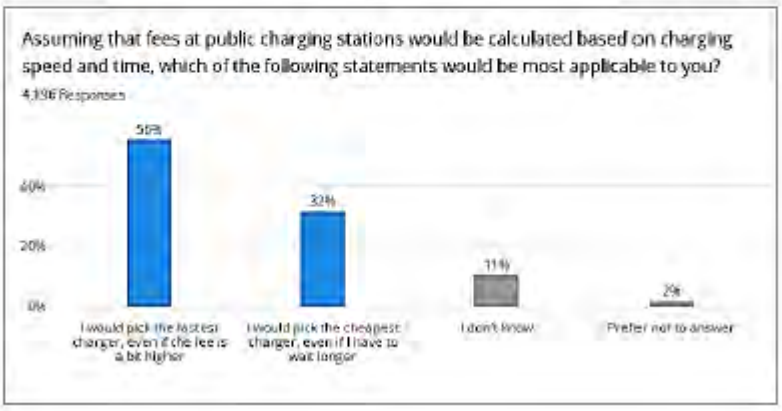
RESPONSE:

For those customers with nowhere else to charge their EVs other than public charging stations, 27 per cent said they are willing to support a $5 price for a 30-minute fast charging session.

13.0 Reference: Exhibit B-1, page 15 and 16

- *Price*: If a 50 kW charging station service includes most of the features important to them – such as multiple stations per site (to reduce waiting time) and easy-to-find and safe locations that are close to amenities – half (48 per cent) of respondents would be willing to pay less than $5 for a 30-minute charging session and almost one-third (29 per cent) would be willing to pay $5. This translates to most (77 per cent) willing to pay approximately 17 cents per minute or less.

- *Price and power levels*: More than one-half (56 per cent) would pick the fastest charging station even if the fee is a bit higher. One-third (32 per cent) would choose the least expensive charging station even if it means a longer wait time.



1.13.5 Please confirm that a $5 price for EV charging would not be a bright line for uptake of non-uptake of an EV charging service, but that price would have a curvilinear relationship to uptake.

RESPONSE:

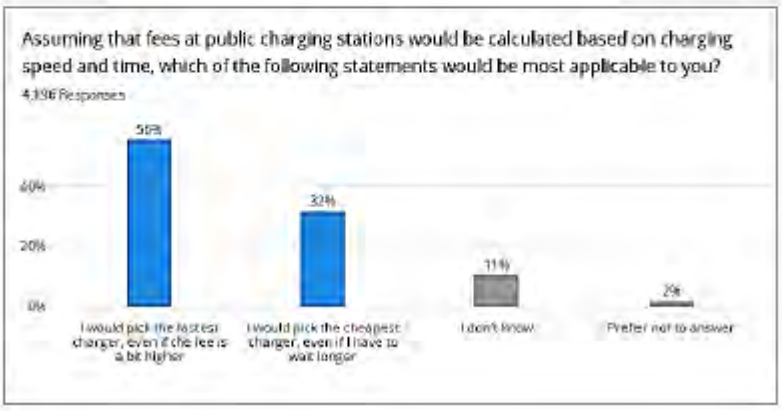
As BC Hydro's fast charging station service was offered at no charge until May 1, BC Hydro does not currently have the data required to model the relationship between price and utilization.

Data currently available on the relationship between price and utilization is based on surveys and interviews, as presented in the preamble to this information request. These data indicate that fast charging station customer are price sensitive and that utilization has an inverse relationship to price; however, the mathematical form of that relationship is not known at this time.

13.0 Reference: Exhibit B-1, page 15 and 16

- *Price*: If a 50 kW charging station service includes most of the features important to them – such as multiple stations per site (to reduce waiting time) and easy-to-find and safe locations that are close to amenities – half (48 per cent) of respondents would be willing to pay less than $5 for a 30-minute charging session and almost one-third (29 per cent) would be willing to pay $5. This translates to most (77 per cent) willing to pay approximately 17 cents per minute or less.

- *Price and power levels*: More than one-half (56 per cent) would pick the fastest charging station even if the fee is a bit higher. One-third (32 per cent) would choose the least expensive charging station even if it means a longer wait time.



1.13.6 Please provide BC Hydro's understanding of the curvilinear relationship of price to uptake with respect to EV charging, and whether or not BC Hydro has done any research on this topic.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.13.5.

14.0 Reference: Exhibit B-1, page 17

> **Qualitative Results**
>
> The survey also gave respondents the opportunity to provide any other feedback regarding potential fast charging service rates. 2,149 respondents provided such feedback, a high-level summary of which is provided below:
>
> - *Keep it free*: Respondents who want to keep this service free mention the availability of free fast charging service as one of the factors they use to justify the expense of an electric vehicle purchase, and that a fee "punishes" drivers who are doing their part for the environment. Some would like to postpone the introduction of a rate until electric vehicle adoption reaches some critical mass. Others would like for BC Hydro to focus on improving station reliability and expanding the network before charging a rate for the service.

1.14.1 How did BC Hydro balance the self-interest of those surveyed with electric vehicles against the interests of those customers who do not have or cannot afford electric vehicles?

RESPONSE:

BC Hydro balance the -interest of those surveyed with electric vehicles against the interests of those customers who do not have or cannot afford electric vehicles as follows:

- **The Proposed Rates are intended to collect revenue from the customers of the fast charging service which will help minimize cost impact on all ratepayers, including those who do not have or cannot afford electric vehicles;**
- **The Proposed Rates consider the interests of fast charging station users by incorporating their feedback in the design;**
- **The web survey was published through BC Hydro's website, thus making the survey available to the public, without restricting to customers/users of fast charging stations;**

- **The invitation to the public engagement session on December 7, 2020 was sent to individuals who responded to the survey as well as other stakeholders and interested parties. Please refer to Appendix F to the Application for a list of organizations that were represented at the session; and**

- **The public engagement session made all participants aware of the filing of the Application and the regulatory process. The broad public involvement of this regulatory process is evidenced by over 100 letters of comment received by the BCUC.**

15.0 Reference: Exhibit B-1, pages 18 and 19

> **Key Takeaways from Customer Research**
>
> In analyzing the personal interviews and survey results, we observe the following key takeaways:
>
> - A rate should be low enough to not discourage electric vehicle adoption;
> - A rate could lead to higher expectations of user experience and station reliability;
> - An electricity-based rate is overwhelmingly preferred to a time-based rate; and
> - A rate may help free up fast charging stations for those who have nowhere else to charge.

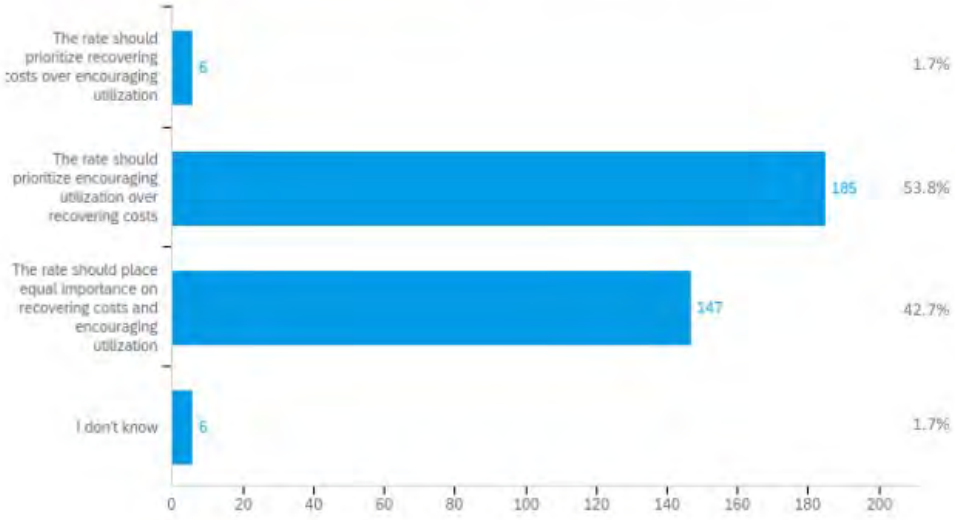
1.15.1 Please note where it is included in the evidence of personal interviews and survey results that a rate should not be high enough to discourage EV adoption.

RESPONSE:

As shown in Appendix F to the Application, from the workshop survey responses, 53 per cent responded that the rate should prioritize adoption, whereas 42 per cent responded that adoption and recovering costs should have equal weight:

Survey questions & results

Q1 In determining the rate for DC fast charging service, how should we prioritize recovering costs associated with our fast charging service versus encouraging utilization of our fast charging stations?



Regarding respondent qualitative analysis supporting "adoption," this was mentioned over 30 times in the Appendix F comments section.

15.0 Reference: Exhibit B-1, pages 18 and 19

> **Key Takeaways from Customer Research**
>
> In analyzing the personal interviews and survey results, we observe the following key takeaways:
>
> - A rate should be low enough to not discourage electric vehicle adoption;
> - A rate could lead to higher expectations of user experience and station reliability;
> - An electricity-based rate is overwhelmingly preferred to a time-based rate; and
> - A rate may help free up fast charging stations for those who have nowhere else to charge.

1.15.2 Please identify the rate which would be logically considered to discourage electric vehicle adoption, and provide the supporting evidence.

RESPONSE:

BC Hydro is not able to correlate a specific fast charging rate that would discourage the use of electric vehicles based on the research findings. Please refer to Appendix D of the Application for the following:

- **On page 11, the research indicates that half of the users would stop using the charging stations with any fee;**
- **On page 14, the research indicates that 77 per cent would prefer to pay $5 or less than $5; and**
- **On page 18, the research indicates that 59 per cent support BC Hydro charging a fee.**

16.0 Reference: Exhibit B-1, page 19

> **3.2 Public Engagement Workshop**
>
> BC Hydro hosted a fast charging service rate design virtual workshop through WebEx on December 7, 2020. The workshop invitation was sent to electric vehicle drivers and individuals who responded to the survey discussed in section 3.1 above, as well as to other stakeholders and interested parties. In total, 2,970 invitations were sent and 320 registrants participated in the workshop. The workshop presentation is included as Appendix E.
>
> Workshop participants were asked to complete a feedback form, which required responses to ten pre-determined questions, and 359 feedback forms were received. Replies to the feedback form were analyzed using the Qualtrics research tool. The final report is included as Appendix F. The following key results emerge from the feedback:
>
> - Fifty-one per cent of respondents indicate that the rate for a 50 kW charger should be less than 20 cents per minute, with an additional 38 per cent indicating that it should be between 20 cents to 25 cents per minute.

1.16.1 Please provide an overview of the 'other stakeholders and interested parties' who participated including quantification of the stakeholders and their interest groupings.

RESPONSE:

Please refer to page 41 of Appendix F to the Application for an overview of the other stakeholders and interested parties who participated in the workshop.

Please note that individuals who did not disclose whether they were associated with an organization have not been listed for privacy reasons.

16.0 Reference: Exhibit B-1, page 19

> **3.2 Public Engagement Workshop**
>
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>
> - Fifty-one per cent of respondents indicate that the rate for a 50 kW charger should be less than 20 cents per minute, with an additional 38 per cent indicating that it should be between 20 cents to 25 cents per minute.

1.16.2 Please identify the number of workshop participants who also participated in the survey.

RESPONSE:

Three hundred and fifty nine survey responses were received. BC Hydro cannot correlate whether all survey respondents participated in the workshop live as some participants attended anonymously or reviewed materials offline.

17.0 Reference: Exhibit B-1, page 24

Table 2 Jurisdiction Review of Rates for Fast Charging Service as of February 2, 2021

Operator	Service	Rate (cents/min) @ Power Level	Number of Sites and Fast Chargers in B.C.
City of North Vancouver	• Single 50 kW charger	20¢ 50 kW	• 1 site • 1 charger
City of Vancouver	• Single or 2x 50 kW chargers	21¢ 50 kW	• 5 sites • 9 chargers
Electrify Canada	• 4x chargers up to 350 kW • Ample lighting, major retail parking lots	27¢ <90kW* 57¢ >90kW* *20% member discount available for $4/month	• 3 sites (additional 5 sites under construction) • 12 chargers
FortisBC	• Single or 2x 50 kW chargers	Current: 30¢ 50 kW Proposed: 27¢ 50 kW 54¢ 100 kW	• 15 sites • 20 chargers
Hydro Quebec Electric Circuit Network	• Basic to high quality stations • Single, 2x, 4x, 6x – 50 kW, and some 100 kW	20.1¢ 50 kW 20.1¢ 100 kW* *interim rate	• ~250 sites in Quebec
Petro-Canada	• 2x chargers up to 350 kW • Ample lighting, on-site amenities/staff	27¢ up to 350 kW	• 12 sites • 23 chargers
Tesla	• Proprietary stations (Tesla only) • Many chargers per site	22¢ <60kW 44¢ >60kW	• 16 sites • 172 chargers

BC Hydro's Proposed Rates are designed to align with prices of other fast charging operators.

1.17.1 Please confirm or otherwise clarify the CEC's understanding that FBC reduced its originally proposed rate of $0.27/minute to $0.26/minute for 50kW charging.

RESPONSE:

This is in accordance with BC Hydro's current understanding of FortisBC's proposal.

17.0 Reference: Exhibit B-1, page 24

Table 2 Jurisdiction Review of Rates for Fast Charging Service as of February 2, 2021

Operator	Service	Rate (cents/min) @ Power Level	Number of Sites and Fast Chargers in B.C.
City of North Vancouver	• Single 50 kW charger	20¢ 50 kW	• 1 site • 1 charger
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Electrify Canada	• 4x chargers up to 350 kW • Ample lighting, major retail parking lots	27¢ <90kW* 57¢ >90kW* *20% member discount available for $4/month	• 3 sites (additional 5 sites under construction) • 12 chargers
FortisBC	• Single or 2x 50 kW chargers	Current: 30¢ 50 kW Proposed: 27¢ 50 kW 54¢ 100 kW	• 15 sites • 20 chargers
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Tesla	• Proprietary stations (Tesla only) • Many chargers per site	22¢ <60kW 44¢ >60kW	• 16 sites • 172 chargers

BC Hydro's Proposed Rates are designed to align with prices of other fast charging operators.

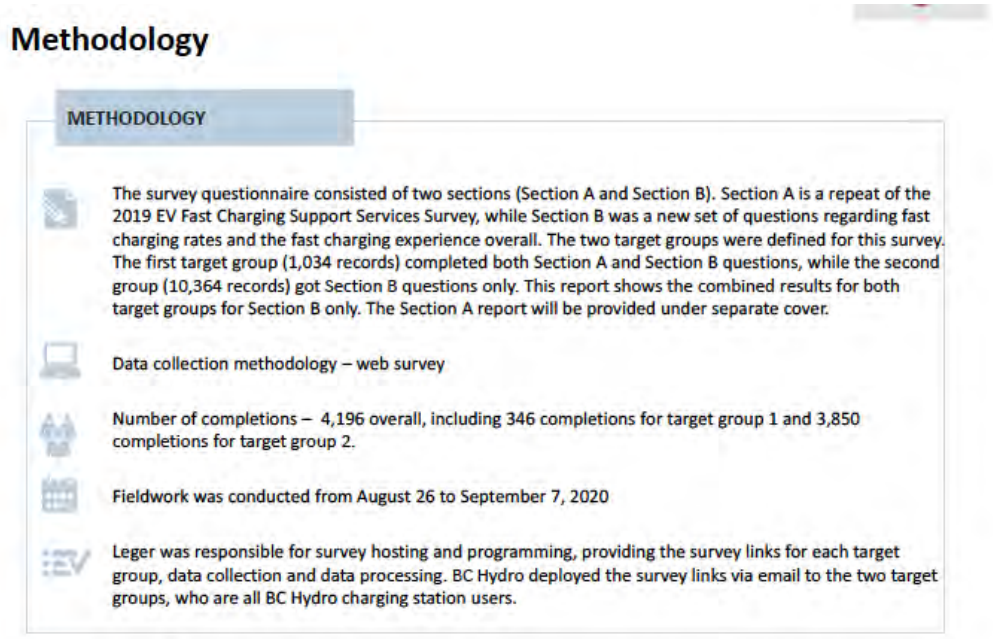
1.17.2 Would Petro-Canada be considered a 'competitor' to BC Hydro for EV charging? Please explain why or why not.

RESPONSE:

BC Hydro cannot comment on the business models of other fast charging operators.

BC Hydro supports additional public fast charging services in B.C., including by non-BC Hydro operators, as we expect such developments will encourage electric vehicle adoption in support of the Government of B.C.'s CleanBC Plan and to the benefit of BC Hydro's ratepayers.

18.0 Reference: Exhibit B-1, Appendix D, page 5 of 27



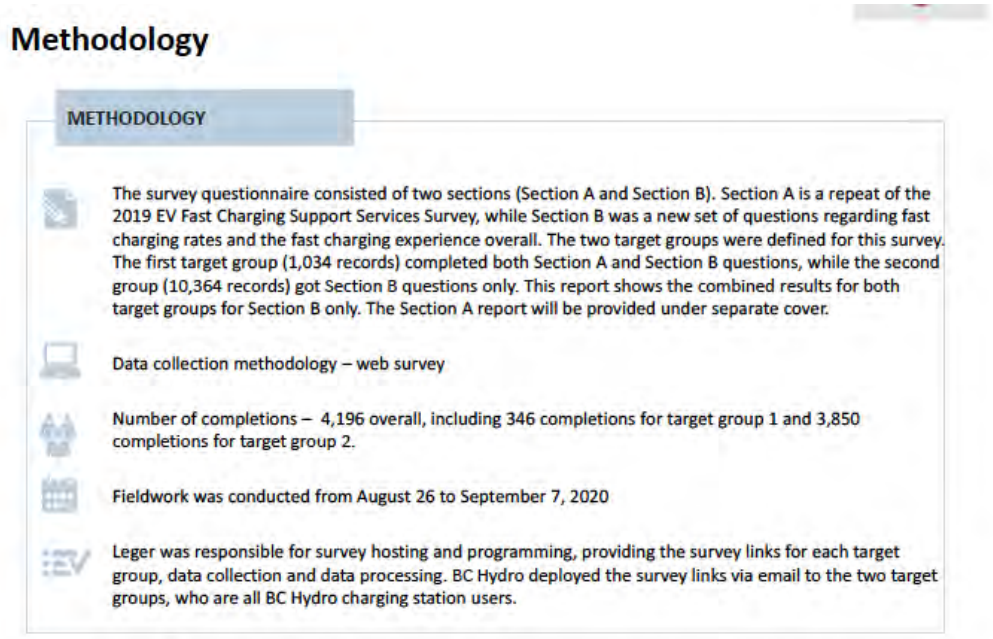
1.18.1 Please describe what constituted the first target group and the second target group.

RESPONSE:

The first target group was those who had recently contacted the BC Hydro contact centre for fast charging support. They received both section A and section B of the survey.

The second target group did not recently contact BC Hydro and were sent the link to only section B, which was also available to any member of public who obtained the link.

18.0 Reference: Exhibit B-1, Appendix D, page 5 of 27



1.18.2 How were these target groups selected?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.18.1 regarding how the first target group was selected.

The second target group was any individual who registered as a BC Hydro EV customer and opted-in for communications from BC Hydro, plus any member of the public who obtained the survey link.

19.0 Reference: Exhibit B-1, page 25

> BC Hydro considered the feedback from customers and stakeholders when designing the Proposed Rates. For example, our Proposed Rates are within the range considered passable to customers and stakeholders. Further, while BC Hydro considered proposing a single rate for all station power levels, based on the feedback shown in section 3.2, we decided to propose a different rate for each of the three station power levels. In addition, as suggested in the customer feedback, BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas. For example, the average cost for a charging session at a BC Hydro fast charging station is $6. In comparison charging at a Tesla or Petro Canada fast charging station may be $8 or more, while charging at home under BC Hydro's residential service rate schedule may be $2 and a tank of gasoline may be at least $20.

1.19.1 Please provide an expected cost of filling an average size tank with gasoline.

RESPONSE:

Cost of filling an average capacity of an automobile fuel tank with gasoline is $77 and calculation is shown below.

= (Average capacity of an automobile fuel tank[1]) x (Average retail gas price in BC[2])

= (55 litres) x (133.9 cents per litre)

= $76.95

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[1] **Taken mid-point of Automotive Fuel Tank Market report that states "average capacity of an automobile fuel tank is 40-70 liters":https://www.marketsandmarkets.com/Market-Reports/automotive-fuel-tank-market 23737735.html#:~:text=The%20average%20capacity%20of%20an,tank%20capacity%20of%20%3C45%20liters**

[2] **GasBuddy average BC retail gas price of 133.9 cents per litre from May 6, 2021: https://gasbuddy.com**

20.0 Reference: Exhibit B-1, pages 25-26

> BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs
>
> including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery.

1.20.1 Over what period of time does BC Hydro plan to reach its full cost recovery objective? Please provide the plan for doing so.

RESPONSE:

Pleas refer to BC Hydro's response to BCOAPO IR 1.8.2.

20.0 Reference: Exhibit B-1, pages 25-26

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1.20.2 What actions and evaluation has BC Hydro undertaken to date to ensure its full cost recovery in the future?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.1.

Fast charging technology is fairly new and has a much shorter lifespan than traditional utility assets. BC Hydro has focused on managing the overall costs of the fast charging assets currently in service. To that end, BC Hydro financial results for fiscal 2020 have been analyzed to identify major causes of cost escalation. The analysis identified that the most unreliable (first generation) chargers required a disproportionate amount of maintenance. A project to remove the unreliable chargers was initiated and executed. As a result of the removal of the first-generation chargers, further cost savings were realized given that their removal allowed BC Hydro to migrate all Network Management Services to a single vendor (AddEnergie).

BC Hydro is developing asset management practices for its fast charging assets, with the goal of establishing the lowest total lifecycle cost. BC Hydro assesses maintenance costs on an ongoing basis to ensure cost control, and to identify potential costs savings. As the fast charging technology matures, we anticipate fewer failures, higher reliability and overall lower costs on a per charger basis.

20.0 Reference: Exhibit B-1, pages 25-26

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> including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery.

1.20.3 Please confirm that matching BC Hydro's prices with operators such as Tesla or Petro-Canada would likely result in higher revenue collection.

RESPONSE:

Given the inverse relationship between price and utilization, BC Hydro is unable to confirm that higher prices would result in higher revenue collection.

As demonstrated in section 3 of the Application, customer research indicates that BC Hydro's fast charging station customers are price sensitive, and an increased rate could negatively impact utilization, which in turn would negatively impact revenue.

20.0 Reference: Exhibit B-1, pages 25-26

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> including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery.

1.20.4 Please provide quantification of the revenues expected to be collected if BC Hydro prices were to match Petro-Canada's prices.

RESPONSE:

BC Hydro is unable to quantify the revenues expected to be collected if BC Hydro prices were to match Petro Canada's prices. Customer research indicates that BC Hydro's fast charging station customers are sensitive to price and that utilization will fall if the rate is increased. However, as the service has been offered at no charge until May 1, 2021, we do not have the data required to model the relationship between price and utilization, which would be required in order to provide the requested analysis.

20.0 Reference: Exhibit B-1, pages 25-26

> BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs
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> including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery.

1.20.5 Given the expected prevalence of BC Hydro charging stations, is it fair to say that BC Hydro could be considered a price-setting leader in BC? Please explain why or why not.

RESPONSE:

Fast charging stations, whether BC Hydro-owned or owned by other operators, are not prevalent and it will be some years before they become prevalent. Given this early stage of market development, we do not view that a price-setting leader concept as being applicable.

BC Hydro does not view itself as being a price-setting leader. Rather, our Proposed Rates are intended to encourage station utilization while maintaining a level playing field with other fast charging station operators, by considering prices of other operators, the range of prices that research indicates customers are willing to pay, while collecting sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules.

20.0 Reference: Exhibit B-1, pages 25-26

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> including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery.

1.20.6 Please provide a quantitative sensitivity analysis of different prices and the cost recovery. Please provide all of BC Hydro's assumptions in the analysis.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.13.5 where we explain that data are not available at this time to provide quantitative sensitivity analysis of different prices and the cost recovery.

20.0 Reference: Exhibit B-1, pages 25-26

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> including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery.

1.20.7 Please confirm or otherwise explain that BC Hydro could have higher rates to maintain 'a level playing field' with other competitive market fast charging stations.

RESPONSE:

BC Hydro is unable to confirm that having higher rates would further contribute to "a level playing field" with other operators. BC Hydro's Proposed Rates fall within the range of the rates of other operators as shown in Table 2 of the Application.

20.0 Reference: Exhibit B-1, pages 25-26

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1.20.8 Please confirm or otherwise explain that 'a level playing field' should consider the ability of a competitor to recover its costs and still remain competitive.

RESPONSE:

Yes, the ability of other fast charging service provider to recover their costs and still remain competitive is a consideration for BC Hydro. BC Hydro considered the concept of "a level playing field" when designing the Proposed Rates, which are within the range of prices of other operators in its service territory and are intended to recover the cost of electricity (Energy and Demand) of the applicable General Service rates. However, BC Hydro cannot comment on other fast charging service providers' ability to recover their costs and whether their pricing structures remain competitive.

20.0 Reference: Exhibit B-1, pages 25-26

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1.20.8 Please confirm or otherwise explain that 'a level playing field' should consider the ability of a competitor to recover its costs and still remain competitive.

1.20.8.1 Please discuss the range of price points that BC Hydro considers as constituting a 'level playing field' and please explain why.

RESPONSE:

BC Hydro considers the current range of prices for the same service level (50 kW) offered by other fast charging as informing "a level playing field". Based on Table 2, this range is between 20 and 27 cents/minute for 50 kW service.

21.0 Reference: Exhibit B-1, page 25 and 26

4.1 Rate Design Approach

The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (**SGS**) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (**MGS**) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute. The Proposed Rates are applicable in all of BC Hydro's integrated area or Rate Zone I. The Proposed Rates are subject to any BCUC approved general revenue requirement increases or decreases..

BC Hydro considers the fast charging service to be part of its General Service and has thus developed the Proposed Rates to reflect its General Service pricing for the following reasons.

- The "General Service" as defined in BC Hydro's Electric Tariff[12] captures the fast charging service. "General Service" is defined as "*Service for business, commercial, institutional or industrial use, including use in nursing homes,*

boarding houses, rooming houses, common areas of multiple occupancy buildings, recreational establishments, marinas and yacht clubs, hotels, motels, mobile home parks and similar establishments or parts thereof, or for any other use not specifically provided for in the Electric Tariff." (emphasis added) Fast charging service is not specifically provided for in the Electric Tariff and therefore qualifies as "General Service".

- Different power levels of fast charging stations correspond with the "Availability" requirement of Small General Service or Medium General Service. Under BC Hydro's Rate Schedules, Small General Service is available for customers whose Demand[13] is less than 35 kW, and Medium General Service is available for customers whose Demand is between 35 kW and 150 kW.
- Other fast charging operators (i.e., exempt utilities) in BC Hydro's service territory take General Service and are charged under the applicable General Service Rate Schedule based on their electricity Demand. Adopting General Service rates as the basis for the Proposed Rates in the Application ensures that BC Hydro's rate for fast charging service is not lower than the Energy and Demand rates BC Hydro charges to other fast charging station operators. In this respect the Proposed Rates reflect the BCUC's recommendation in the Phase 2 EV Inquiry Report that "non-exempt public utilities provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities…, including the non-exempt public utility itself"[14].

1.21.1 Please confirm that BC Hydro is competing in the EV charging commercial business downstream from its normal Smart Meter electricity metering, and is competing with potential competitive market businesses.

RESPONSE:

BC Hydro confirms that the public fast charging service is downstream from its normal Smart Meter electricity metering.

We are unable confirm the extent to which BC Hydro is competing with commercial businesses. Although there are several providers of fast charging service, the public electric vehicle fast charging market in British Columbia is yet to become fully mature and competitive.

BC Hydro supports the entry of additional public electric vehicle charging operators in British Columbia. We view the expansion of this service as supporting electric vehicle adoption, which will increase BC Hydro's revenues to the benefit of all ratepayers, as well as supporting the government's CleanBC goals. BC Hydro's involvement in providing public fast charging service is going to help the maturation of the market over time.

21.0 Reference: Exhibit B-1, page 25 and 26

4.1 Rate Design Approach

The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (**SGS**) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (**MGS**) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute. The Proposed Rates are applicable in all of BC Hydro's integrated area or Rate Zone I. The Proposed Rates are subject to any BCUC approved general revenue requirement increases or decreases..

BC Hydro considers the fast charging service to be part of its General Service and has thus developed the Proposed Rates to reflect its General Service pricing for the following reasons.

- The "General Service" as defined in BC Hydro's Electric Tariff[12] captures the fast charging service. "General Service" is defined as "*Service for business, commercial, institutional or industrial use, including use in nursing homes,*

boarding houses, rooming houses, common areas of multiple occupancy buildings, recreational establishments, marinas and yacht clubs, hotels, motels, mobile home parks and similar establishments or parts thereof, or for any other use not specifically provided for in the Electric Tariff." (emphasis added) Fast charging service is not specifically provided for in the Electric Tariff and therefore qualifies as "General Service".

- Different power levels of fast charging stations correspond with the "Availability" requirement of Small General Service or Medium General Service. Under BC Hydro's Rate Schedules, Small General Service is available for customers whose Demand[13] is less than 35 kW, and Medium General Service is available for customers whose Demand is between 35 kW and 150 kW.
- Other fast charging operators (i.e., exempt utilities) in BC Hydro's service territory take General Service and are charged under the applicable General Service Rate Schedule based on their electricity Demand. Adopting General Service rates as the basis for the Proposed Rates in the Application ensures that BC Hydro's rate for fast charging service is not lower than the Energy and Demand rates BC Hydro charges to other fast charging station operators. In this respect the Proposed Rates reflect the BCUC's recommendation in the Phase 2 EV Inquiry Report that "non-exempt public utilities provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities…, including the non-exempt public utility itself"[14].

1.21.2 Please confirm that electricity costs for EV charging stations are a fraction of the total cost of providing EV charging services, downstream from the BC Hydro Smart Meters.

RESPONSE:

BC Hydro can only make submissions on the cost of BC Hydro fast charging stations and not the costs of other operators.

BC Hydro confirms that the cost of electricity is only one element of the cost of providing public fast charging service. As illustrated by Table 3 in the Application, in BC Hydro's case, the electricity costs are approximately one quarter of the total cost of service for public fast charging stations.

21.0 Reference: Exhibit B-1, page 25 and 26

4.1 Rate Design Approach

The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (**SGS**) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (**MGS**) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute. The Proposed Rates are applicable in all of BC Hydro's integrated area or Rate Zone I. The Proposed Rates are subject to any BCUC approved general revenue requirement increases or decreases..

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boarding houses, rooming houses, common areas of multiple occupancy buildings, recreational establishments, marinas and yacht clubs, hotels, motels, mobile home parks and similar establishments or parts thereof, or for any other use not specifically provided for in the Electric Tariff." (emphasis added) Fast charging service is not specifically provided for in the Electric Tariff and therefore qualifies as "General Service".

- Different power levels of fast charging stations correspond with the "Availability" requirement of Small General Service or Medium General Service. Under BC Hydro's Rate Schedules, Small General Service is available for customers whose Demand[13] is less than 35 kW, and Medium General Service is available for customers whose Demand is between 35 kW and 150 kW.
- Other fast charging operators (i.e., exempt utilities) in BC Hydro's service territory take General Service and are charged under the applicable General Service Rate Schedule based on their electricity Demand. Adopting General Service rates as the basis for the Proposed Rates in the Application ensures that BC Hydro's rate for fast charging service is not lower than the Energy and Demand rates BC Hydro charges to other fast charging station operators. In this respect the Proposed Rates reflect the BCUC's recommendation in the Phase 2 EV Inquiry Report that "non-exempt public utilities provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities…, including the non-exempt public utility itself"[14].

1.21.3 Please confirm that BC Hydro could develop a separate rate class for EV charging users that would also ensure that energy and demand charges are not lower than that for other fast charging station operators, by charging general service electricity rates for its EV charging station services.

RESPONSE:

In BC Hydro's case, it is the rate schedule, not the rate class, that determines the applicable charges and rates. BC Hydro's Proposed Rate Schedules 1360, 1560 and 1561 are designed to recover at least the cost of electricity (Energy and Demand) under the applicable General Service rates. This design would not be impacted by the development of a separate rate class. The development of a separate rate class would not ensure any specific level of cost recovery or rates.

Please also refer to BC Hydro's responses to BCUC IRs 1.1.1, 1.1.3 and 1.1.3.1 for a discussion of the implications of creating a separate class of service for public fast charging.

21.0 Reference: Exhibit B-1, page 25 and 26

4.1 Rate Design Approach

The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (**SGS**) rate and is proposed at 12 cents per minute; RS 1560, which is applicable to public fast charging service at 50 kW stations, is considered a Medium General Service rate (**MGS**) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute. The Proposed Rates are applicable in all of BC Hydro's integrated area or Rate Zone I. The Proposed Rates are subject to any BCUC approved general revenue requirement increases or decreases..

BC Hydro considers the fast charging service to be part of its General Service and has thus developed the Proposed Rates to reflect its General Service pricing for the following reasons.

- The "General Service" as defined in BC Hydro's Electric Tariff[12] captures the fast charging service. "General Service" is defined as "*Service for business, commercial, institutional or industrial use, including use in nursing homes,*

boarding houses, rooming houses, common areas of multiple occupancy buildings, recreational establishments, marinas and yacht clubs, hotels, motels, mobile home parks and similar establishments or parts thereof, or for any other use not specifically provided for in the Electric Tariff." (emphasis added) Fast charging service is not specifically provided for in the Electric Tariff and therefore qualifies as "General Service".

- Different power levels of fast charging stations correspond with the "Availability" requirement of Small General Service or Medium General Service. Under BC Hydro's Rate Schedules, Small General Service is available for customers whose Demand[13] is less than 35 kW, and Medium General Service is available for customers whose Demand is between 35 kW and 150 kW.
- Other fast charging operators (i.e., exempt utilities) in BC Hydro's service territory take General Service and are charged under the applicable General Service Rate Schedule based on their electricity Demand. Adopting General Service rates as the basis for the Proposed Rates in the Application ensures that BC Hydro's rate for fast charging service is not lower than the Energy and Demand rates BC Hydro charges to other fast charging station operators. In this respect the Proposed Rates reflect the BCUC's recommendation in the Phase 2 EV Inquiry Report that "non-exempt public utilities provide a transparent wholesale pricing mechanism that applies to all operators of EV charging facilities…, including the non-exempt public utility itself"[14].

1.21.4 From which rate classes will any costs that are not recovered from EV charging customers be recovered? Please explain.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.2.4, where BC Hydro explains that the requirement of section 18(2) of the *Clean Energy Act* requires that BC Hydro be allowed to collect sufficient revenue in each fiscal year to enable it to recover its costs incurred with respect to its electric vehicle fast charging stations. If revenue collected under the Proposed Rates will not recover all costs of service in each fiscal year, and the remaining costs will be recovered from all ratepayers. That is, any difference between the revenue and costs in any given year will be to the credit or debit of all of customers in all of BC Hydro's rate classes.

22.0 Reference: Exhibit B-1, page 28

> Having separate Rate Schedules for each fast charging station power level service will allow BC Hydro to conduct the analysis of utilization, electricity load characteristics, costs and revenues for the purpose of the evaluation described in section 5 below. As explained in section 2.2 above, the fast charging service will be separately metered at the site level, and BC Hydro can track data on electricity use and revenue by Rate Schedule. In this respect, the Proposed Rates are consistent with the BCUC's recommendation in the Phase 2 EV Inquiry Report that non-exempt public utilities should develop a separate rate and tariff for fast charging service.

1.22.1 Please confirm that BC Hydro could conduct the same analysis if the EV charging were under separate rate schedules that were not included in General Service electricity rates.

RESPONSE:

BC Hydro can conduct the same analysis irrespective of whether the Proposed Rates are included in General Service Rate Classes or in a new rate class.

23.0 Reference: Exhibit B-1, pages 29-30 and page 31

Equation 3: Rate to recover station capital costs =

{(Annualized Capital Costs) /12 months} / Average Number of Charging Session per Station per month / Average Charging Session Length

Where:

- Maintenance costs are those costs associated with metering, repair and other station maintenance work and are approximately $8,000 per year per station. Not included are labour costs associated with electric vehicle infrastructure which are approximately $800,000 per year.

- Scenario 3 is the full cost of service rate. This rate recovers all the costs associated with the fast charging service, which are the electricity costs as well as station capital and maintenance costs. This rate is calculated as the sum of Equations 1, 2 and 3. The capital costs in this scenario are net of funding from government partners such as NRCan.

Table 3 50 kW Charging Station Rate by Utilization and Cost Recovery Scenario

Utilization Rate		Scenario 1	Scenario 2	Scenario 3
(%)	Average Number of Charging Sessions per Station per Month	Electricity Costs (RS 1500 Equivalent) ($/min)	Electricity + Station Maintenance Costs[17] ($/min)	Full Cost of Service: Electricity + Maintenance + Capital Costs ($/min)
3	46	0.25	0.76	1.29
3.7	57	0.21	0.62	1.06
5	77	0.17	0.47	0.79
10	153	0.11	0.26	0.42
15	230	0.09	0.19	0.29
20	307	0.07	0.15	0.23

1.23.1 BC Hydro states that in Scenario 3 the Full Cost of Service recovery is the sum of Equations 1, 2 and 3. Please identify in which equation the labour costs of $800,000 are included, or confirm that as stated in the above excerpt, the labour costs are not included.

RESPONSE:

Confirmed, labour costs associated with electric vehicle infrastructure, which are approximately $800,000 per year, are not included in any of the equations or Table 3 shown in the Application (pages 29, 30 and 31).

24.0 Reference: Exhibit B-1, page 28 and 31

While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

Table 3 50 kW Charging Station Rate by Utilization and Cost Recovery Scenario

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10	153	0.11	0.26	0.42
15	230	0.09	0.19	0.29
20	307	0.07	0.15	0.23

In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study,[18] we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station. Our Proposed Rate of 21 cents per minute would recover

electricity (Energy and Demand) costs as specified under the MGS rate schedule at a utilization level of 3.7 per cent. If the utilization levels are greater than this, we would also recover some maintenance and capital costs. When the service was free, the average utilization was 15 per cent, however as described in section 3.1, half of potential station users indicated that they would stop using the service if a rate is introduced

1.24.1 Please confirm or otherwise explain the CEC's understanding that FBC is expecting to recover the full cost of service for 50kW charging under its EV charging rate of $0.26/minute.

RESPONSE:

BC Hydro understands that FortisBC (FBC) proposed rates are based on recovering its full cost of service for EV charging on a levelized basis. This means that in years where FBC under recovers the costs from EV charging customers, the balance of the costs will be covered by FBC's other customers and, conversely, in years where EV charging revenues exceed costs, these benefits flow back to all of FBC's other customers.

24.0 Reference: Exhibit B-1, page 28 and 31

While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

Table 3 50 kW Charging Station Rate by Utilization and Cost Recovery Scenario

Utilization Rate		Scenario 1	Scenario 2	Scenario 3
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20	307	0.07	0.15	0.23

In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study,[18] we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station. Our Proposed Rate of 21 cents per minute would recover

electricity (Energy and Demand) costs as specified under the MGS rate schedule at a utilization level of 3.7 per cent. If the utilization levels are greater than this, we would also recover some maintenance and capital costs. When the service was free, the average utilization was 15 per cent, however as described in section 3.1, half of potential station users indicated that they would stop using the service if a rate is introduced

1.24.2 Please provide BC Hydro's understanding of the differences that result in such a significant variation in cost recovery capabilities.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.4.

24.0 Reference: Exhibit B-1, page 28 and 31

While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

Table 3 50 kW Charging Station Rate by Utilization and Cost Recovery Scenario

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In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study,[18] we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station. Our Proposed Rate of 21 cents per minute would recover

electricity (Energy and Demand) costs as specified under the MGS rate schedule at a utilization level of 3.7 per cent. If the utilization levels are greater than this, we would also recover some maintenance and capital costs. When the service was free, the average utilization was 15 per cent, however as described in section 3.1, half of potential station users indicated that they would stop using the service if a rate is introduced

1.24.3 Please provide BC Hydro's equivalent rate scenario if it were matching the FBC methodology for determining rates.

RESPONSE:

Please refer to BC Hydro's response to BCUC IRs 1.7.3 and 1.7.3.1.

24.0 Reference: Exhibit B-1, page 28 and 31

While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

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In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study,[18] we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station. Our Proposed Rate of 21 cents per minute would recover

electricity (Energy and Demand) costs as specified under the MGS rate schedule at a utilization level of 3.7 per cent. If the utilization levels are greater than this, we would also recover some maintenance and capital costs. When the service was free, the average utilization was 15 per cent, however as described in section 3.1, half of potential station users indicated that they would stop using the service if a rate is introduced

1.24.4 Is it likely that FBC customers would use BC Hydro charging stations instead of FBC charging stations given the difference in proposed prices? Please explain.

RESPONSE:

There are many factors that may inform an individual's choice with regard to which public fast charging station to use. This includes the rate that is charged but may also include other factors such as the convenience of the location and its proximity to other amenities/services.

24.0 Reference: Exhibit B-1, page 28 and 31

While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

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In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study,[18] we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station. Our Proposed Rate of 21 cents per minute would recover

electricity (Energy and Demand) costs as specified under the MGS rate schedule at a utilization level of 3.7 per cent. If the utilization levels are greater than this, we would also recover some maintenance and capital costs. When the service was free, the average utilization was 15 per cent, however as described in section 3.1, half of potential station users indicated that they would stop using the service if a rate is introduced

1.24.5 How did BC Hydro arrive at the expected utilization rate of 3.7%?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.16.1.

24.0 Reference: Exhibit B-1, page 28 and 31

While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

Table 3 50 kW Charging Station Rate by Utilization and Cost Recovery Scenario

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In all cases, the rate goes down as utilization increases and fixed costs such as the station capital costs and the MGS Demand Charge are spread across more station users. As noted above, BC Hydro does not have enough information on which to estimate station utilization at this time. However, based on a market study,[18] we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station. Our Proposed Rate of 21 cents per minute would recover

electricity (Energy and Demand) costs as specified under the MGS rate schedule at a utilization level of 3.7 per cent. If the utilization levels are greater than this, we would also recover some maintenance and capital costs. When the service was free, the average utilization was 15 per cent, however as described in section 3.1, half of potential station users indicated that they would stop using the service if a rate is introduced

1.24.6 Please provide BC Hydro's quantitative estimates for the uptake of its EV charging service over the next 5, 10, and 20-year periods.

RESPONSE:

BC Hydro has not specifically estimated the uptake of its EV charging service in 2026, 2031 and 2041.

BC Hydro currently estimates there will be around 350,000 EV's on the road by 2030 based on the following source, https://electricvehicles.bchydro.com/about/our-role-with-EVs, although the majority of these vehicles will likely charge at home.

BC Hydro will be further updating its forecast as part of the next Integrated Resource Plan.

25.0 Reference: Exhibit B-1, page 32

> BC Hydro proposes 27 cents per minute for fast charging service at 100 kW stations. The rate will collect sufficient revenues to recover at least electricity supply costs (Energy and Demand charges) under the MGS rate so long as the station utilization rate is 6.5 per cent or greater. The station utilization needed for electricity cost recovery is higher for the 100 kW station than it is for the 50 kW station because the Peak Demand is higher. BC Hydro expects that utilization will be higher at the 100 kW stations because they are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated.

1.25.1 Please confirm the CEC's understanding that FortisBC is intending to recover its full cost of service for EV charging at 100 kW with a rate of $0.54/minute.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.24.1.

25.0 Reference: Exhibit B-1, page 32

> BC Hydro proposes 27 cents per minute for fast charging service at 100 kW stations. The rate will collect sufficient revenues to recover at least electricity supply costs (Energy and Demand charges) under the MGS rate so long as the station utilization rate is 6.5 per cent or greater. The station utilization needed for electricity cost recovery is higher for the 100 kW station than it is for the 50 kW station because the Peak Demand is higher. BC Hydro expects that utilization will be higher at the 100 kW stations because they are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated.

1.25.2 Please provide BC Hydro's understanding of the differences that result in such a significant variation in cost recovery capabilities.

RESPONSE:

BC Hydro is unable to comment on FortisBC's cost recovery capability for it's fast charging service.

We provide BC Hydro's cost recovery information in section 4.2 of the Application.

Please refer to BC Hydro's response to BCUC IR 1.15.4 where we explain that each of BC Hydro's and FortisBC's applications should be assessed individually by the BCUC based on their own merits and the regulatory and legal framework that applies.

25.0 Reference: Exhibit B-1, page 32

> BC Hydro proposes 27 cents per minute for fast charging service at 100 kW stations. The rate will collect sufficient revenues to recover at least electricity supply costs (Energy and Demand charges) under the MGS rate so long as the station utilization rate is 6.5 per cent or greater. The station utilization needed for electricity cost recovery is higher for the 100 kW station than it is for the 50 kW station because the Peak Demand is higher. BC Hydro expects that utilization will be higher at the 100 kW stations because they are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated.

1.25.3 Is it likely that FortisBC customers would use BC Hydro charging stations instead of FBC charging stations given the difference in proposed prices? Please explain.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.24.4.

25.0 Reference: Exhibit B-1, page 32

> BC Hydro proposes 27 cents per minute for fast charging service at 100 kW stations. The rate will collect sufficient revenues to recover at least electricity supply costs (Energy and Demand charges) under the MGS rate so long as the station utilization rate is 6.5 per cent or greater. The station utilization needed for electricity cost recovery is higher for the 100 kW station than it is for the 50 kW station because the Peak Demand is higher. BC Hydro expects that utilization will be higher at the 100 kW stations because they are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated.

1.25.4 How likely does BC Hydro believe it is that it will achieve station utilization of 6.5% or greater? Please explain and provide evidence to support BC Hydro's expectation and when that might be achieved.

RESPONSE:

When responding to BCUC IR 1.7.2, BC Hydro noticed an error in page 32 of the Application. This page should have indicated that the utilization of 100 kW station is 5.5 per cent. This is corrected in Errata No. 1 to the Application. This error does not change the rate calculation.

The utilization of 100 kW fast charging stations is expected to be nearly double 50 kW stations as 100 kW stations will be targeted to specific locations where the deployment will be supported by utilization data collected after interim rate implementation on May 1, 2021.

26.0 Reference: Exhibit B-1, page 34

> 6. If a fast charging service Customer intends to use a radio frequency identification card (**RFID**) purchased from BC Hydro to activate the use of a fast charging station, a one-time fee of $15 will be applied for the initial purchase of the RFID card. The use of an RFID card is one of four station activation and payment options, as further described in section 6.

1.26.1 How did BC Hydro arrive at a fee of $15 for its RFID card? Please provide the justification with quantification of costs.

RESPONSE:

The fee of $15 (plus GST) for the RFID card is the cost to BC Hydro charged by AddEnergie Technologies and is neither subsidized nor marked-up.

The fee covers the following:

- **Physical production of unique and secure RFID cards;**
- **Fulfillment of customer card order (processing each order and connecting cards to individual customers EV account); and**
- **Postage and handling to the customer.**

BC Hydro absorbs the following administrative costs, which are not included in the $15 fee. These are undertaken in batches of 500 to 1,000:

- **Pre-printed form letters, to which cards are attached; and**
- **Pre-printed envelopes.**

27.0 Reference: Exhibit B-1, page 36 and page 36-37

> BC Hydro proposes to monitor several aspects of the fast charging service, including station utilization (at different power levels), revenue collected under the applicable Rate Schedules, costs incurred, and customer feedback, and provide to the BCUC by March 31, 2024 an evaluation report and recommendations for fast charging service rates going forward.
>
> (fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation.

1.27.1 Please confirm that BC Hydro would have two years of data for fiscal 2022 and 2023 as of the end of March 2023.

RESPONSE:

Not confirmed. For any fiscal given year, the clean final set of financial and electricity data at the customer specific level is not available until late summer. This lag is partly due to reconciliation of any estimated bills or billing errors. The final data set covering all of fiscal 2022 and fiscal 2023 should be available by September 1, 2023.

27.0 Reference: Exhibit B-1, page 36 and page 36-37

> BC Hydro proposes to monitor several aspects of the fast charging service, including station utilization (at different power levels), revenue collected under the applicable Rate Schedules, costs incurred, and customer feedback, and provide to the BCUC by March 31, 2024 an evaluation report and recommendations for fast charging service rates going forward.
>
> (fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation.

1.27.2 Please explain why BC Hydro has requested an additional year in which to compile the evidence and report.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.18.1.

28.0 Reference: Exhibit B-1, page 36

The March 2024 report will include the evaluation of the following:

- Station utilization at different power level stations and factors that impact it;
- Customer satisfaction and experience;
- Implementation effectiveness including billing, payments and special conditions;
- Comparison of BC Hydro fast charging service rates with other operators.;
- Collection of data on the electricity use characteristics (e.g., load profile, load factor, and peak demand) of the fast charging service and determination of whether General Service remains appropriate or a new rate class should be developed specific to electric vehicle fast charging service;
- Technological advancements in metering and billing for fast charging services;
- Customer and stakeholder engagement on the results of the evaluation report and industry developments; and
- The potential need for repricing or redesign of the rates.

We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024. This timeline will allow for the collection and analysis of two full fiscal years of utilization and financial data

(fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation.

1.28.1 What specific information will BC Hydro collect that will enable it to determine the potential opportunity for repricing and improved cost recovery?

RESPONSE:

Fast charging station utilization and fast charging station customers price sensitivity will be important information in determining whether repricing may improve cost recovery. If utilization is strong, and Customers are not highly price sensitive, then BC Hydro may be able to increase the rates without negatively impacting revenue. This outcome would improve cost recovery.

28.0 Reference: Exhibit B-1, page 36

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(fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation.

1.28.1 What specific information will BC Hydro collect that will enable it to determine the potential opportunity for repricing and improved cost recovery?

1.28.1.1 Please explain how BC Hydro will collect the information and what methodologies will be applied to determining price elasticities.

RESPONSE:

BC Hydro will survey and interview customers and will analyze station utilization data to understand how fast charging station Customers respond to price.

For clarity, BC Hydro may not be able to estimate price elasticity (i.e., the percentage change in consumption in response to a percentage change in price) because we will have only two price points, free or the price in the Proposed Rates, to analyze for each charging station power level. Typically to get a reliable and statistically valid quantified estimate of price elasticity a rich data set with price variation is required.

Nonetheless we expect to have enough information to gauge price responsiveness from analyzing utilization data following the introduction of the Proposed Rates, and from analyzing the results of Customer research.

28.0 Reference: Exhibit B-1, page 36

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(fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation.

1.28.2 Please confirm that BC Hydro will include engagement from non-EV users and from EV station competitors in its customer and stakeholder engagement in the future.

RESPONSE:

As stated in BC Hydro's response to BCSEA VEVA IR 1.5.5, BC Hydro is taking a broader engagement approach in 2021 through the BC Hydro Electrification Plan

public engagement process. BC Hydro's public fast charging service is included in our Electrification Plan.

More specific to BC Hydro's rate design research and engagement, we focus first and foremost on the BC Hydro customers that are most impacted by the proposals under consideration. BC Hydro also strives to include representatives of other BC Hydro ratepayer groups in our engagement activities. Our rate design engagement materials are publicly posted on our website, and our rate design applications to the BCUC undergo a public review process in which any interested party can participate.

28.0 Reference: Exhibit B-1, page 36

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(fiscal 2022 and fiscal 2023) as well as the completion of customer and stakeholder engagement informed by the results of the evaluation.

1.28.2 Please confirm that BC Hydro will include engagement from non-EV users and from EV station competitors in its customer and stakeholder engagement in the future.

1.28.2.1 Please elaborate on how many ratepayers who are non-EV users will be canvassed, and how the engagement will be conducted.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.28.2.

28.0 Reference: Exhibit B-1, page 36

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RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.28.2.

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On page 26, BC Hydro notes that full cost recovery would not be feasible with anticipated utilization, i.e.,

> While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

As noted above, BC Hydro's proposed rates for the charging stations it owns and operates do not reflect full-cost recovery from EV drivers but rather recovery of electricity costs from EV drivers and other costs from all ratepayers. This approach differs from that recently taken by Fortis BC in its fast charging rate application[1], and may not fulfil the cost recovery expectation or direction from the BCUC in the Phase 2 Report of the EV Inquiry[2] regarding a separate rate and tariff[3], and as noted in Appendix E, may not meet "the requirements of government regulation" if not recovering capital and operating costs for prescribed undertakings[4]. More importantly, however, the proposed rates reflect a cost recovery methodology that is not available to exempt utilities (i.e. third party charging station service providers) and thus represents an uneven playing field between BC Hydro owned stations and those owned by exempt utilities. Further, at present, only non exempt utilities are able to generate credits under the BC Low Carbon Fuel Standard for EV charging; exempt utilities are not. These valuable credits could help offset the costs of EV charging investments and the costs recovered by rates. These differences raise potential competitiveness concerns for exempt utilities relative to non exempt utilities when providing charging services in BC.

In addition, BC Hydro notes in its August 2019 BC Hydro application for fleet electrification rates (which were approved in September 2019), that optional demand charge rates for fleet electrification projects were needed to help

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Given that: (a) BC Hydro is seeking to ensure a level playing field remains and that non exempt utilities do not "crowd out exempt utilities" (as noted on page 5 of Exhibit B-1), (b) BC Hydro has an objective to support the government's CleanBC goals related to increasing transportation electrification[6], and (c) BC Hydro can access cost recovery mechanisms and BC Low Carbon Fuel Standard credits not available to exempt utilities, ChargePoint poses the following questions:

1.1.1 Are BC Hydro's EV activities motivated by an objective to support the government's CleanBC goals to move the transportation sector away from fossil fuels to electricity?

RESPONSE:

BC Hydro's ownership and operation of EV fast charging stations and request for treatment as prescribed undertakings under section 5 of the GGRR is aligned with CleanBC goals to move the transportation sector away from fossil fuels to electricity.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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1.1.2 Please confirm BC Hydro is aware of the cost recovery approach taken by Fortis BC in its fast charging rate application in Project Number 1598940?

RESPONSE:

Confirmed.

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[5] British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

[6] British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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1.1.3 Please confirm that BC Hydro has taken a different approach than Fortis BC to cost recovery, and if confirmed, why?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.4.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

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1.1.4 Please confirm that BC Hydro, as proposed, will not recover all costs to construct, maintain and operate DCFC stations from EV drivers, and will recover some costs from all ratepayers (i.e. BC Hydro's general ratebase)?

RESPONSE:

Confirmed that the Proposed Rates will not recover full cost of service in a fiscal year from the customers of electric vehicle fast charging service and will recover remaining costs from non-electric vehicle fast charging service customers.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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1.1.5 Please confirm that exempt utilities do not have a ratebase?

RESPONSE:

Confirmed to the extent that the exempt utilities do not have a utility service territory.

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1.1.6 Please confirm that if a non exempt utility like BC Hydro does not recover all costs from EV drivers in their rates for fast charging services then there is an uneven playing field as exempt utilities must recover costs via their rates to EV drivers?

(a) Does BC Hydro acknowledge that the uneven playing field arising from these differences creates a disincentive for exempt utility investment in EV charging and potential competitiveness impacts?
(b) Does an uneven playing field work against the goals of increasing transportation electrification and CleanBC?

RESPONSE:

Not confirmed.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

(a) BC Hydro does not believe that it is creating an uneven playing field since its Proposed Rates are within the range of prices offered by other exempt utilities; and

(b) Please refer to BC Hydro's response to CHARGEPOINT IR 1.1.1.

1.0 Reference: Exhibit B-1

On page 26, BC Hydro notes that full cost recovery would not be feasible with anticipated utilization, i.e.,

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1.1.7 Please confirm that BC Hydro proposed and was approved for optional rates for fleet EV charging to encourage fleet electrification and remove barriers to fleet EV charging investment caused by demand charges in existing tariffs[7]?

(a) Please confirm that stakeholders identified demand charges as a barrier to fleet adoption and the proposed rates were designed to address these concerns?

RESPONSE:

Confirmed.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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1.1.8 Please confirm that in the BCUC's EV Charging Inquiry[7], interveners identified demand charges as a barrier to EV charging investments, including public fast charging.

RESPONSE:

Confirmed.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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1.1.9 Drawing on the experience of BC Hydro's fleet rate, could optional alternatives to existing demand rates for non-fleet charging, like public fast charging, support exempt utility investment in EV charging?

RESPONSE:

BC Hydro has limited experience with its fleet rate and currently does not know whether such optional alternatives to existing demand rates for non-fleet charging, like public fast charging, would support exempt utility investment in EV charging.

Alternative rate designs supporting exempt utility investments in public electric vehicle fast charging service are beyond the scope of this Application, as this Application is about setting rates for BC Hydro's fast charging stations that are prescribed undertakings under the Greenhouse Gas Reduction (Clean Energy) Regulation and section 18 of the *Clean Energy Act*.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

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1.1.10 Could optional demand charge rates address some of the competitiveness impacts associated with the differences in cost recovery approaches available to BC Hydro that are not available to exempt utilities?

RESPONSE:

Please refer to BC Hydro's response to CHARGEPOINT IR 1.1.9.

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1.1.11 Is BC Hydro considering alterative demand charge rates for General Service Business customers operating non-fleet charging stations (i.e. exempt utilities). If yes, is there a future point in time when BC Hydro would file these rates? If no, why not?

RESPONSE:

Please refer to BC Hydro's response to CHARGEPOINT IR 1.1.9.

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1.1.12 Please confirm that, at present, only non exempt utilities can generate credits under the BC Low Carbon Fuel Standard for EV charging?

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to CHARGEPOINT IR 1.1.13.

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1.1.13 Please confirm that, at present, exempt utilities cannot generate credits under the BC Low Carbon Fuel Standard for EV charging?

RESPONSE:

Not confirmed. Project categories supported under Part 3 Agreements completed on December 31, 2020 included deployment of non-residential electric vehicle charging infrastructure.

Please refer to the following link:

https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/renewable-low-carbon-fuels/part-3-agreements/applications

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1 FortisBC Inc. – Rate Design and Rates for Electric Vehicle Direct Current Fast Charging Service Application – Project Number 1598940, https://www.bcuc.com/ApplicationView.aspx?ApplicationId=611

2 Phase 2 Report, British Columbia Utilities Commission Inquiry into the Regulation of Electric Vehicle Charging Service ~ Project No. 1598981, Section 9.1.4.

3 Exhibit B-1, page 5, "Non-exempt public utilities should develop a separate rate and tariff (or a separate class of service) for any operators utilizing any level of charging, other than Level 1 or 2."

4 Exhibit B-1.

encourage investment in fleet electrification infrastructure and reduce barriers associated with demand charges, i.e.,[5]

> Potential fleet charging customers, such as public transit providers, have indicated that the LGS Rate demand charge is a barrier to converting their fleets to electric operation. In the early stages of battery electric fleet conversion from fossil fuel to electricity, the characteristics of the charging load can result in demand charges that make up a higher proportion of a customer's bill than is typical for LGS Rate customers. This is due to the fact until the entire fleet is converted to electricity, charger utilization may be low. The impact of demand charges on the economics of transportation charging is a challenge that a number of jurisdictions across North America have identified.

Given that: (a) BC Hydro is seeking to ensure a level playing field remains and that non exempt utilities do not "crowd out exempt utilities" (as noted on page 5 of Exhibit B-1), (b) BC Hydro has an objective to support the government's CleanBC goals related to increasing transportation electrification[6], and (c) BC Hydro can access cost recovery mechanisms and BC Low Carbon Fuel Standard credits not available to exempt utilities, ChargePoint poses the following questions:

1.1.14 Please confirm that BC Low Carbon Fuel Standard credits could support investments from exempt utilities in EV charging if they were able to generate credits?

RESPONSE:

BC Hydro is unable to confirm the statement in the information request, as the question asks about other entities' business/investment decisions.

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[5] British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

[6] British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

1.0 Reference: Exhibit B-1

On page 26, BC Hydro notes that full cost recovery would not be feasible with anticipated utilization, i.e.,

> While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers.

As noted above, BC Hydro's proposed rates for the charging stations it owns and operates do not reflect full-cost recovery from EV drivers but rather recovery of electricity costs from EV drivers and other costs from all ratepayers. This approach differs from that recently taken by Fortis BC in its fast charging rate application[1], and may not fulfil the cost recovery expectation or direction from the BCUC in the Phase 2 Report of the EV Inquiry[2] regarding a separate rate and tariff[3], and as noted in Appendix E, may not meet "the requirements of government regulation" if not recovering capital and operating costs for prescribed undertakings[4]. More importantly, however, the proposed rates reflect a cost recovery methodology that is not available to exempt utilities (i.e. third party charging station service providers) and thus represents an uneven playing field between BC Hydro owned stations and those owned by exempt utilities. Further, at present, only non exempt utilities are able to generate credits under the BC Low Carbon Fuel Standard for EV charging; exempt utilities are not. These valuable credits could help offset the costs of EV charging investments and the costs recovered by rates. These differences raise potential competitiveness concerns for exempt utilities relative to non exempt utilities when providing charging services in BC.

In addition, BC Hydro notes in its August 2019 BC Hydro application for fleet electrification rates (which were approved in September 2019), that optional demand charge rates for fleet electrification projects were needed to help

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> Potential fleet charging customers, such as public transit providers, have indicated that the LGS Rate demand charge is a barrier to converting their fleets to electric operation. In the early stages of battery electric fleet conversion from fossil fuel to electricity, the characteristics of the charging load can result in demand charges that make up a higher proportion of a customer's bill than is typical for LGS Rate customers. This is due to the fact until the entire fleet is converted to electricity, charger utilization may be low. The impact of demand charges on the economics of transportation charging is a challenge that a number of jurisdictions across North America have identified.

Given that: (a) BC Hydro is seeking to ensure a level playing field remains and that non exempt utilities do not "crowd out exempt utilities" (as noted on page 5 of Exhibit B-1), (b) BC Hydro has an objective to support the government's CleanBC goals related to increasing transportation electrification[6], and (c) BC Hydro can access cost recovery mechanisms and BC Low Carbon Fuel Standard credits not available to exempt utilities, ChargePoint poses the following questions:

1.1.15 Please confirm that if exempt utilities cannot generate BC Low Carbon Fuel Standard credits, an uneven playing field and competitiveness impacts arise between exempt and non exempt utilities?

RESPONSE:

Not confirmed. Please refer to BC Hydro's responses to CHARGEPOINT IRs 1.1.13 and 1.1.14.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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As noted above, BC Hydro's proposed rates for the charging stations it owns and operates do not reflect full-cost recovery from EV drivers but rather recovery of electricity costs from EV drivers and other costs from all ratepayers. This approach differs from that recently taken by Fortis BC in its fast charging rate application[1], and may not fulfil the cost recovery expectation or direction from the BCUC in the Phase 2 Report of the EV Inquiry[2] regarding a separate rate and tariff[3], and as noted in Appendix E, may not meet "the requirements of government regulation" if not recovering capital and operating costs for prescribed undertakings[4]. More importantly, however, the proposed rates reflect a cost recovery methodology that is not available to exempt utilities (i.e. third party charging station service providers) and thus represents an uneven playing field between BC Hydro owned stations and those owned by exempt utilities. Further, at present, only non exempt utilities are able to generate credits under the BC Low Carbon Fuel Standard for EV charging; exempt utilities are not. These valuable credits could help offset the costs of EV charging investments and the costs recovered by rates. These differences raise potential competitiveness concerns for exempt utilities relative to non exempt utilities when providing charging services in BC.

In addition, BC Hydro notes in its August 2019 BC Hydro application for fleet electrification rates (which were approved in September 2019), that optional demand charge rates for fleet electrification projects were needed to help

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Given that: (a) BC Hydro is seeking to ensure a level playing field remains and that non exempt utilities do not "crowd out exempt utilities" (as noted on page 5 of Exhibit B-1), (b) BC Hydro has an objective to support the government's CleanBC goals related to increasing transportation electrification[6], and (c) BC Hydro can access cost recovery mechanisms and BC Low Carbon Fuel Standard credits not available to exempt utilities, ChargePoint poses the following questions:

1.1.16 Does BC Hydro plan to generate Low Carbon Fuel Standard credits from its fast chargers?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.2.1.

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[5] British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

[6] British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

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Given that: (a) BC Hydro is seeking to ensure a level playing field remains and that non exempt utilities do not "crowd out exempt utilities" (as noted on page 5 of Exhibit B-1), (b) BC Hydro has an objective to support the government's CleanBC goals related to increasing transportation electrification[6], and (c) BC Hydro can access cost recovery mechanisms and BC Low Carbon Fuel Standard credits not available to exempt utilities, ChargePoint poses the following questions:

1.1.17 Would BC Hydro support changes to the Low Carbon Fuel Standard to give exempt utilities access to credit as this would level the playing field and help reduce the costs exempt utilities need to recover from rates?

RESPONSE:

Please refer to BC Hydro's response to CHARGEPOINT IR 1.1.13.

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5 British Columbia Hydro and Power Authority Fleet Electrification Rate Application ~ Project No. 1599032, Exhibit B-1, page 2.

6 British Columbia Hydro and Power Authority F2020 to F2021 Revenue Requirements Application ~ Project No. 1598990, Exhibit B-1, Appendix E page 12 of 36.

1.0 A. RATEPAYERS COSTS

Reference: Need for Fast Charging Service Rates
Exhibit #B-1, Section #1.1, p. #2-3
Ratepayers Costs

"As shown in the F2022 RRA, BC Hydro will have approximately 96 fast-charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below."

"First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers."

1.1.1 As BC Hydro (BCH) cannot collect any revenue from its EV customers for any costs related to the 96 fast-charging stations (FCS) in operation by the end of fiscal 2021 (i.e., March 31, 2021), what is the total cost for those 96 FCS that the ratepayers have incurred?

RESPONSE:

The subject of this information request was within the scope of BC Hydro's Fiscal 2022 Revenue Requirements Application.

For additional information, please refer to BC Hydro's response to BCUC IRs 1.1.1 and 1.1.3 in BC Hydro's Fiscal 2022 Revenue Requirements Application.

1.0 A. RATEPAYERS COSTS

Reference: Need for Fast Charging Service Rates
Exhibit #B-1, Section #1.1, p. #2-3
Ratepayers Costs

"As shown in the F2022 RRA, BC Hydro will have approximately 96 fast-charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below."

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1.1.1 As BC Hydro (BCH) cannot collect any revenue from its EV customers for any costs related to the 96 fast-charging stations (FCS) in operation by the end of fiscal 2021 (i.e., March 31, 2021), what is the total cost for those 96 FCS that the ratepayers have incurred?

1.1.1.1 Will BCH recover those costs for the 96 FCSs from their EV customers in the future?

RESPONSE:

The subject of this information request was within the scope of BC Hydro's Fiscal 2022 Revenue Requirements Application.

For additional information please refer to BC Hydro's response to BCUC IR 1.1.2 in BC Hydro's Fiscal 2022 Revenue Requirements Application.

1.0 A. RATEPAYERS COSTS

Reference: Need for Fast Charging Service Rates
Exhibit #B-1, Section #1.1, p. #2-3
Ratepayers Costs

"As shown in the F2022 RRA, BC Hydro will have approximately 96 fast-charging stations in operation by the end of fiscal 2021 (i.e., March 31, 2021). However, there is currently no rate in effect for the fast charging service provided through those stations. BC Hydro files the Application seeking BCUC approval of the Proposed Rates for the fast charging service, for the main reasons discussed below."

"First, in absence of the approved Proposed Rates, BC Hydro cannot collect any revenue from users of the fast charging service as a BCUC approved rate is required in order for BC Hydro to charge for the fast charging service. This means that absent BCUC approved rates for fast charging service, the entire cost for providing the fast charging service is recovered from all ratepayers."

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1.1.1.1 Will BCH recover those costs for the 96 FCSs from their EV customers in the future?

1.1.1.1.1 If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCUC IRs 1.2.5.1 and 1.15.1.

2.0 A. RATEPAYERS COSTS

Reference: Rate Design Approach
Exhibit #B-1, Section 4.1, pp. 25
The Equivalent of a Tank of Gas

"In addition, as suggested in the customer feedback, BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas."

1.2.1 How did BCH arrive at the cost of an equivalent tank of gasoline to be at least $20?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.11.6.

2.0 A. RATEPAYERS COSTS

Reference: Rate Design Approach
Exhibit #B-1, Section 4.1, pp. 25
The Equivalent of a Tank of Gas

"In addition, as suggested in the customer feedback, BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas."

1.2.2 Explain why BCH uses Tesla (an EV manufacturer), which may be subsidizing its charging price through its EV sales, as an example to set its rates.

RESPONSE:

As shown in Table 2 of the Application, BC Hydro reviewed the rates of a number of fast charging service providers and BC Hydro's Proposed Rates fall within the price range of other fast charging operators.

BC Hydro does not have knowledge of the extent to which each of these service providers may be subsidizing their rates.

2.0 A. RATEPAYERS COSTS

Reference: Rate Design Approach
Exhibit #B-1, Section 4.1, pp. 25
The Equivalent of a Tank of Gas

"To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

While BCH suggests that higher rates would reduce initial station utilization and revenue recovery, the same is not necessarily true when we look at gasoline prices. As there is a need for transportation, an increase in price may result in a reduction of kWh sold but the revenue may stay the same. For BEVs, fuel switching is not an option.

1.2.3 Provide evidence of this claim as once an EV is purchased the options for providing energy are limited to that type of energy as it is for gasoline purchases and need overshadows price as important.

RESPONSE:

BC Hydro understands this information request to be in regard to evidence that higher rates will reduce revenue recovery.

Please refer to the following references provided in the Application:

- **Page 13, where we report that interviewees indicate that a rate too high would influence their decision to not use the fast charging service; and**
- **Page 15, where we report that about half (49 per cent) of survey respondents indicate they would stop using the service if a rate is introduced.**

BC Hydro notes that potential fast charging service Customers may have the following alternatives to using BC Hydro's fast charging service: charging at home, charging at work, charging at other public locations.

3.0 A. RATEPAYERS COSTS

Reference: Cost Recovery Calculations
Exhibit #B-1, Section 4.2, pp. 28-33
Scenarios

"While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers."

1.3.1 Not included in the proposed rates are labour costs associated with electric vehicle infrastructure 5 which are approximately $800,000 per year.

RESPONSE:

BC Hydro is unable to identify a question.

3.0 A. RATEPAYERS COSTS

Reference: Cost Recovery Calculations
Exhibit #B-1, Section 4.2, pp. 28-33
Scenarios

"While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers."

1.3.1 Not included in the proposed rates are labour costs associated with electric vehicle infrastructure 5 which are approximately $800,000 per year.

1.3.1.1 Please explain why this proposed rate is not unjust, unreasonable, unduly discriminatory or unduly preferential rate when it may provide for a preferential rate and a benefit to a small group of ratepayers (EV customers) resulting in a discriminatory rate being applied to other ratepayers (non-EV customers).

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.1.1.

3.0 A. RATEPAYERS COSTS

Reference: Cost Recovery Calculations
Exhibit #B-1, Section 4.2, pp. 28-33
Scenarios

"While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers."

1.3.2 Based on Table 3, utilization Rate 3.7% the costs for an 80% charge (/12 hour) are: Scenario 1 = $6.3; Scenario 2 = $18.62; and Scenario 3 =$31.80. All these amounts are significantly less than the equivalent gasoline cost of about $80.

RESPONSE:

BC Hydro is unable to identify a question.

3.0 A. RATEPAYERS COSTS

Reference: Cost Recovery Calculations
Exhibit #B-1, Section 4.2, pp. 28-33
Scenarios

"While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers."

1.3.2.1 Please provide the rationale and evidence to support the claim that "When the service was free, the average utilization was 15 percent, however as described in section 3.1, half of the potential station users indicated that they would stop using the service if a rate is introduced." considering other options for EV charging that are available to EV owners. What will the impact to BCH be if the municipalities and the investor-owned utilities (IOU) also provide DCFC stations?

RESPONSE:

BC Hydro expects that an increase in the extent to which other operators provide fast charging service would have a positive impact on electric vehicle adoption, which, holding all else equal, would have a positive impact on BC Hydro's overall electricity sales and revenues.

3.0 A. RATEPAYERS COSTS

Reference: Cost Recovery Calculations
Exhibit #B-1, Section 4.2, pp. 28-33
Scenarios

"While BC Hydro presents the full cost of service-based rate under various utilization scenarios in section 4.2 below, at this time we do not believe that the station utilization is high enough to make such a rate feasible. Our Proposed Rates recover at least the cost of electricity (Energy and Demand) but are not expected to recover all of the station capital and maintenance costs at this time. Costs not recovered by the Proposed Rates will be recovered from all ratepayers."

1.3.3 Please provide Charging Station Rate by Utilization and Cost Recovery Scenario tables for 25kW and 100kW Charging Stations in the same format as Table 3, 50kW.

RESPONSE:

Please refer to BC Hydro's response to BCUC IRs 1.14.1 and 1.14.2.

4.0 B. CLEAN ENERGY ACT

Reference: Legal Framework
Exhibit #B-1, Section 1.3.3, pp. 7-8
CEA Section 18

Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro (BCH) can recover costs from all ratepayers and not just from those who use the service.

1.4.1 While Section 18 does not specify from whom the revenue should be collected, does BCH intend to collect any portion of its revenue from all ratepayers and not just from those who use the service?

RESPONSE:

BC Hydro expects to collect the costs of fast charging service from customers of the service and from all other ratepayers.

4.0 B. CLEAN ENERGY ACT

Reference: Legal Framework
Exhibit #B-1, Section 1.3.3, pp. 7-8
CEA Section 18

Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro (BCH) can recover costs from all ratepayers and not just from those who use the service.

1.4.1 While Section 18 does not specify from whom the revenue should be collected, does BCH intend to collect any portion of its revenue from all ratepayers and not just from those who use the service?

1.4.1.1 If so, please provide the estimated dollar amount per year BCH estimates it will collect from those who do not use the service.

RESPONSE:

At this time BC Hydro is unable to provide a longer-term forecast of the revenues that will be received through our public electric vehicle fast charging service rate schedules and we are therefore unable to estimate the dollar amount per year that will be collected from those who do not use the service. As described in section 5 of the Application, BC Hydro intends to monitor revenue and report out in a public evaluation to be filed in 2024.

Please refer to BC Hydro's response to BCUC IR 1.2.4.1 for fiscal 2022 estimates.

4.0 B. CLEAN ENERGY ACT

Reference: Legal Framework
Exhibit #B-1, Section 1.3.3, pp. 7-8
CEA Section 18

Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro (BCH) can recover costs from all ratepayers and not just from those who use the service.

1.4.1 While Section 18 does not specify from whom the revenue should be collected, does BCH intend to collect any portion of its revenue from all ratepayers and not just from those who use the service?

1.4.1.2 Has BCH sought clarification on section 18 since BCH notes that it does not specify from whom the revenue be collected?

RESPONSE:

BC Hydro has not sought the clarification described in the information request for the purpose of this application. Section 18(2) is clear on its face that a public utility is guaranteed recovery in rates its costs incurred with respect to fast charging stations that are prescribed undertakings.

4.0 B. CLEAN ENERGY ACT

Reference: Legal Framework
Exhibit #B-1, Section 1.3.3, pp. 7-8
CEA Section 18

Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro (BCH) can recover costs from all ratepayers and not just from those who use the service.

1.4.1 While Section 18 does not specify from whom the revenue should be collected, does BCH intend to collect any portion of its revenue from all ratepayers and not just from those who use the service?

1.4.1.2 Has BCH sought clarification on section 18 since BCH notes that it does not specify from whom the revenue be collected?

1.4.1.2.1 If all revenue is collected from all ratepayers, is BCH suggesting that the rates would still be in accordance with the UCA?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain that given that the Proposed Rates are for fast charging service stations that are "prescribed undertakings" under section 5 of the Greenhouse Reduction (Clean Energy) Regulation, and that by virtue of section 18(2) of the *Clean Energy Act* the BCUC must allow BC Hydro to recover the cost of service from non electric vehicle fast charging service customers (i.e., all ratepayers), the rate design objective - minimizing the cost impact on all ratepayers (or the contribution from non electric vehicle fast charging service customers) - is why the Proposed Rates meet the statutory requirements of sections 59 to 61 of the *Utilities Commission Act*.

5.0 C. STATE OF CHARGE

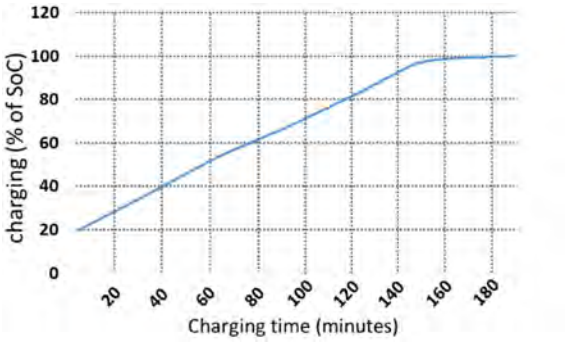
Reference: BCH Fast Charging Station
Exhibit #B-1, Section 2.1, p. 10
State of Charge (SoC) - Charging Losses above 80% Capacity

"The time required to charge an electric vehicle will also be dependent on what the vehicle can accept, and in many cases, a similar amount of electricity is dispensed from a 25 kW, 50 kW or 100 kW charging station once the vehicle battery exceeds 90 percent capacity."

1.5.1 As charging the battery above 80% may double the losses[1] when compared to the 20%–80% SoC range, would BCH please provide additional justification for this statement or should the upper level of the SoC range be 80%?

RESPONSE:

The 90 per cent threshold appears to be supported by the study cited in this information request. The rate of charge of an EV battery begins to slow when a state of full charge is approached. The chart below is from the study cited in this information request (Figure 9). The slope of the line between an 80 per cent and 90 per cent state of charge is generally the same as that for the interval below 80 per cent. However, at a 90 per cent and above state of charge, the line flattens significantly.



1 https://reader.elsevier.com/reader/sd/pii/S2352484719310911?token=454694728B853DAA384DF91748305DCB8257BF9AC5286D507250451A75D44423363D46BFCF177425DF694B5A67DEA307&originRegion=us-east-1&originCreation=20210422022457

6.0 D. PUBLIC ENGAGEMENT

Reference: Personal Interviews
Exhibit #B-1, Section 3.1, pp. 12-13
Non-EV Owners

"From August 20, 2020, to September 15, 2020, BC Hydro conducted nine, one-hour interviews over the phone with electric vehicle drivers in B.C. to gather feedback. Interviewees were selected from a pool of electric vehicle drivers who have engaged with BC Hydro in the past, representing organizations such as Vancouver Electric Vehicle Association, Victoria Electric Vehicle Club, Electric Vehicle Peer Network,

Fraser Basin Council, BCIT Smart Microgrid Applied Research Team."

1.6.1 Why did BCH not also conduct a similar number of interviews with non-EV owners who are ratepayers and may have to pay for a portion of this prescribed undertaking?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.10.5.1.

6.0 D. PUBLIC ENGAGEMENT

Reference: Personal Interviews
Exhibit #B-1, Section 3.1, pp. 12-13
Non-EV Owners

"From August 20, 2020, to September 15, 2020, BC Hydro conducted nine, one-hour interviews over the phone with electric vehicle drivers in B.C. to gather feedback. Interviewees were selected from a pool of electric vehicle drivers who have engaged with BC Hydro in the past, representing organizations such as Vancouver Electric Vehicle Association, Victoria Electric Vehicle Club, Electric Vehicle Peer Network,

Fraser Basin Council, BCIT Smart Microgrid Applied Research Team."

1.6.2 Are the results of the survey asymmetric when non-EV owners are not included?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.10.5.1.

7.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Cost Comparison to Gasoline

BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas. For example, the average cost for a charging session at a BC Hydro fast-charging station is $6. In comparison charging at a Tesla or Petro-Canada fast-charging station may be $8 or more while charging at home under BC Hydro's residential service rate schedule may be $2 and a tank of gasoline may be at least $20.

1.7.1 What is the estimated equivalent distance that one can travel using those costs for roughly equivalent vehicles?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.13.2.

7.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Cost Comparison to Gasoline

BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas. For example, the average cost for a charging session at a BC Hydro fast-charging station is $6. In comparison charging at a Tesla or Petro-Canada fast-charging station may be $8 or more while charging at home under BC Hydro's residential service rate schedule may be $2 and a tank of gasoline may be at least $20.

1.7.2 Since Petro-Canada is a private sector company, why has BCH priced its FCS energy price below that of Petro-Canada?

RESPONSE:

BC Hydro has priced its fast charging service for the power levels of its offering (25 kW, 50 kW and 100 kW). BC Hydro notes that Petro-Canada is providing a different service (up to 350 kW power level for CCS plus on-site support staff).

To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates considered the prices of other operators with a similar power level and the range of prices that research indicates customers are willing to pay (for each power level), while aiming to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules.

7.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Cost Comparison to Gasoline

BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas. For example, the average cost for a charging session at a BC Hydro fast-charging station is $6. In comparison charging at a Tesla or Petro-Canada fast-charging station may be $8 or more while charging at home under BC Hydro's residential service rate schedule may be $2 and a tank of gasoline may be at least $20.

1.7.2 Since Petro-Canada is a private sector company, why has BCH priced its FCS energy price below that of Petro-Canada?

1.7.2.1 Does Petro-Canada vary its price by the FCS charger in use?

RESPONSE:

It appears that the $0.27 per minute charge is applicable whether the connector used is CHAdeMO (maximum charge rate of 100 kW) or CCS (maximum charge rate of 350 kW).

7.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Cost Comparison to Gasoline

BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas. For example, the average cost for a charging session at a BC Hydro fast-charging station is $6. In comparison charging at a Tesla or Petro-Canada fast-charging station may be $8 or more while charging at home under BC Hydro's residential service rate schedule may be $2 and a tank of gasoline may be at least $20.

1.7.2 Since Petro-Canada is a private sector company, why has BCH priced its FCS energy price below that of Petro-Canada?

1.7.2.2 Does BCH intend to compete with Petro-Canada in this area?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.17.2.

7.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Cost Comparison to Gasoline

BC Hydro's Proposed Rates are higher than the rate to charge at home, but less than that of operators such as Tesla and Petro Canada, and also less than the equivalent of a tank of gas. For example, the average cost for a charging session at a BC Hydro fast-charging station is $6. In comparison charging at a Tesla or Petro-Canada fast-charging station may be $8 or more while charging at home under BC Hydro's residential service rate schedule may be $2 and a tank of gasoline may be at least $20.

1.7.2 Since Petro-Canada is a private sector company, why has BCH priced its FCS energy price below that of Petro-Canada?

1.7.2.2 Does BCH intend to compete with Petro-Canada in this area?

1.7.2.2.1 If so, why should the Panel consider setting rates below those already in use by other FCS providers such as Petro-Canada?

RESPONSE:

Please refer to BC Hydro's response to FLINTOFF IR 1.7.2.

8.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Willingness to Pay

"…the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay,…"

1.8.1 As all ratepayers will be affected by the prescribed undertaking, why is that the EV customers' willingness to pay taken into consideration when the cost of service should be considered for setting the rates?

RESPONSE:

Fast charging service Customers willingness to pay will impact station utilization, which in turn impacts revenue received by BC Hydro for fast charging service, and costs that must be recovered from all ratepayers.

8.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Willingness to Pay

"…the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay,…"

1.8.1 As all ratepayers will be affected by the prescribed undertaking, why is that the EV customers' willingness to pay taken into consideration when the cost of service should be considered for setting the rates?

1.8.1.1 Do these rates discriminate against other ratepayers based on a "willingness to pay" principle?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.1.1.

8.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Willingness to Pay

"…the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay,…"

1.8.1 As all ratepayers will be affected by the prescribed undertaking, why is that the EV customers' willingness to pay taken into consideration when the cost of service should be considered for setting the rates?

1.8.1.2 Do the EV owners have other options for charging that compete with BCH FCS where they can access energy at lower rates if they are unwilling to pay the proposed rate?

RESPONSE:

Electric vehicle owners may have the options to charge at home, charge at work, and / or charge at non-BC Hydro public charging stations.

8.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Willingness to Pay

"…the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay,…"

1.8.1 As all ratepayers will be affected by the prescribed undertaking, why is that the EV customers' willingness to pay taken into consideration when the cost of service should be considered for setting the rates?

1.8.1.3 Will these lower proposed BCH prices negatively affect Petro-Canada's revenue from their stations?

RESPONSE:

BC Hydro does not have insight to Petro-Canada's revenues.

8.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Willingness to Pay

"…the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay,…"

1.8.1 As all ratepayers will be affected by the prescribed undertaking, why is that the EV customers' willingness to pay taken into consideration when the cost of service should be considered for setting the rates?

1.8.1.3 Will these lower proposed BCH prices negatively affect Petro-Canada's revenue from their stations?

1.8.1.3.1 What advantages does BCH have over the private sector when it comes to providing its FCSs?

RESPONSE:

BC Hydro does not have insight to private sector business operations and is therefore unable to provide the requested comparison.

Please refer to BC Hydro's response to BCUC IR 1.7.1 where BC Hydro states that the Proposed Rates considered prices of other operators and the range of prices that research indicates customers are willing to pay, while aiming to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service Rate Schedules.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.1 As the Regional Districts and BC Municipalities are or are becoming involved in providing DC Fast Charging Stations (DCFCs), will BCH FCSs compete with them or compliment them on rates?

RESPONSE:

BC Hydro cannot provide the comparison requested.

The rates charged by BC Hydro for its public fast charging service are subject to review by and approval of the BCUC.

Whereas, other non-public utilities and municipalities/Regional Districts providing EV charging service are excluded or exempted from regulation pursuant to the *Utilities Commission Act* and applicable orders from the BCUC and are therefore able to set rates they deem appropriate.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.2 Can the Regional Districts or BC Municipalities provide these FCSs within their municipalities or districts with funding loans or other assistance from BCH as an alternate approach to BCH being directly involved in providing the FCSs and still be a prescribed undertaking?

RESPONSE:

For BC Hydro's fast charging stations to meet the requirements of section 5 of the Greenhouse Gas Reduction (Clean Energy) Regulation (GGRR) as prescribed undertakings, BC Hydro must construct and operate, or purchase and operate, an eligible charging station. Thus, providing funding or other assistance would not be sufficient for the purpose of the GGRR.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.2.1 What advantages do Regional Districts or BC Municipalities have when it comes to providing DCFCs over BCH or IOU (Petro-Canada)?

RESPONSE:

BC Hydro does not know what advantages Regional Districts or BC Municipalities may have.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.2.1 What advantages do Regional Districts or BC Municipalities have when it comes to providing DCFCs over BCH or IOU (Petro-Canada)?

1.9.2.1.1 Are there any zoning advantages that BCH cannot access?

RESPONSE:

BC Hydro does not know whether or not Regional Districts or municipalities have any zoning advantages.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.2.1 What advantages do Regional Districts or BC Municipalities have when it comes to providing DCFCs over BCH or IOU (Petro-Canada)?

1.9.2.1.2 Are there any tax advantages that BCH cannot access?

RESPONSE:

BC Hydro does not know the tax situations of other electric vehicle charging operators.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.2.1 What advantages do Regional Districts or BC Municipalities have when it comes to providing DCFCs over BCH or IOU (Petro-Canada)?

1.9.2.1.3 Are there any government grant advantages that BCH cannot access?

RESPONSE:

BC Hydro does not know what grants may be available to other electric vehicle charging operators.

9.0 E. RATE DESIGN

Reference: Conclusion
Exhibit #B-1, Section 4.1, pp. 39-40
Level Playing Field

"The Proposed Rates take into consideration of several recommendation(s) from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues."

1.9.2.1 What advantages do Regional Districts or BC Municipalities have when it comes to providing DCFCs over BCH or IOU (Petro-Canada)?

1.9.2.1.4 Would these municipal DCFCs be exempt from regulation?

RESPONSE:

BCUC Order No. G-66-19, among other things, states:

> **A person is exempt from Part 3 of the UCA with respect to the sale, delivery or provision of electricity for EV charging services to or for the public or a corporation for compensation, except for the provisions of sections 25 and 38 relating to safety only, in the class of cases where the person is not otherwise a public utility under the UCA.**

Under the *Utilities Commission Act*, a municipality or regional district providing service within its own boundaries is specifically excluded from the definition of public utility (i.e., not a public utility). Thus, if the municipality or regional district is not a public utility under the UCA, the above order would be applicable to it.

10.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Bonbright

"Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

1.10.1 As the BCH FCSs are prescribed undertakings and full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness, does Bonbright need to be considered in setting the rates or should the Panel be guided solely by Sections 18(2) and 18(3) of the Clean Energy Act and the UCA?

RESPONSE:

BC Hydro views the application of the Bonbright rate design criteria as an important framework for assessing rate designs and understanding trade-offs, recognizing that the Commission must follow applicable legislation in their determination on any application.

10.0 E. RATE DESIGN

Reference: Rate Design
Exhibit #B-1, Section 4.1, p. 26
Bonbright

"Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

1.10.2 As the proposed rates admittedly have limited fairness, will BCH be requesting recovering these amounts in future rates?

RESPONSE:

Please refer to BC Hydro's response to FLINTOFF IRs 1.1.1 and 1.1.1.1 and BCUC IR 1.2.5.1.

11.0 E. RATE DESIGN

Reference: Public Engagement Feedback
Exhibit #B-1, Appendix F, p. 17of42
Idling Fees

"Rates should be reasonable and include idling fees (ie. for DCFC charging time over 40 minutes) to encourage quicker turnovers."

1.11.1 Why has BCH not included idling fees in the proposed rates?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.4.1.

11.0 E. RATE DESIGN

Reference: Public Engagement Feedback
Exhibit #B-1, Appendix F, p. 17of42
Idling Fees

"Rates should be reasonable and include idling fees (ie. for DCFC charging time over 40 minutes) to encourage quicker turnovers."

1.11.2 Does BCH acknowledge that idling fees will lead to improved behaviour[1] at the FCSs?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.3.

[1] https://bc.ctvnews.ca/mobile/electric-vehicle-drivers-not-immune-to-conflict-at-the-pump-1.4656765?cache=yes?clipId=89926

12.0 E. RATE DESIGN

Reference: Monitoring and Evaluation
Exhibit #B-1, Section 5, pp. 36-37, and Appendix A
Evaluation Report & Draft Order

"We propose to file the evaluation report and, if warranted, an application to propose new rate(s) for fast charging service, by March 31, 2024."

1.12.1 Should the Panel order BCH to file the evaluation report and specify the format for such a report so that the financial information is easily and readily available for any re-pricing, redesign or setting of rates?

RESPONSE:

BC Hydro's view is that specifying the format of a report to be filed in 2024 would not be productive or efficient. Rather we submit it is more valuable to focus on the scope and content of the report, which we have described in section 5 of the Application.

13.0 E. RATE DESIGN

Reference: Provincial Taxes
Exhibit #B-1, Appendix B, pp. 36-37
Rate Schedule 1561

BC Provincial Fuel Taxes (Cents/Litre)

	Gasoline	Diesel
British Columbia – Vancouver Area (4)	27.00	27.50
British Columbia – Victoria Area (4)	20.00	20.50
British Columbia – Rest of province (4)	14.50	15.00

The Saskatchewan government[1] recently introduced amendments to The Fuel Tax Act that will require owners of electric passenger vehicles registered in Saskatchewan to pay a new annual road-use fee of $150 starting Oct. 1, 2021. Those drivers of gas- or diesel-powered vehicles pay for provincial highway maintenance through a fuel tax at the pump, but owners of electric vehicles weren't contributing an equal amount.

While BCH's application and rates only touch on provincial taxes, it does not address the loss of revenue as EV owners are not subject to the provincial fuel tax.

1.13.1 Does BCH intend to address this matter later in its rate review or will it be left to the Commission to address it with the BC Government?

RESPONSE:

BC Hydro understands the question to be in regards to B.C provincial fuel taxes applied to the sale of gasoline and diesel. This matter is not within the scope of the Application. The proposed 2024 evaluation report described in section 5 of the Application will include monitoring of relevant advancements impacting BC Hydro's public fast charging service rate design, which could potentially include fuel taxes if relevant at that time.

[1] https://www.cjme.com/2021/04/20/sask-govt-rolls-out-ev-road-use-fee-vaping-tax-as-promised-in-budget/

13.0 E. RATE DESIGN

Reference: Provincial Taxes
Exhibit #B-1, Appendix B, pp. 36-37
Rate Schedule 1561

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	Gasoline	Diesel
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British Columbia – Victoria Area (4)	20.00	20.50
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While BCH's application and rates only touch on provincial taxes, it does not address the loss of revenue as EV owners are not subject to the provincial fuel tax.

1.13.1.1 Looking forward, which of the two options, a provincial energy/fuel tax on kWh used or a flat rate such employed by Saskatchewan, would be more favourable and in the public interest to recommend to the BC Government?

RESPONSE:

As the matter of fuel taxes is not within the scope of the current Application, BC Hydro has not developed a view on the question posed in this information request.

Please refer to section 2.2 of the Application for a discussion of current metering and billing limitations for BC Hydro's public fast charging service.

[1] https://www.cjme.com/2021/04/20/sask-govt-rolls-out-ev-road-use-fee-vaping-tax-as-promised-in-budget/

13.0 E. RATE DESIGN

Reference: Provincial Taxes
Exhibit #B-1, Appendix B, pp. 36-37
Rate Schedule 1561

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While BCH's application and rates only touch on provincial taxes, it does not address the loss of revenue as EV owners are not subject to the provincial fuel tax.

1.13.2 As a portion of these taxes goes to the various Transportation Authorities including Translink, would it be in the public interest that EV owners pay a tax on energy used since some of these funds support highways, bridges and mass transit in the province?

RESPONSE:

BC Hydro does not have a view on the matter raised in this information request. We note that the Proposed Rates are exclusive of goods and services and provincial sales taxes, and further note that neither BC Hydro, nor the BCUC has the mandate to impose a new provincial sales tax.

[1] https://www.cjme.com/2021/04/20/sask-govt-rolls-out-ev-road-use-fee-vaping-tax-as-promised-in-budget/

13.0 E. RATE DESIGN

Reference: Provincial Taxes
Exhibit #B-1, Appendix B, pp. 36-37
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While BCH's application and rates only touch on provincial taxes, it does not address the loss of revenue as EV owners are not subject to the provincial fuel tax.

1.13.3 Is BCH able to provide an estimate of the amount of fuel tax not collected by year caused by the introduction of EVs in BC?

RESPONSE:

Fuel tax on the sale of gasoline and diesel is not withing the scope of the Application or BC Hydro's mandate. As such we have not collected the data or completed the analysis required to answer this information request.

[1] https://www.cjme.com/2021/04/20/sask-govt-rolls-out-ev-road-use-fee-vaping-tax-as-promised-in-budget/

1.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: INTRODUCTION
Line 22; Pg. 2; lines 16 to 20 Pg.5; line 18 - 19, Pg. 26

" BC Hydro considers the fast charging service to be part of its General Service and thus developed the Proposed Rates to reflect its General Service pricing …"

EV charging will be a <u>new</u> revenue source/business opportunity for BCH. The number of EVs will grow dramatically over the next few years. Manufacturers are committed to converting their vehicles and governments are financially supporting adoption and mandating conversion deadlines.

The use and popularity of BCH EVSEs will increase, producing a revenue stream not currently available. This will be an important business for BCH. Ratepayers, EV owners and governments will want to know how well this business segment is managed. They will want easy-to-access, transparent financial information on a timely basis.

1.1.1 Why is BCH not proposing to establish a separate business entity/rate class to record capital & operating costs and EV charging revenues?

RESPONSE:

BC Hydro is establishing separate rate schedules for EV fast charging service and will be able to track electricity use and revenue by rate schedule.

BC Hydro already records capital and operating costs of EV fast charging service separately which is reported as part of its revenue requirements.

Please also refer to BC Hydro's response to BCUC IR 1.1.1 for a discussion about the lack of a need for a separate rate class for BC Hydro.

1.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: INTRODUCTION
Line 22; Pg. 2; lines 16 to 20 Pg.5; line 18 - 19, Pg. 26

" BC Hydro considers the fast charging service to be part of its General Service and thus developed the Proposed Rates to reflect its General Service pricing …"

EV charging will be a new revenue source/business opportunity for BCH. The number of EVs will grow dramatically over the next few years. Manufacturers are committed to converting their vehicles and governments are financially supporting adoption and mandating conversion deadlines.

The use and popularity of BCH EVSEs will increase, producing a revenue stream not currently available. This will be an important business for BCH. Ratepayers, EV owners and governments will want to know how well this business segment is managed. They will want easy-to-access, transparent financial information on a timely basis.

1.1.2 Could revenues and costs to supply exempt EVSEs also be captured in this separate class so that there is one financial summary source for the total amount of electricity used to supply public non-exempt and exempt EVSEs?

RESPONSE:

Entities that provide fast charging in BC Hydro's service territory are served under BC Hydro General Service rates. BC Hydro can track the usage and revenues if the fast charging stations are associated with a separately metered, dedicated BC Hydro account

1.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: INTRODUCTION
Line 22; Pg. 2; lines 16 to 20 Pg.5; line 18 - 19, Pg. 26

" BC Hydro considers the fast charging service to be part of its General Service and thus developed the Proposed Rates to reflect its General Service pricing …"

EV charging will be a <u>new</u> revenue source/business opportunity for BCH. The number of EVs will grow dramatically over the next few years. Manufacturers are committed to converting their vehicles and governments are financially supporting adoption and mandating conversion deadlines.

The use and popularity of BCH EVSEs will increase, producing a revenue stream not currently available. This will be an important business for BCH. Ratepayers, EV owners and governments will want to know how well this business segment is managed. They will want easy-to-access, transparent financial information on a timely basis.

1.1.3 What are the total capital and operating costs incurred by BCH to establish and run its charging stations to date?

RESPONSE:

The subject of this information request was within the scope of the Fiscal 2022 Revenue Requirements Application. Please refer to BC Hydro's response to BCUC IR 1.1.1 for operating costs and BCUC IR 1.1.4 for capital costs in BC Hydro's Fiscal 2022 Revenue Requirements Application.

2.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: BACKGROUND
Section 2.2, lines 15 – 18, pg. 11; line 23 – 26; pg. 11

BCH is unable to deploy an electricity-based delivery rate at this time. Time-based rates did not receive widespread support.

1.2.1 Please explain why it is not possible to measure the amount of electricity provided to the fast-charging station, which can be metered with approved revenue metering equipment, as a basis to calculate consumption. In other words, is it not possible to use existing 'input' metering to calculate the amount of electricity dispensed (i.e.: 'output')?

RESPONSE:

While the electricity provided to the fast charging station, including the charging equipment, lighting and ancillary equipment (e.g., heating and cooling), can be metered with current Measurement Canada approved revenue metering equipment, there is no Measurement Canada approved solution measuring the electricity dispensed from the station to the battery of the electric vehicle.

3.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: PUBLIC ENGAGEMENT
Line 7, pg.15

". . . most of the features important to them – such as multiple stations per site (to reduce waiting time)"

1.3.1 What are BCH plans to change the type of connectors currently installed on its EVSEs?

RESPONSE:

BC Hydro is currently deploying fast charging stations with Combined Charging System / SAE Combo (CCS) and CHArge de Move (CHAdeMO) as those connector types are currently required for government funding. If government funding requirements for connector type changes in the future, BC Hydro will adjust its deployment plans to reflect these changes to government requirements.

3.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: PUBLIC ENGAGEMENT
Line 7, pg.15

". . . most of the features important to them – such as multiple stations per site (to reduce waiting time)"

1.3.1.1 Each BCH unit has one CCS and one CHAdeMO connector. CCS is quickly becoming the preferred connection method by most manufacturers (Korean manufacturers now use CCS and Nissan recently announced converting from CHAdeMO). The number of CCS vehicles will far exceed the number of CHAdeMO vehicles in the near future.

RESPONSE:

BC Hydro cannot identify a question.

3.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: PUBLIC ENGAGEMENT
Line 7, pg.15

". . . most of the features important to them – such as multiple stations per site (to reduce waiting time)"

1.3.2 Will each EVSE unit be able to charge two vehicles at once, at an assumed reduced consumption capacity (1/2??), if both vehicles are connected using the same protocol (eg: CCS)?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.4.

Please also refer to BC Hydro's response to BCOAPO IR 1.1.1 for a description of BC Hydro's fast charging stations.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 4, pg.18

"Respondents overwhelmingly favour electricity-based pricing"

BCH wins accolades for installing its EVSEs. Unfortunately, using time-based pricing as a measurement means will not be as well received. This runs the risk of tarnishing the favourable public image of BCH's fast charging work.

1.4.1 What is BCH's strategy to persuade EV owners and concerned first-time EV buyers that time-based charging is a fair approach, especially when many other jurisdictions (eg: California) are rejecting this method and the time required to transfer the same amount of electricity to different vehicles is so variable?

RESPONSE:

The use of time-based rates is common for existing public electric vehicle fast charging in B.C., as shown in Table 2 of the Application. BC Hydro believes that the time-based rate concept will be familiar to EV owners and the customers are likely aware of the metering and billing limitation as a result of lacking a Measurement Canada approved standard, as reflected in their feedback to our public engagement.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 4, pg.18

"Respondents overwhelmingly favour electricity-based pricing"

BCH wins accolades for installing its EVSEs. Unfortunately, using time-based pricing as a measurement means will not be as well received. This runs the risk of tarnishing the favourable public image of BCH's fast charging work.

1.4.1.1 Referencing awaiting Measurement Canada approval is understandable but may be seen as "passing the buck". Deferring rate implementation, capitalizing the operating and recovering those costs through future revenues after approved electricity-based is available may be better accepted by the EV users.

RESPONSE:

BC Hydro is unable to identify a question.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 4, pg.18

"Respondents overwhelmingly favour electricity-based pricing"

BCH wins accolades for installing its EVSEs. Unfortunately, using time-based pricing as a measurement means will not be as well received. This runs the risk of tarnishing the favourable public image of BCH's fast charging work.

1.4.2 What is BCH's time plan for converting to an electricity-based standard once approved?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.15.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 5 – 6, pg. 6; Line 18 – 19. Pg. 25; Line 19 -22, pg. 39

" maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators."

"…Proposed Rates are…less than that of operators such as Tesla and Petro Canada."

1.4.3 How does proposing rates which are $2+ per average charging session less than competitors maintain a 'level playing field'?

RESPONSE:

BC Hydro encourages station utilization while maintaining a level playing field with other fast charging station operators. In support of this, the Proposed Rates considered prices of other operators and the range of prices that research indicates customers are willing to pay, while aiming to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 5 – 6, pg. 6; Line 18 – 19. Pg. 25; Line 19 -22, pg. 39

" maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators."

"…Proposed Rates are…less than that of operators such as Tesla and Petro Canada."

1.4.3.1 This seems to be BCH undercutting exempt EVSEs.

RESPONSE:

BC Hydro is unable to identify a question.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 5 – 6, pg. 6; Line 18 – 19. Pg. 25; Line 19 -22, pg. 39

" maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators."

"…Proposed Rates are…less than that of operators such as Tesla and Petro Canada."

1.4.4 How does BCH plan to provide full, transparent financial information on its EV charging business to ratepayers, EV owners, exempt EVSEs and general public?

RESPONSE:

BC Hydro regularly files revenue requirement applications for (RRA) approval with the BCUC which include expenditures on EV charging. These filings are public.

BC Hydro has also committed to file a public evaluation report with the BCUC by March 31, 2024.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 5 – 6, pg. 6; Line 18 – 19. Pg. 25; Line 19 -22, pg. 39

" maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators."

"…Proposed Rates are…less than that of operators such as Tesla and Petro Canada."

1.4.4.1 BCH is entering into competition with exempt EVSEs. As the sole source supplier to these organizations, BCH will have to show that it is competing fairly and not using its monopolistic position to its advantage. It is very important that EV charging is encouraged to be a , fair, competitive market, unlike the vehicle gas distribution oligopoly currently in place.

RESPONSE:

BC Hydro is unable to identify a question.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 25, pg. 25

" …objective is for…rates to recover full costs… However, achieving this objective will require station utilization levels to be higher…"

1.4.5 What are the impediments to BCH recording and capitalizing start-up and operational costs and non-revenue charging losses and recovering these upfront investments through amortized costs against future fast charging once an authorized metering system is in place?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.2.4.

4.0 A. REGULATORY CONTEXT AND BACKGROUND

Reference: RATE DESIGN
Line 25, pg. 25

" …objective is for…rates to recover full costs… However, achieving this objective will require station utilization levels to be higher…"

1.4.5 What are the impediments to BCH recording and capitalizing start-up and operational costs and non-revenue charging losses and recovering these upfront investments through amortized costs against future fast charging once an authorized metering system is in place?

1.4.5.1 Poor public acceptance of the proposed time-based measurement could, in fact, lead to a reduction in utilization levels. Charging a lower rate using an unpopular measurement system may have negative consequences to overall utilization. Also, as noted above, having two connector types on each EVSE and allowing only one connection to work at any time, reduces the number of possible chargings.

RESPONSE:

BC Hydro is unable to identify a question.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.1 Did BC Hydro consider where the almost one half of current DCFC users would charge their respective electric vehicles after such time a fee was introduced, and they stopped using the public fast charging stations?

RESPONSE:

BC Hydro expects that some potential public fast charging service Customers may have the option to charge their electric vehicle at home, at work, and/or at a non-BC Hydro public charging station.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.1.1 Does BC Hydro have an estimate of the percentage of EV drivers who are anticipated to transition from the public fast charging stations to charging their vehicles at home on Residential Rate 1101?

RESPONSE:

BC Hydro does not have an estimate of the percentage of drivers who will substitute home charging under Rate Schedule 1101 for public fast charging at BC Hydro stations following the implementation of the Proposed Rates.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.1.2 Did BC Hydro engage with any public operators of Level II Charging Stations in relation to the potential for those operators to experience higher utilization of their respective stations at the time of a rate being introduced, especially those at the same location or very near a BC Hydro EV Charging Stations? (For example, the FVRD in Chilliwack, where two vehicles at a time can charge at the BC Hydro chargers, and eight can charge on those provided by the FVRD.)

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.10.6.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.2 For context, in Rate 1101, the rate for 'Step 1" is $0.0941 per kWh; the rate for 'Step 2' is $0.141 per kWh. 'Step 2' costs 49.8% more, and applies to customers who exceed 1350 kWh in an average two-month billing period. Did BC Hydro consider the likelihood of a net increase in Residential Rate 'Step 2' (Conservation Rate) being incurred by EV owners?

RESPONSE:

BC Hydro has not analyzed the likelihood of a net increase in RS 1101 revenue as a result of customers substituting home charging for public fast charging.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.2.1 Is there any data available which identifies, or partially identifies the percentage of 'Step 2' vs 'Step 1' rates which are typically experienced by EV owners charging at home on a Residential Rate?

RESPONSE:

Home charging of electric vehicles is not within the scope of the Application and is being considered in the scope of BC Hydro's residential rate design engagement efforts. We encourage individuals and organizations with an interest in residential rate design to participate in the process, and more information can be found at the link below.

https://www.bchydro.com/about/planning_regulatory/residential-rates-engagement.html?WT.mc_id=rd_yourrates

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.2.2 What is the marginal cost per kWh for electricity supplied to customers on Rate 1101?

RESPONSE:

BC Hydro's reference price for our marginal cost of energy is based on the B.C. sell price which is the Mid-C market price at the B.C. Border adjusted for transmission costs associated with line losses and wheeling. The value varies with market and is expected to be between 3 c/kWh to 5 c/kWh on average for the next number of years.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.2.3 Does BC Hydro differentiate between supplying 'Step 1' and 'Step 2' in calculating these marginal costs? If yes, how so?

RESPONSE:

BC Hydro's marginal cost of energy represent the cost of supplying (or saving) one additional kWh. BC Hydro's marginal costs are independent of whether a Customer served under the Residential Inclining Block Rate billed at the Step 1 or Step 2 Energy Charge.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.2.4 Has or will BC Hydro consider the additional revenue contributions incurred by EV owners incurring Rate 1101 'Step 2' rates at home as a type of cross-subsidization to the Rate for public charging stations? If so, how? If not, please provide rationale.

RESPONSE:

Please refer to BC Hydro's response to HEBERT IR 1.1.2 where we note that BC Hydro does not have an estimate of additional revenue contributions due to customers substituting home charging for public electric vehicle fast charging.

Please refer to section 4.2 of the Application where we describe how revenue from public fast charging rates are not expected to recover their full cost of service, with the remaining costs recovered in rates from all ratepayers through revenue requirement proceedings.

1.0 Reference: 3.1 Customer Research and Insights
Lines 1 to 5 Pg.15

In the rate application, BC Hydro states:

"*Support for a fee*: While almost two-thirds (59 per cent) indicate it is reasonable to charge a rate for the use of a public fast charging station, about half (49 per cent) indicate they would stop using the service if a rate is introduced. One-third (34 per cent) indicate public charging service is critical to them and they have nowhere else to charge."

1.1.2.5 Has or will BC Hydro consider a "time of use" discount for Rate 1101 customers who are willing to charge their EV at off-peak times/overnight at home, as opposed to in public? If so, please advise which upcoming rate application this should be addressed via, with approximate timeframe expected.

RESPONSE:

Please refer to BC Hydro's response to HEBERT IR 1.1.2.1.

1.0 Was there a process from BC Hydro to come up with the proposed rate schedule? If so,is it possible to share the report?

RESPONSE:

BC Hydro's Public Electric Vehicle Fast Charging Application describes the process BC Hydro undertook to develop the Proposed Rates and is available here:

https://www.bcuc.com/Documents/Proceedings/2021/DOC_61620_B-1-BCH-EV-FC-Rate-Application.pdf

As shown in the Application, the process to develop the Proposed Rates included analysis of the need for the service, the legal and regulatory context, customer and stakeholder research and feedback, jurisdiction review, cost of service analysis, Bonbright assessment and implementation considerations.

2.0 Is BC Hydro planning on becoming the main supplier of DCFC in the province or leaveroom for private investment? Can BC Hydro share its future plan on allowing competitive rate to incentive private investment or its plan to expand its network.

RESPONSE:

BC Hydro anticipates the development of a number of different providers of public fast charging service as the electric vehicle market and adoption matures.

As shown in section 3.3 of the Application, BC Hydro's Proposed Rates considered prices of other fast charging operators and are not designed to discourage private investment in public fast charging.

Please also refer to BC Hydro's response to CEC IR 1.5.1.

3.0 How does BC Hydro explain its unfair advantage over all other private investors whohave to pay for expensive demand charges?

RESPONSE:

BC Hydro's Proposed Rates are designed to not be lower than the Energy and Demand rates BC Hydro charges to other fast charging station operators who take service from BC Hydro under the General Service rates.

Please also refer to section 4.1 of the Application for a discussion of our rate design objectives.

4.0 Is BC Hydro planning on removing demand charges for DCFC sites for a period of time to accelerate the well needed private investment on DCFC infrastructure?

RESPONSE:

Please refer to BC Hydro's response to CHARGEPOINT IR 1.1.9.

5.0 Is BC Hydro planning on changing the rate schedule to a per kWh basis or mix of time and kWh when Measurement Canada approves it?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.15.

6.0 Is BC Hydro planning on expanding its variety of charging stations allowing dual charging, faster, and upgradable option in order to future-proof sites while increasingthe user experience and reduce infrastructure costs using taxpayers'/ratepayers' money?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 for a discussion of BC Hydro's plans for the development of its public fast charging service, and to section 1.3.2 of the Application for a discussion of the treatment of the costs associated with electric vehicle charging stations.

1.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1, p. 2 and Appendix E p. 30
Cost Recovery Structure

On page 2 of the British Columbia Hydro and Power Authority (BC Hydro) Fiscal 2022 Revenue Requirements Application (Application), BC Hydro states:

"The Proposed Rates are intended to collect revenue from the users of the fast charging service to recover not only the cost of electricity for the fast charging service but also partially recover BC Hydro's fast charging station capital and maintenance costs."

On page 30 of the Application's Appendix E, BC Hydro presents this table:

BC Hydro rate design objectives

Rate design objectives	How they apply to a public fast charging rate
Economic Efficiency	• Set pricing to achieve full cost recovery over the longer term, starting with recovery of electricity supply costs in the near term
Low Carbon Electrification	• Support low carbon electrification through transportation electrification
Flexibility	• Build in flexibility through repricing in three years and future redesigns such as kWh-based and time-varying-based pricing

1.1.1 Please provide BC Hydro's business plan and details of the business model and the assumptions that BC Hydro has used to support the statement that the Proposed Rates will partially recover capital and maintenance costs. Please provide a working model in excel.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.2 where we provide the working model used to calculate the Proposed Rates in excel.

1.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1, p. 2 and Appendix E p. 30
Cost Recovery Structure

On page 2 of the British Columbia Hydro and Power Authority (BC Hydro) Fiscal 2022 Revenue Requirements Application (Application), BC Hydro states:

"The Proposed Rates are intended to collect revenue from the users of the fast charging service to recover not only the cost of electricity for the fast charging service but also partially recover BC Hydro's fast charging station capital and maintenance costs."

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Flexibility	• Build in flexibility through repricing in three years and future redesigns such as kWh-based and time-varying-based pricing

1.1.2 Have any assumptions or forecasts in BC Hydro's business plan changed between the time of the referenced presentation and this filing regarding the expected amounts of program costs that will be recovered by the Proposed Rates? Please provide details.

RESPONSE:

There have been no changes to the potential for cost recovery provided by the Proposed Rates.

1.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1, p. 2 and Appendix E p. 30
Cost Recovery Structure

On page 2 of the British Columbia Hydro and Power Authority (BC Hydro) Fiscal 2022 Revenue Requirements Application (Application), BC Hydro states:

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Low Carbon Electrification	• Support low carbon electrification through transportation electrification
Flexibility	• Build in flexibility through repricing in three years and future redesigns such as kWh-based and time-varying-based pricing

1.1.3 Please confirm if BC Hydro intends the Proposed Rates to fully recover all costs associated with EV fast charging stations (i.e., operations, energy, capex)?

RESPONSE:

BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. We expect it to take a number of years to achieve this goal.

1.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1, p. 2 and Appendix E p. 30
Cost Recovery Structure

On page 2 of the British Columbia Hydro and Power Authority (BC Hydro) Fiscal 2022 Revenue Requirements Application (Application), BC Hydro states:

"The Proposed Rates are intended to collect revenue from the users of the fast charging service to recover not only the cost of electricity for the fast charging service but also partially recover BC Hydro's fast charging station capital and maintenance costs."

On page 30 of the Application's Appendix E, BC Hydro presents this table:

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Low Carbon Electrification	• Support low carbon electrification through transportation electrification
Flexibility	• Build in flexibility through repricing in three years and future redesigns such as kWh-based and time-varying-based pricing

1.1.3 Please confirm if BC Hydro intends the Proposed Rates to fully recover all costs associated with EV fast charging stations (i.e., operations, energy, capex)?

1.1.3.1 If yes, when will these costs be recovered?

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.1.3.

1.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1, p. 2 and Appendix E p. 30
Cost Recovery Structure

On page 2 of the British Columbia Hydro and Power Authority (BC Hydro) Fiscal 2022 Revenue Requirements Application (Application), BC Hydro states:

"The Proposed Rates are intended to collect revenue from the users of the fast charging service to recover not only the cost of electricity for the fast charging service but also partially recover BC Hydro's fast charging station capital and maintenance costs."

On page 30 of the Application's Appendix E, BC Hydro presents this table:

BC Hydro rate design objectives

Rate design objectives	How they apply to a public fast charging rate
Economic Efficiency	• Set pricing to achieve full cost recovery over the longer term, starting with recovery of electricity supply costs in the near term
Low Carbon Electrification	• Support low carbon electrification through transportation electrification
Flexibility	• Build in flexibility through repricing in three years and future redesigns such as kWh-based and time-varying-based pricing

1.1.3 Please confirm if BC Hydro intends the Proposed Rates to fully recover all costs associated with EV fast charging stations (i.e., operations, energy, capex)?

1.1.3.2 If no, why not?

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.1.3.

2.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.1, p. 5
BCUC Electric Vehicle Inquiry

On page 5 of the Application, BC Hydro states:

> "Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry7 that BC Hydro has considered in the design of the Proposed Rates include:
> - It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments."

1.2.1 Please confirm that cross subsidization of BC Hydro fast charging station rates could potentially interfere with the "level playing field". Please elaborate.

RESPONSE:

BC Hydro does not confirm that recovery of costs with respect to electric vehicle fast charging services from all ratepayers, as permitted under section 18 of the *Clean Energy Act,* could potentially interfere with the "level playing field". BC Hydro is not familiar with the cost structures of other fast charging station operators.

We cannot comment on how other operators may assess BC Hydro's legal and regulatory framework, under which costs associated with electric vehicle charging stations that meet the requirements of section 5 of the GGRR are included in BC Hydro's Fiscal 2022 Revenue Requirements Application for fiscal 2020, fiscal 2021 and fiscal 2022, as described in section 1.3.2 of the Application.

BC Hydro's Proposed Rates are designed to maintain a level playing field with other fast charging station operators by considering the prices of other operators, and while aiming to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules.

2.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.1, p. 5
BCUC Electric Vehicle Inquiry

On page 5 of the Application, BC Hydro states:

> "Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry7 that BC Hydro has considered in the design of the Proposed Rates include:
> - It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments."

1.2.2 Please explain how BC Hydro can be confident that the Proposed Rates do not interfere with the "level playing field" due to cross subsidization.

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.2.1.

2.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.1, p. 5
BCUC Electric Vehicle Inquiry

On page 5 of the Application, BC Hydro states:

> "Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry7 that BC Hydro has considered in the design of the Proposed Rates include:
> - It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments."

1.2.3 Please explain how BC Hydro avoids cross subsidizing its fast charging stations.

RESPONSE:

Approval of BC Hydro's Proposed Rates as filed will reduce cross subsidization. The Proposed Rates are designed to encourage station utilization which should increase revenue collected from users of fast charging service. This outcome will reduce the recovery of electric vehicle fast charging costs from all ratepayers.

Over the near term, BC Hydro does not expect that revenues from the Proposed Rates can fully recover the costs of electric vehicle fast charging service as explained in section 4 of the Application.

2.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.1, p. 5
BCUC Electric Vehicle Inquiry

On page 5 of the Application, BC Hydro states:

> "Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry7 that BC Hydro has considered in the design of the Proposed Rates include:
> - It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments."

1.2.3 Please explain how BC Hydro avoids cross subsidizing its fast charging stations.

1.2.3.1 If BC Hydro does not avoid cross subsidizing its fast charging stations, please explain why not.

RESPONSE:

Increased station utilization will be required for the Proposed Rates to recover the full cost of fast charging station service. Please also refer to section 1.1. of the Application.

2.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.1, p. 5
BCUC Electric Vehicle Inquiry

On page 5 of the Application, BC Hydro states:

> "Phase 2 focused on and clarified the role of "non-exempt public utilities" (e.g., BC Hydro and FortisBC Inc.) in providing the public electric vehicle charging service. Findings from the Phase 2 EV Inquiry7 that BC Hydro has considered in the design of the Proposed Rates include:
> - It is in the public interest to ensure that the playing field remains as level as possible. There is an opportunity for thoughtful regulation to ensure that non-exempt public utility investments do not crowd out exempt utility investments."

1.2.4 Please explain and list what adjustments to the Proposed Rates have been made to account for BC Hydro not bearing commercial risks (e.g., cost overruns) in the same manner that they would be born by non-exempt utilities.

RESPONSE:

The Proposed Rates have not been adjusted to account for commercial risks. On page 26 of the Application, we explain that the Proposed Rates are designed, taking into consideration the prices of other operators and, the range of prices that research has indicated that customers are willing to pay, while aiming to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules to minimize the cost impact on all ratepayers.

On page 28 of the Application, we detail the cost recovery calculations. These use the expected future capital cost, net of third-party contributions, of a 50 kW dual charger station of $85,000, maintenance costs of $8,000 per year per station and average charging session length of 28.6 minutes. These cost estimates and average usage information are based upon historical knowledge and information from implementing EV charging stations across the province over a number of years.

The Proposed Rates in the Application mainly recover the cost of electricity and will recover the maintenance and capital costs if utilization rates are above 20 per cent.

3.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.2, p. 7
Legal Framework

On page 7 of the Application, BC Hydro states:

> "As discussed above, the fast charging stations meeting the criteria of section 5 of the GGRR are prescribed undertakings and the costs incurred with respect to the stations are guaranteed recovery in rates under section 18 of the Clean Energy Act."

1.3.1 How does BC Hydro ensure that its fast charging station costs are controlled, especially in the context that recovery of these costs is guaranteed?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.20.2 and BCOAPO IR 1.12.1.

3.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.2, p. 7
Legal Framework

On page 7 of the Application, BC Hydro states:

> "As discussed above, the fast charging stations meeting the criteria of section 5 of the GGRR are prescribed undertakings and the costs incurred with respect to the stations are guaranteed recovery in rates under section 18 of the Clean Energy Act."

1.3.2 What factors have been considered by BC Hydro in determining the appropriate number of fast charging stations in its fleet? How have those factors influenced the Proposed Rates?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 regarding BC Hydro's current deployment plans for its fast charging stations.

The Proposed Rates assume that the majority of BC Hydro fast charging stations will be upgraded to at least two fast charging stations per site in the near term.

4.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.2, p. 8
Legal Framework

On page 8 of the Application, BC Hydro states:

> "Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro can recover costs from all ratepayers and not just from those who use the service. The Proposed Rates, if approved, would allow BC Hydro to collect revenues directly from those who use the fast charging service, which will reduce costs that need to be recovered from all ratepayers."

1.4.1 Please list all costs that are associated with the 96 fast charging stations (e.g., capital expenditure list, site acquisition costs, planning costs, studies, overhead, operations, etc.) and explain how they have been incorporated into the calculation of BC Hydro's applied for rates in this filing.

RESPONSE:

The following costs are associated with the fast charging stations:

- **Capital costs including fast charging and supporting equipment, planning, site selection, design, engineering, project management, construction, lighting and signage, which are partly offset by any third-party contributions. Please also refer to BC Hydro's response to SUNCOR IR 1.5.1 for additional information regarding the cost of a dual charging station site;**
- **Operating costs including maintenance, EV app maintenance, metering and repairs and some BC Hydro internal labor for supporting EV infrastructure projects; and**
- **Electricity costs.**

The capital costs described above and in the Application are represented in the cost of service calculations as depreciation expense. The maintenance, metering and repair costs are represented in the cost of service calculations as operating costs and use an annual estimated $8,000 per station. The electricity usage is represented in the cost of service as the electricity costs. As stated in the

Application, the internal labor costs are not included in the cost of service calculation as these are not direct costs of the EV charging stations.

Also, as stated on page 26 of the Application, the Proposed Rates are designed to incorporate the feedback from customers and stakeholders, align with prices of other operators and to recover at least the cost of electricity based on BC Hydro's General Service rate schedules to minimize costs impact on all ratepayers. BC Hydro does not believe at this time that the station utilization is high enough to recover the full cost of public fast charging service.

4.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.2, p. 8
Legal Framework

On page 8 of the Application, BC Hydro states:

> "Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro can recover costs from all ratepayers and not just from those who use the service. The Proposed Rates, if approved, would allow BC Hydro to collect revenues directly from those who use the fast charging service, which will reduce costs that need to be recovered from all ratepayers."

1.4.2 Please confirm that all these costs were disclosed in the filed F2021 RRA information.

RESPONSE:

BC Hydro assumes that this question refers to the Fiscal 2022 Revenue Requirements Application proceeding, which is pending before another Commission Panel. BC Hydro confirms the historical costs detailed in BC Hydro's response to RCIA IR 1.4.1 were disclosed in the Fiscal 2022 Revenue Requirements Application, including responses to information requests in that proceeding.

4.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.2, p. 8
Legal Framework

On page 8 of the Application, BC Hydro states:

> "Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro can recover costs from all ratepayers and not just from those who use the service. The Proposed Rates, if approved, would allow BC Hydro to collect revenues directly from those who use the fast charging service, which will reduce costs that need to be recovered from all ratepayers."

1.4.2 Please confirm that all these costs were disclosed in the filed F2021 RRA information.

1.4.2.1 If not confirmed, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.4.2.

4.0 CHAPTER 1 – INTRODUCTION

Reference: Introduction
Exhibit B-1 (Application), Section 1.3.2, p. 8
Legal Framework

On page 8 of the Application, BC Hydro states:

> "Section 18 does not specify from whom the revenue should be collected. For fast charging stations that qualify as prescribed undertakings, BC Hydro can recover costs from all ratepayers and not just from those who use the service. The Proposed Rates, if approved, would allow BC Hydro to collect revenues directly from those who use the fast charging service, which will reduce costs that need to be recovered from all ratepayers."

1.4.3 Please confirm the amount or percentage of the total all-in capital and operating costs of the fast charging stations (as listed above) that is anticipated to be recovered by the Proposed Rates in each of the next three years.

RESPONSE:

BC Hydro does not have the data available to provide the requested forecast. Revenues, and therefore cost recovery, will be highly dependent on station utilization. BC Hydro does not yet have enough information to estimate the station utilization after a rate is in place because the interim rates for the fast charging station service have just been implemented (commenced on May 1, 2021).

BC Hydro plans to analyze and report on cost recovery in our evaluation plan described in section 5 of the Application, to be filed in 2024.

5.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4, p. 25

On page 8 of the Application, BC Hydro states:

> "The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (SGS) rate and is proposed at12 cents per minute; RS 1560, which is applicable to public fast charging service at50 kW stations, is considered a Medium General Service rate (MGS) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute. The Proposed Rates are applicable in all of BC Hydro's integrated area or Rate Zone I. The Proposed Rates are subject to any BCUC approved general revenue requirement increases or decreases."

1.5.1 Did BC Hydro consider time of use pricing when designing the Proposed Rates? Please elaborate.

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.12.1.

5.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4, p. 25

On page 8 of the Application, BC Hydro states:

> "The proposed RS 1360, which is applicable to public fast charging service at 25 kW stations, is considered a Small General Service (SGS) rate and is proposed at12 cents per minute; RS 1560, which is applicable to public fast charging service at50 kW stations, is considered a Medium General Service rate (MGS) and is proposed at 21 cents per minute, and RS 1561, which is applicable to public fast charging service at 100 kW stations, is also considered an MGS rate and proposed at 27 cents per minute. The Proposed Rates are applicable in all of BC Hydro's integrated area or Rate Zone I. The Proposed Rates are subject to any BCUC approved general revenue requirement increases or decreases."

1.5.2 Why did BC Hydro opt against time of use pricing?

RESPONSE:

Please refer to BC Hydro's response to BCSEA VEVA IR 1.12.1.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.1 Do the Proposed Rates attempt to maximize the utilization of fast charging stations by offering low rates, subject to those rates not being lower than the minimum rates that BC Hydro judges would satisfy the "level playing field" criterion?

RESPONSE:

BC Hydro does not have sufficient data to determine what rate would "maximize the utilization of fast charging stations" and as such that was not our rate design goal.

Rather, as noted in the preamble, we attempted to develop reasonable pricing based on Customer research, jurisdiction review and alignment of the cost recovery of the Proposed Rates with the electricity costs (Energy and Demand) of equivalent General Service Rates which are available to other fast charging service operators in our service territory.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.1 Do the Proposed Rates attempt to maximize the utilization of fast charging stations by offering low rates, subject to those rates not being lower than the minimum rates that BC Hydro judges would satisfy the "level playing field" criterion?

1.6.1.1 If no, please elaborate.

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.6.1.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.2 Has BC Hydro estimated the expected annual revenues from these Rates?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.1.3.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.2 Has BC Hydro estimated the expected annual revenues from these Rates?

1.6.2.1 If yes, please indicate where those revenue estimates can be found in the filing.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.1.3.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.3 Does BC Hydro have accountability to achieve the revenue estimates?

RESPONSE:

BC Hydro will publicly report on revenues and costs as described in section 5 of the Application. They will also be reflected in the Revenue Requirement Applications for the relevant test period.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.3 Does BC Hydro have accountability to achieve the revenue estimates?

1.6.3.1 If yes, please explain where that is discussed in the application.

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.6.3.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.4 Does BC Hydro have a long term plan to eliminate cross-subsidization of fast charging stations?

RESPONSE:

BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. BC Hydro's plan towards achieving this goal including monitoring, evaluating and potentially repricing as described in section 5 of the Application.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.4 Does BC Hydro have a long term plan to eliminate cross-subsidization of fast charging stations?

1.6.4.1 If no, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.6.4.

6.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.1, p. 26
Rate Design Approach

On page 26 of the Application, BC Hydro states:

> "BC Hydro's longer-term rate design objective is for the fast charging service rates to collect sufficient revenues from the users of the service to recover its full costs including electricity (Energy and Demand), as well as the fast charging station maintenance and capital costs, on a portfolio (or all station) basis. However, achieving this objective will require station utilization levels to be higher than what can be expected over the near term. To encourage station utilization while maintaining a level playing field with other fast charging station operators, the Proposed Rates are designed to align with prices of other operators, to fall within the range of prices that research indicates customers are willing to pay, and to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules as further described below. Higher rates would reduce initial station utilization and BC Hydro expects this would reduce revenue recovery."

1.6.4 Does BC Hydro have a long term plan to eliminate cross-subsidization of fast charging stations?

1.6.4.2 If yes, please provide documentation that describes and quantifies the long term plan.

RESPONSE:

Please refer to BC Hydro's responses to BCSEA VEVA IRs 1.5.2 and 1.5.3.

7.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.4, p. 34 – 35
Bonbright Assessment of Proposed Rates

On page 34 and 35 of the Application, BC Hydro states:

> "Table 4 below provides BC Hydro's assessment of the Proposed Rates using the Bonbright rate design criteria. The Proposed Rates have mixed performance on the Bonbright criteria. Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Table 4 Bonbright Assessment of Proposed Fast Charging Rate

Bonbright Criteria	Grouping	Performance	Remarks
1. Price signals to encourage efficient use and discourage inefficient use	Economic efficiency	Fair	• Price level is intended to encourage efficient use of stations by encouraging usage relative to higher price levels. • Per minute charge discourages inefficient use of stations by reducing wait times. • However, the Proposed Rates do not fully reflect BC Hydro's marginal cost because it is a time-based charge. They do not provide any price signal tied to consumption.
2. Fair apportionment of costs among customers	Fairness	Fair	• A per-minute-based rate benefits customers with larger battery size and is a disadvantage to customers with smaller battery size relative to a per kWh charge. • Stations are available to the public and same rate applies to all users of stations at a particular power level. • Over the near term, revenue will not recover all costs of service, with the remaining costs to be recovered from all ratepayers under section 18 of the *Clean Energy Act*).
3. Avoid undue discrimination			
4. Customer understanding and acceptance; practical and cost-effective to implement	Practicality	Good	• The Proposed Rates are easy to understand and practical for BC Hydro to administer.
5. Freedom from controversy as to proper interpretation			
6. Recovery of the revenue requirement	Stability	Good / Fair	The Proposed Rates have stable pricing and • Improve revenue recovery and revenue stability over long term by encouraging electric vehicle usage. and • Do not fully recover the revenue requirement.
7. Revenue stability			
8. Rate stability			

1.7.1 BC Hydro deems the Proposed Rates to be Good or Fair under BC Hydro's self-assessment of the listed Bonbright principles, despite stating that:

> "Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness." And
>
> "Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Is "Good to Fair" the same as saying that BC Hydro is achieving the specified Bonbright principles? Please elaborate.

RESPONSE:

A fair rating indicates that the proposed rate is achieving the Bonbright criteria but to a lesser degree than a good rating.

The fair ratings are based on second best circumstances, where both fairness and efficiency are limited by the state of the EV charging market and available technology.

7.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.4, p. 34 – 35
Bonbright Assessment of Proposed Rates

On page 34 and 35 of the Application, BC Hydro states:

> "Table 4 below provides BC Hydro's assessment of the Proposed Rates using the Bonbright rate design criteria. The Proposed Rates have mixed performance on the Bonbright criteria. Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Table 4 Bonbright Assessment of Proposed Fast Charging Rate

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1. Price signals to encourage efficient use and discourage inefficient use	Economic efficiency	Fair	• Price level is intended to encourage efficient use of stations by encouraging usage relative to higher price levels. • Per minute charge discourages inefficient use of stations by reducing wait times. • However, the Proposed Rates do not fully reflect BC Hydro's marginal cost because it is a time-based charge. They do not provide any price signal tied to consumption.
2. Fair apportionment of costs among customers	Fairness	Fair	• A per-minute-based rate benefits customers with larger battery size and is a disadvantage to customers with smaller battery size relative to a per kWh charge. • Stations are available to the public and same rate applies to all users of stations at a particular power level. • Over the near term, revenue will not recover all costs of service, with the remaining costs to be recovered from all ratepayers under section 18 of the *Clean Energy Act*).
3. Avoid undue discrimination			
4. Customer understanding and acceptance; practical and cost-effective to implement	Practicality	Good	• The Proposed Rates are easy to understand and practical for BC Hydro to administer.
5. Freedom from controversy as to proper interpretation			
6. Recovery of the revenue requirement	Stability	Good / Fair	The Proposed Rates have stable pricing and • Improve revenue recovery and revenue stability over long term by encouraging electric vehicle usage. and • Do not fully recover the revenue requirement.
7. Revenue stability			
8. Rate stability			

1.7.2 Is it appropriate to apply the Bonbright Assessment principles to the evaluation of rates that are applied in a contestable marketplace?

RESPONSE:

Bonbright criteria are widely accepted in electric utility rate design and as such are appropriate for inclusion in the Application.

7.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.4, p. 34 – 35
Bonbright Assessment of Proposed Rates

On page 34 and 35 of the Application, BC Hydro states:

> "Table 4 below provides BC Hydro's assessment of the Proposed Rates using the Bonbright rate design criteria. The Proposed Rates have mixed performance on the Bonbright criteria. Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Table 4 Bonbright Assessment of Proposed Fast Charging Rate

Bonbright Criteria	Grouping	Performance	Remarks
1. Price signals to encourage efficient use and discourage inefficient use	Economic efficiency	Fair	• Price level is intended to encourage efficient use of stations by encouraging usage relative to higher price levels. • Per minute charge discourages inefficient use of stations by reducing wait times. • However, the Proposed Rates do not fully reflect BC Hydro's marginal cost because it is a time-based charge. They do not provide any price signal tied to consumption.
2. Fair apportionment of costs among customers	Fairness	Fair	• A per-minute-based rate benefits customers with larger battery size and is a disadvantage to customers with smaller battery size relative to a per kWh charge. • Stations are available to the public and same rate applies to all users of stations at a particular power level. • Over the near term, revenue will not recover all costs of service, with the remaining costs to be recovered from all ratepayers under section 18 of the *Clean Energy Act*).
3. Avoid undue discrimination			
4. Customer understanding and acceptance; practical and cost-effective to implement	Practicality	Good	• The Proposed Rates are easy to understand and practical for BC Hydro to administer.
5. Freedom from controversy as to proper interpretation			
6. Recovery of the revenue requirement	Stability	Good / Fair	The Proposed Rates have stable pricing and • Improve revenue recovery and revenue stability over long term by encouraging electric vehicle usage. and • Do not fully recover the revenue requirement.
7. Revenue stability			
8. Rate stability			

1.7.2 Is it appropriate to apply the Bonbright Assessment principles to the evaluation of rates that are applied in a contestable marketplace?

1.7.2.1 If yes, please explain why.

RESPONSE:

Please refer to BC Hydro's response to RCIA IR 1.7.2.

7.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.4, p. 34 – 35
Bonbright Assessment of Proposed Rates

On page 34 and 35 of the Application, BC Hydro states:

> "Table 4 below provides BC Hydro's assessment of the Proposed Rates using the Bonbright rate design criteria. The Proposed Rates have mixed performance on the Bonbright criteria. Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Table 4 Bonbright Assessment of Proposed Fast Charging Rate

Bonbright Criteria	Grouping	Performance	Remarks
1. Price signals to encourage efficient use and discourage inefficient use	Economic efficiency	Fair	• Price level is intended to encourage efficient use of stations by encouraging usage relative to higher price levels. • Per minute charge discourages inefficient use of stations by reducing wait times. • However, the Proposed Rates do not fully reflect BC Hydro's marginal cost because it is a time-based charge. They do not provide any price signal tied to consumption.
2. Fair apportionment of costs among customers	Fairness	Fair	• A per-minute-based rate benefits customers with larger battery size and is a disadvantage to customers with smaller battery size relative to a per kWh charge. • Stations are available to the public and same rate applies to all users of stations at a particular power level. • Over the near term, revenue will not recover all costs of service, with the remaining costs to be recovered from all ratepayers under section 18 of the *Clean Energy Act*).
3. Avoid undue discrimination			
4. Customer understanding and acceptance; practical and cost-effective to implement	Practicality	Good	• The Proposed Rates are easy to understand and practical for BC Hydro to administer.
5. Freedom from controversy as to proper interpretation			
6. Recovery of the revenue requirement	Stability	Good / Fair	The Proposed Rates have stable pricing and • Improve revenue recovery and revenue stability over long term by encouraging electric vehicle usage. and • Do not fully recover the revenue requirement.
7. Revenue stability			
8. Rate stability			

1.7.3 Re: Table 4 (Remarks for Criteria 2 and 3) - Why does BC Hydro consider it to be "fair" that "revenue will not recover all costs of service" from those using the service, when that implies that these costs will therefore be recovered from all ratepayers, including those unable to afford an EV?

RESPONSE:

For clarity, in assessing the Bonbright criteria BC Hydro uses the following rankings: poor, fair, good or very good. In this context, "fair" should be interpreted as "moderate" or "middling". BC Hydro does not consider the Proposed Rates to perform well on "fair allocation of costs" because they do not recover their full cost of service and some of these costs will be recovered from all ratepayers, including those who do not use the service.

7.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.4, p. 34 – 35
Bonbright Assessment of Proposed Rates

On page 34 and 35 of the Application, BC Hydro states:

> "Table 4 below provides BC Hydro's assessment of the Proposed Rates using the Bonbright rate design criteria. The Proposed Rates have mixed performance on the Bonbright criteria. Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Table 4 Bonbright Assessment of Proposed Fast Charging Rate

Bonbright Criteria	Grouping	Performance	Remarks
1. Price signals to encourage efficient use and discourage inefficient use	Economic efficiency	Fair	• Price level is intended to encourage efficient use of stations by encouraging usage relative to higher price levels. • Per minute charge discourages inefficient use of stations by reducing wait times. • However, the Proposed Rates do not fully reflect BC Hydro's marginal cost because it is a time-based charge. They do not provide any price signal tied to consumption.
2. Fair apportionment of costs among customers	Fairness	Fair	• A per-minute-based rate benefits customers with larger battery size and is a disadvantage to customers with smaller battery size relative to a per kWh charge. • Stations are available to the public and same rate applies to all users of stations at a particular power level. • Over the near term, revenue will not recover all costs of service, with the remaining costs to be recovered from all ratepayers under section 18 of the *Clean Energy Act*).
3. Avoid undue discrimination			
4. Customer understanding and acceptance; practical and cost-effective to implement	Practicality	Good	• The Proposed Rates are easy to understand and practical for BC Hydro to administer.
5. Freedom from controversy as to proper interpretation			
6. Recovery of the revenue requirement	Stability	Good / Fair	The Proposed Rates have stable pricing and • Improve revenue recovery and revenue stability over long term by encouraging electric vehicle usage. and • Do not fully recover the revenue requirement.
7. Revenue stability			
8. Rate stability			

1.7.3.1 Does BC Hydro consider that imposing actual cost of service for EV charging represents a hardship upon the users of that service? If yes, please elaborate, considering that EVs are typically used by consumers with the means to purchase a premium vehicle.

RESPONSE:

BC Hydro has not considered whether or not imposing the actual cost of service for EV charging represents a hardship upon the users of that service.

BC Hydro recognizes that at this time there is no practical way to recover the full cost of service from electric vehicle customers. Please also refer to BC Hydro's response to BCUC IR 1.14.9.

7.0 CHAPTER 4 – RATE DESIGN

Reference: Rate Design
Exhibit B-1 (Application), Section 4.4, p. 34 – 35
Bonbright Assessment of Proposed Rates

On page 34 and 35 of the Application, BC Hydro states:

> "Table 4 below provides BC Hydro's assessment of the Proposed Rates using the Bonbright rate design criteria. The Proposed Rates have mixed performance on the Bonbright criteria. Full cost recovery from those who use the service cannot be achieved with the station utilization levels expected over the near term, which limits their fairness. Current metering limitations constrain the Proposed Rates to being time-based which limit their economic efficiency."

Table 4 Bonbright Assessment of Proposed Fast Charging Rate

Bonbright Criteria	Grouping	Performance	Remarks
1. Price signals to encourage efficient use and discourage inefficient use	Economic efficiency	Fair	• Price level is intended to encourage efficient use of stations by encouraging usage relative to higher price levels. • Per minute charge discourages inefficient use of stations by reducing wait times. • However, the Proposed Rates do not fully reflect BC Hydro's marginal cost because it is a time-based charge. They do not provide any price signal tied to consumption.
2. Fair apportionment of costs among customers 3. Avoid undue discrimination	Fairness	Fair	• A per-minute-based rate benefits customers with larger battery size and is a disadvantage to customers with smaller battery size relative to a per kWh charge. • Stations are available to the public and same rate applies to all users of stations at a particular power level. • Over the near term, revenue will not recover all costs of service, with the remaining costs to be recovered from all ratepayers under section 18 of the *Clean Energy Act*).
4. Customer understanding and acceptance; practical and cost-effective to implement 5. Freedom from controversy as to proper interpretation	Practicality	Good	• The Proposed Rates are easy to understand and practical for BC Hydro to administer.
6. Recovery of the revenue requirement 7. Revenue stability 8. Rate stability	Stability	Good / Fair	The Proposed Rates have stable pricing and • Improve revenue recovery and revenue stability over long term by encouraging electric vehicle usage. and • Do not fully recover the revenue requirement.

1.7.4 Re: Table 4 – Please explain why BC Hydro assesses rates that do not actually "recover the revenue requirement" as being Good/Fair?

RESPONSE:

BC Hydro has grouped three Bonbright criteria (recovery of the revenue requirement, revenue stability, and rate stability) into one Grouping of Stability for the purpose of the ranking.

The Proposed Rates are assessed as good on rate stability because they are simple time-based rates that do not change except with general rate increases or decreases. They are assessed as Fair (i.e., moderate, or middling) on recovery of the revenue requirements because they are not expected to fully recover costs over the near-term, but do support longer-term revenue growth by encouraging electrification.

8.0 CHAPTER 7 – CONCLUSION

Reference: Conclusion
Exhibit B-1 (Application), Section 7, p. 39 – 40
Conclusion

On page 39 and 40 of the Application, BC Hydro states:

> "The Proposed Rates are just and reasonable and should be approved as filed. The Proposed Rates take into consideration of several recommendation from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues. The revenue collected from the Proposed Rates will be to the benefit of all. ratepayers. The rates will be monitored and a public evaluation filed with the BCUC by March 2024, which will provide an opportunity to update the rates for fast charging service based on developments in the electric vehicle market, customer and stakeholder feedback, as well as any potential metering and billing technology improvements."

1.8.1 What actual station utilization is expected to be achieved in each of the next three years?

RESPONSE:

BC Hydro does not yet have enough information to estimate the station utilization after a rate is in place because the interim rates have just been implemented, commencing on May 1, 2021. However, we believe that the range of 3 per cent to 5 per cent utilization is a reasonable estimate at this time for the 50 kW stations.

8.0 CHAPTER 7 – CONCLUSION

Reference: Conclusion
Exhibit B-1 (Application), Section 7, p. 39 – 40
Conclusion

On page 39 and 40 of the Application, BC Hydro states:

> "The Proposed Rates are just and reasonable and should be approved as filed. The Proposed Rates take into consideration of several recommendation from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues. The revenue collected from the Proposed Rates will be to the benefit of all. ratepayers. The rates will be monitored and a public evaluation filed with the BCUC by March 2024, which will provide an opportunity to update the rates for fast charging service based on developments in the electric vehicle market, customer and stakeholder feedback, as well as any potential metering and billing technology improvements."

1.8.2 What revenues are expected to be generated in each of the next three years?

RESPONSE:

BC Hydro does not have a year specific revenue expectation at this time, but will report out an annual revenues in the evaluation we plan to file in 2024.

8.0 CHAPTER 7 – CONCLUSION

Reference: Conclusion
Exhibit B-1 (Application), Section 7, p. 39 – 40
Conclusion

On page 39 and 40 of the Application, BC Hydro states:

> "The Proposed Rates are just and reasonable and should be approved as filed. The Proposed Rates take into consideration of several recommendation from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues. The revenue collected from the Proposed Rates will be to the benefit of all. ratepayers. The rates will be monitored and a public evaluation filed with the BCUC by March 2024, which will provide an opportunity to update the rates for fast charging service based on developments in the electric vehicle market, customer and stakeholder feedback, as well as any potential metering and billing technology improvements."

1.8.3 If BC Hydro has explicit utilization and revenue targets, please explain where those details can be found in the filing.

RESPONSE:

BC Hydro does not have explicit utilization and revenue targets for our public fast charging service.

8.0 CHAPTER 7 – CONCLUSION

Reference: Conclusion
Exhibit B-1 (Application), Section 7, p. 39 – 40
Conclusion

On page 39 and 40 of the Application, BC Hydro states:

> "The Proposed Rates are just and reasonable and should be approved as filed. The Proposed Rates take into consideration of several recommendation from the EV Inquiry, such as, maintaining a level playing field for fast charging service operators through pricing that is comparable to that of other operators. The Proposed Rates are also set to a level that is expected to support station utilization and BC Hydro revenues. The revenue collected from the Proposed Rates will be to the benefit of all. ratepayers. The rates will be monitored and a public evaluation filed with the BCUC by March 2024, which will provide an opportunity to update the rates for fast charging service based on developments in the electric vehicle market, customer and stakeholder feedback, as well as any potential metering and billing technology improvements."

1.8.4 Please provide a detailed explanation showing that the Proposed Rates are part of a long term business plan that has the objectives of ultimately addressing the failings that BC Hydro points out in Section 4.4 and referenced in the prior set of questions.

RESPONSE

As explained in section 4.4 of the Application, the Proposed Rates are rated "fair" or "good", not "failing" under the Bonbright criteria. The Electrification Plan to be filed with BC Hydro's Fiscal 2023 to Fiscal 2025 Revenue Requirements Application will include a discussion of BC Hydro's investments in the electric vehicle fast charging service for the next five years.

1.0 Reference: Introduction[1]

1.1.1 Exhibit B-1, Section 3.3, Table 2, p. 24[2] shows that both Electrify Canada and Petro-Canada have 350kW stations. Does BC Hydro have plans to introduce charging stations with greater than 100kW?

RESPONSE:

Please refer to BC Hydro's responses to BCSEA VEVA IRs 1.9.3 and 1.9.4.

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1 Exhibit B-1, p. 1, line 1-13.

2 See also A-3, BCUC IR1.6.0 p.10, 6.3 p. 10 to add to Table 2 other networks - FLO, ChargePoint and Greenlots/Shell, IR1.8.5.1 Petro-Canada and IR1.9.4 and 9.5 to add Tesla

1.0 Reference: Introduction[1]

1.1.2 Please discuss whether at this time, rates should also be proposed for stations with a power level over 100kW, including 350kW stations.

RESPONSE:

Rates should not be developed for stations with a power level over 100 kW at this time as 100 kW is the highest power level charging station BC Hydro expects to deploy over the near term.

[1] Exhibit B-1, p. 1, line 1-13.

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.1 The number of charging stations

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1.

[1] Exhibit B-1, p. 2, lines 13-14

[2] See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.2 The proximity of alternative public fast charging sites

RESPONSE:

BC Hydro does not have the requested information. PlugShare provides an interactive map of charging stations.

1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.3 The proximity to free or low cost public level 2 chargers

RESPONSE:

BC Hydro does not have the requested information. PlugShare provides an interactive map for public stations.

1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.4 The highest Peak Demand that has occurred, and when it occurred

RESPONSE:

The highest peak demand occurs during the day time and is equivalent to the charging station power level, for example the highest peak demand for 50 kW charging stations is approximately 50 kW.

Please also refer to BC Hydro's response to BCUC IR 1.12.2 where average hourly kWh information is provided in a graphic form.

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1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.5 A description of the charging stations including if possible the make, model, single or double charging station, number and kind of each type of charging port connector, the maximum input power rate in kW, and the maximum output rate in kW

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1 for available information.

1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.6 When a station is a double charging station (i.e. dual ports), does the kW output change to the charging EV when a second EV commences charging during the charging session of the first EV?

RESPONSE:

BC Hydro charging stations have two ports: CHAdeMO and Combined Charging System (CCS) to enable electric vehicles with different plug-in to connect to the charging station. E.g., Japanese vehicles (such as Nissan, Mitsubishi, and Toyota) and Korean vehicles (such as Hyundai and Kia) require CHAdeMO connectors, while North American vehicles (such as Chevrolet and Ford) and European vehicles (such as Volkswagen) use CCS connector. At any given time only one vehicle can charge at the charging station. The second vehicle cannot start until the first vehicle completes charging.

Please refer to BC Hydro's response to BCUC IR 1.8.4.

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1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.7 Is there power sharing between separate stations[3]

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.4.

1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

3 See also A-3, BCUC IR1.8.4 p.13

2.0 Reference: 1.1 Need for Fast Charging Service Rates[1]

1.2.1 Please specify for each charging site the charging stations at the site, including the following information:[2]

1.2.1.8 Please provide the same information for currently planned charging sites.[3]

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1.

1 Exhibit B-1, p. 2, lines 13-14

2 See also A-3, BCUC IR1.18.9 p. 29 and IR1.18.10 p. 29

3 See also A-3, BCUC IR1.7.4 p. 11

3.0 Reference: 1.3.3 Leg al Framework[1]

1.3.1 Is BC Hydro aware of any evidence that faster charging speeds of EV batteries causes more rapid deterioration of the battery? If so, can you please provide this evidence?

RESPONSE:

BC Hydro understands that electric vehicle battery performance may vary with the make and model of the electric vehicle; however, this topic is not BC Hydro's core expertise nor is it the subject of the Application.

[1] Exhibit B-1, p. 8, lines 18-19

3.0 Reference: 1.3.3 Leg al Framework[1]

1.3.2 Do any EV vehicle manufacturers recommend that fast EV charging should not be done frequently unless necessary? If so can you please provide the details?

RESPONSE:

BC Hydro is not aware if any EV vehicle manufacturers recommend that fast EV charging should not be done frequently unless necessary. We note that this topic is not BC Hydro's core expertise nor is it the subject of the Application.

[1] Exhibit B-1, p. 8, lines 18-19

3.0 Reference: 1.3.3 Leg al Framework[1]

1.3.3 Should the environmental impact of fast charging on an EV battery be a factor that the BCUC considers, as being within "all matters that it considers proper and relevant affecting the rate"?

RESPONSE:

While acknowledging that the BCUC has a broad discretion in setting rates, BC Hydro does not believe that "the environmental impact of the fast charging on EV battery" should be a relevant factor for setting the rates as applied for in this application as there is no evidence on the impact in this proceeding nor is BC Hydro aware of such impact.

[1] Exhibit B-1, p. 8, lines 18-19

3.0 Reference: 1.3.3 Leg al Framework[1]

1.3.4 If the rate may impact the willingness of existing strata condominium building to install EV charging stations, and that impairs adoption of EVs by the occupants of those buildings, is this a factor that BCUC should consider as being within "all matters that it considers proper and relevant affecting the rate"?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.4.6 where we explain that EV adoption in general is a matter for consideration in setting the rates as applied for in this proceeding; however, the specific impact of the Proposed Rates on the willingness of existing strata condominium buildings to install EV charging stations and those buildings' occupants to adopt EVs is not an appropriate consideration as there is no evidence of such impact in this proceeding.

[1] Exhibit B-1, p. 8, lines 18-19

4.0 Reference: 2.2 Metering for Fast Charging Station Service[1]

1.4.1 Is it possible to do electricity-based or a combination of an electricity and time based rate, where the sale contract specifies that the customer is purchasing the energy at an approved meter which measures the energy before it goes into the charging station?

RESPONSE:

It is not possible for BC Hydro to implement an electricity based public fast charging rate at this time, as further described in section 2.2. of the Application.

[1] Exhibit B-1, p. 11, lines 14-26 and p. 12 lines 1-2.

4.0 Reference: 2.2 Metering for Fast Charging Station Service[1]

1.4.1 Is it possible to do electricity-based or a combination of an electricity and time based rate, where the sale contract specifies that the customer is purchasing the energy at an approved meter which measures the energy before it goes into the charging station?

1.4.1.1 If this is possible, would this make sense where the charging station is a single station, or where it is a dual station, and the station has two AC inputs, and both would need meters?

RESPONSE:

Please refer to BC Hydro's response to STRATA PLAN VR 2673 IR 1.4.1.

[1] Exhibit B-1, p. 11, lines 14-26 and p. 12 lines 1-2.

4.0 Reference: 2.2 Metering for Fast Charging Station Service[1]

1.4.1 Is it possible to do electricity-based or a combination of an electricity and time based rate, where the sale contract specifies that the customer is purchasing the energy at an approved meter which measures the energy before it goes into the charging station?

1.4.1.2 Would this be a way to test a kWh based rate, without waiting for establishment of anticipated standards?

RESPONSE:

Please refer to BC Hydro's response to STRATA PLAN VR 2673 IR 1.4.1.

[1] Exhibit B-1, p. 11, lines 14-26 and p. 12 lines 1-2.

5.0 Reference: 3.1 Customer Research and Insights[1]

1.5.1 Does the 49% of respondents that indicated they would stop using the service if a rate was introduced, include the 48% that indicated they were willing to pay less than $5 for a 30 minute charging session?

RESPONSE:

Each question was asked of all survey respondents.

BC Hydro is unable to confirm the extent to which respondents who indicated they would stop using the service if a rate was introduced also indicated that they were willing to pay less than $5.

[1] Exhibit B-1, p. 15 lines 2-3- and line 9

6.0 Reference: 3.2 Public Engagement Workshop[1]

1.6.1 What is the purpose, result, or benefit of the special condition 2 to treat EV drivers as unique customer group?

RESPONSE:

The intent for Special Condition 2, copied below and included in each of Rate Schedule 1360, 1560 and 1561 in Appendix B of the Application, is to clarify the terms under which BC Hydro may interrupt service to a Fast Charging Station. These terms are consistent with section 9.4 of BC Hydro's Electric Tariff and do not provide unique treatment to fast charging service Customers.

> **2. BC Hydro may disconnect, interrupt or terminate Service at a Fast Charging Station due to existing or expected system, safety, accessibility, technical, environmental or other constraints at a Charging Site or at a Fast Charging Station as determined by BC Hydro. BC Hydro will, whenever practical, give notice of such disconnection, interruption, or termination to Customers, by posting information at the Fast Charging Station and the Charging Site and on a relevant third party website. In the event of a disconnection or interruption of Service, BC Hydro, whenever possible, to provide information on the expected duration of disconnection or interruption.**

[1] Exhibit B-1, p. 21 lines 9-11

6.0 Reference: 3.2 Public Engagement Workshop[1]

1.6.2 Did respondents indicate any confusion on this question?

RESPONSE

BC Hydro is not aware of Special Condition 2 of the Proposed Rates as shown in Appendix B, causing confusion.

BC Hydro has a dedicated customer support team to provide assistance to station users if and when any confusion arises.

[1] Exhibit B-1, p. 21 lines 9-11

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.1 Does the comparison between the cost of a session at a BC Hydro fast charging station, Tesla or Petro Canada charging station, charging at home, and a tank of gasoline each reflect the energy needed to travel the same distance?

RESPONSE:

BC Hydro has not completed the analysis described in the information request. We note that there is significant variability in energy needed to travel the same distance based on the make and model of the car, the driving conditions and how the vehicle is operated.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.1.1 Can you please provide a ratio for each of the proposed rates for 25kW, 50kW and 100kW stations that currently reflects the cost of BC Hydro fast charging compared to cost of gasoline to travel the same distance?

RESPONSE:

BC Hydro is unable to complete the requested analysis as there is significant variability in energy needed to travel the same distance based on the make and model of the car, the driving conditions and how the vehicle is operated.

Please also refer to BC Hydro's response to CEC IR 1.13.1.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.2 Are there circumstances where the Large General Service applies to EV fast charging, and not the Medium General Service or the Small General Service? If so, please explain.

RESPONSE:

At this time, none of BC Hydro's fast charging stations are expected to be considered as Large General Service, which is available for General Service with Demand 150 kW and Over.

Any Premises, including ones that include fast charging stations, will be charged under the Large General Service Rate if they qualify for General Service and have Billing Demand equal to or greater than 150 kW, or Energy consumption in any 12 month period that is greater than 550,000 kWh.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.2.1 In a situation where a site has 4 50kW stations, the metering is done at a charging site level, and all 4 are utilized at maximum capacity at the same time, will that cause the Large General Service to apply?

RESPONSE:

Please refer to BC Hydro's response to STRATAPLANVR2673 IR 1.7.2.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.2.2 In a situation where a 350 kW Station is fully utilized, will that cause the Large General Service to apply?

RESPONSE:

Please refer to BC Hydro's response to STRATAPLANVR2673 IR 1.7.2.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.2.3 Why are the exempt utilities in BC Hydro's service area charged under the applicable General Service Rate Schedule based on their electricity Demand, and not on both their Demand and Energy?[2]

RESPONSE:

BC Hydro's Electric Tariff, available at the link below, describes the Availability of the General Service Rate Schedules.

https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/tariff-filings/electric-tariff/bchydro-electric-tariff.pdf

As shown, the Large General Service Rate is Available for Customers who qualify for General Service and whose Billing Demand is equal to or greater than 150 kW, or whose Energy consumption in any 12 month period is greater than 550,000 kWh. The Medium General Service Rate is Available for Customers who qualify for General Service and whose Billing Demand is equal to or greater than 35 kW but less than 150 kW, and whose Energy consumption in any 12-month period is equal to or less than 550,000 kWh.

1 Exhibit B-1, p. 25 lines 21-24 and p. 27

2 Exhibit B-1, p. 27 lines 12-21

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.2.4 Should there be a rate that corresponds to the Large General Service?

RESPONSE:

Please refer to BC Hydro's response to STRATAPLANVR2673 IR 1.7.2.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

7.0 Reference: 4.1 Rate Design Approach[1]

1.7.2.5 If BC Hydro is on the Medium General Service and a competitor is on the large General Service, will BC Hydro have a competitive advantage under conditions of very low utilization?

RESPONSE:

BC Hydro does not believe that the scenario described provides a competitive advantage.

When designing the Proposed Rates BC Hydro considered the prices of other operators in our service territory and aimed to collect sufficient revenue to recover at least the cost of electricity based on BC Hydro's General Service rate schedules.

Large General Service Customers who have billing Demand that falls below 150 kW, and whose Energy consumption in any 12-month period falls below 550,000 kWh will be migrated to the Medium General Service Rate.

[1] Exhibit B-1, p. 25 lines 21-24 and p. 27

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.1 On page 29 line 7, it is stated that the Peak Demand that can be drawn by an EV being charged is 50kW, and footnote 16 indicates this based on data collected. Is the 50kW measured at the input AC side of the charging station, or on the DC output side? If is the output DC side, what is the input kW?

RESPONSE:

The 50 KW demand is based on data from the embedded meter in the DC fast charging station measuring the DC output power dispensed into the electric vehicle.

The AC revenue meter installed at a fast charging station site measures the total energy delivered to the charging station(s) installed at a site. The total load includes auxiliary load associated with AC-to-DC transformation and lighting and heating loads in addition to the actual energy dispensed from the fast charging station to the electric vehicle. There is no meter installed to only measure the input AC power that is being utilized by the fast charging station.

[1] Exhibit B-1, p. 28-32

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.2 If the utilization rate is 1%, what result would occur for electricity costs in Table 3 on page 31?

RESPONSE:

Below is a revised Table 3 with 1 per cent utilization rate for 50 kW stations:

Utilization Rate		Scenario 1	Scenario 2	Scenario 3
(%)	Average Number of Charging Sessions per Station per Month	Electricity Costs (RS 1500 Equivalent) ($/min)	Electricity + Station Maintenance Costs ($/min)	Full Cost of Service: Electricity + Maintenance + Capital Costs ($/min)
1.0%	15	$0.66	$2.18	$3.80

[1] Exhibit B-1, p. 28-32

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.2.1 What would be the result if Peak Demand is at 150kW for the month, and the charging station is on the large General Service?

RESPONSE:

BC Hydro understands the information request to be in regards to Table 3 of the Application. BC Hydro is unable to complete the requested analysis for a 150 kW Charging Station as we do not have 150 kW Charging Stations and therefore do not have cost estimates for them.

[1] Exhibit B-1, p. 28-32

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.3 Using the Average Electricity Consumption per Charging Session of 13.1kWh[2], please calculate the cost of achieving this charge for each of the three proposed rates, and also determine the corresponding time to do the charge.

RESPONSE:

The electricity consumption and time required to charge a vehicle will depend on the vehicle make and model and its state of charge when a Charging Session starts.

Assuming a charging duration of half an hour, the Customer's bill per charging session would be $3.60 under Rate Schedule 1360, $6.30 under Rate Schedule 1560, and $8.10 under Rate Schedule 1561.

1 Exhibit B-1, p. 28-32

2 Exhibit B-1, p. 29 line 9

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.3 Using the Average Electricity Consumption per Charging Session of 13.1kWh[2], please calculate the cost of achieving this charge for each of the three proposed rates, and also determine the corresponding time to do the charge.

1.8.3.1 Please assume that the charge is done with full power.

RESPONSE:

Please refer to BC Hydro's response to STRATAPLAN VR 2673 IR 1.8.3.

1 Exhibit B-1, p. 28-32

2 Exhibit B-1, p. 29 line 9

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.3 Using the Average Electricity Consumption per Charging Session of 13.1kWh[2], please calculate the cost of achieving this charge for each of the three proposed rates, and also determine the corresponding time to do the charge.

1.8.3.2 As an alternative scenario, please adjust the power and time to what is expected based on experience, and state the assumptions.

RESPONSE:

Please refer to BC Hydro's response to STRATAPLAN VR2673 IR 1.8.3.

[1] Exhibit B-1, p. 28-32

[2] Exhibit B-1, p. 29 line 9

8.0 Reference: 4.2 Cost Recovery Calculations[1]

1.8.3 Using the Average Electricity Consumption per Charging Session of 13.1kWh[2], please calculate the cost of achieving this charge for each of the three proposed rates, and also determine the corresponding time to do the charge.

1.8.3.3 Please calculate the percentage increase in the rate from RS 1360 $0.12 to RS 1560 $0.21, from RS 1560 $0.21 to RS 1561 $0.27, and from RS 1360 $0.12 to RS 1561 $0.27.

RESPONSE:

An increase in the RS 1360 Rate from $0.12 to $0.21 per minute would be a 75 per cent increase.

An increase in the RS 1560 Rate from $0.21 to $0.27 per minute would be a 29 per cent increase.

An increase in the RS 1360 Rate from $0.12 to $0.27 per minute would be a 125 per cent increase.

1 Exhibit B-1, p. 28-32

2 Exhibit B-1, p. 29 line 9

1.0 Network details:

1.1.1 In order to assess the total cost of ownership and return on investment consistent with the application, Suncor request that the applicant provide additional details related to the following:

1.1.1.1 The number of planned EV charging locations;

RESPONSE:

For clarity, BC Hydro first notes that return on investment is not the subject of this Application. The purpose of this application is limited to request for approval of the proposed Rate Schedules 1360, 1560 and 1561. BC Hydro's Fiscal 2022 Revenue Requirements Application addressed matters related to the BC Hydro's investments in electric vehicle infrastructure.

For information on BC Hydro's planned charging locations please refer to BC Hydro's responses to BCOAPO IR 1.1.1, BCSEA VEVA IR 1.5.2 and CEC IR 1.5.1.

1.0 Network details:

1.1.1 In order to assess the total cost of ownership and return on investment consistent with the application, Suncor request that the applicant provide additional details related to the following:

1.1.1.2 the number of electric vehicle charging posts – the maximum number of EVs that can be charged at any point in time per location;

RESPONSE:

Pease refer to BC Hydro's response to BCOAPO IR 1.1.1.

1.0 Network details:

1.1.1 In order to assess the total cost of ownership and return on investment consistent with the application, Suncor request that the applicant provide additional details related to the following:

1.1.1.3 The proposed equipment including the brand, make, model number and specification, particularly the maximum power capability of each electric vehicle charging post and what the applicant intends to set them at recognizing that the active power going to the EV supply equipment can be limited by the operator.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1.

1.0 Network details:

1.1.2 Suncor request that the applicant provide cost details pertaining to the utility service, including but not limited to permitting, equipment upgrades, labour cost required to energize each location.

RESPONSE:

BC Hydro is unable to provide the detailed information requested in the time provided.

For information on the costs of BC Hydro's fast charging service, please refer to section 4.2 of the Application and to records available in BC Hydro's Fiscal 2022 Revenue Requirements Application, such as BC Hydro's response to BCUC IRs 1.1.1 and 1.1.3 in BC Hydro's Fiscal 2022 Revenue Requirements Application.

For information related to the cost of a potential new electrical service, please contact BC Hydro directly through the process described at bchydro.com:

https://app.bchydro.com/accounts-billing/electrical-connections.html?WT.ac=ec20-hp1

1.0 Network details:

1.1.3 Can the applicant provide a response to whether the utility service upgrades and equipment deployed will be the bare minimum (not to exceed 150 kW) necessary to meet the Medium General Service designation. If additional capacity is built in, please provide a rationale for why and details as to the number of additional EV charging posts that can be added based on the maximum capacity of the utility service proposed at each location.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IRs 1.1.1 and 1.2.1 for information on the expected demand of BC Hydro's current and planned fast charging stations. Please also refer to BC Hydro's response to BCSEA VEVA IR 1.5.2 for a discussion of deployment plan.

1.0 Network details:

1.1.4 Suncor asks that the applicant provide details explaining how each charging site is metered. For example, will the applicant use the site host's meter or, will each of the applicant's charging location be separately metered on a site basis, or individually metered at each charge post.

RESPONSE:

Please refer to BC Hydro response to BCUC IR 1.5.11.1.

1.0 Network details:

1.1.5 Does the applicant intend to apply for a rate review to allow for a higher charging tariff to be applied to consumers in the event that a current or future charging location is later designated as a Large General Service?

RESPONSE:

At this time BC Hydro does not expect any of our fast charging stations to have Billing Demand equal to or greater than 150 kW, or Energy consumption in any 12-month period is greater than 550,000 kW, which is the Availability of our Large General Service Rate Schedule.

As described in section 5 of the Application, BC Hydro plans to next review pricing of our public fast charging service rate schedules in 2024.

2.0 Suncor seeks further details related to section 4.2 (Cost Recovery Calculations

1.2.1 Utilization rate: Proponent suggests 3.7% utilization (50kW) – please provide details on assumptions related to number of EV vehicles, time spent at the charger, and kWh delivered in each charge post

RESPONSE:

Please refer to pages 28 through 30 of the Application for available assumptions.

2.0 Suncor seeks further details related to section 4.2 (Cost Recovery Calculations

1.2.2 Maintenance (associated with metering, repair and other station maintenance work) of $8,000 per year per station – please provide documentation proving this cost structure

RESPONSE:

Please refer to BC Hydro response to BCOAPO IR 1.12.1.

2.0 Suncor seeks further details related to section 4.2 (Cost Recovery Calculations

1.2.2 Maintenance (associated with metering, repair and other station maintenance work) of $8,000 per year per station – please provide documentation proving this cost structure

1.2.2.1 Does this cost include customer service, software, payment and fees?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.12.1.

The cost does not include customer service.

2.0 Suncor seeks further details related to section 4.2 (Cost Recovery Calculations

1.2.2 Maintenance (associated with metering, repair and other station maintenance work) of $8,000 per year per station – please provide documentation proving this cost structure

1.2.2.2 Does the cost include spare parts inventory?

RESPONSE:

Yes, the cost includes some spare parts inventory such as charging cables, fuses and filters (i.e., the most used parts).

2.0 Suncor seeks further details related to section 4.2 (Cost Recovery Calculations

1.2.2 Maintenance (associated with metering, repair and other station maintenance work) of $8,000 per year per station – please provide documentation proving this cost structure

1.2.2.3 Is maintenance of the EV charging network completed by BC Hydro employees, or a 3rd party maintenance provider?

RESPONSE:

The maintenance of the EV charging network is provided as a combination of BC Hydro employees and third-party accredited providers.

Please also refer to BC Hydro's response to BCOAPO IR 1.12.5 for further details.

2.0 Suncor seeks further details related to section 4.2 (Cost Recovery Calculations

1.2.3 Please provide details on what share of the on-the-go/fast charging market (non-residential charging) the applicant assumes, when predicting a 3.7% utilization and 6.5% for their 100kW units

RESPONSE:

BC Hydro made no assumption of what share of the on the go/fast charging market (non residential charging) will use BC Hydro's fast charging stations. Further, we do not predict any specific level of utilization.

BC Hydro does not yet have enough information to predict the station utilization after a rate is in place because the interim rate for the fast charging station service has just been implemented, commencing on May 1, 2021. Based on a market study, we believe that the range of 3 to 5 per cent utilization is a reasonable estimate at this time for the 50 kW station.

3.0 Regarding 100kW service outlined in section 4.2 – proposed rate of 27 cents per minute

1.3.1 Please provide details on the locations that will have 100kW chargers? – E.g. number of charge posts per location, combination of 50kW and 100kW, separation of metering (metered at host vs. by location vs. by charge post)

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1.

3.0 Regarding 100kW service outlined in section 4.2 – proposed rate of 27 cents per minute

1.3.2 Can the applicant provide a breakdown of the cost recovery calculation used to establish the 27 cents per minute recovery, which is designed to recover their utility costs at this charging rate?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.14.2.

3.0 Regarding 100kW service outlined in section 4.2 – proposed rate of 27 cents per minute

1.3.3 Please provide details on the expected maintenance, capital, utility, and other costs related to the higher power chargers

RESPONSE:

Please refer to BC Hydro's responses to BCUC IR 1.7.2 and CEC IR 1.7.4.

4.0 Please provide details around the 6.5% utilization expectation in the BC market to recover utility costs at a rate of 27 cents per minute – as outlined in the case developed for 50kW chargers

RESPONSE:

When responding to BCUC IR 1.7.2, BC Hydro noticed an error in page 32 of the Application. This page should have indicated that the utilization of 100 kW station is 5.5 per cent. This is corrected in Errata No. 1 to the Application. This error does not change the rate calculation.

BC Hydro does not yet have enough information to estimate the station utilization after a rate is in place because the interim rate for the fast charging station service has just been implemented, commencing on May 1, 2021. BC Hydro expects that utilization will be higher at the 100 kW stations than at the 50 kW stations because the 100 kW stations are expected to be used primarily at locations near primary travel corridors or where high demand for charging has been demonstrated. However, we will be unable to verify and estimate utilization once the rate is in place until we complete the monitoring and evaluation work described in section 5 of the Application.

5.0 Capital cost calculations

1.5.1 Please provide details on the presented $85,000 per dual station as compared to the gross of $235,000 per duel station prior to NRCan funding

RESPONSE:

The details of the capital cost for a twin 50kW station deployment are as follows.

Capital Costs ($ 000s)	
Site Selection, Properties, Legal, Design, Engineering, PM	**25**
Line Construction **(Includes OH/UG Line work for service to DCFC site)**	**35**
DCFC Site Construction **(Civil/Electrical contractors and/or BC Hydro Construction Services)**	**40**
Charger #1	**50**
Charger #2	**50**
Switchgear Kiosk	**30**
Lighting & Signage	**5**
Total Capital Costs	**235**
NRCan Funding	**100**
EMLI Funding	**50**
Total Government Funding Included	**150**
Net Capital Cost	**85**

5.0 Capital cost calculations

1.5.2 Can you please break down the funding contributions that have been provided, or anticipated to be provided, by third party entities (including, but not limited to municipal, provincial, federal, or private foundations)?

RESPONSE:

Please refer to columns T, U, and V in BC Hydro's response to BCOAPO IR 1.1.1.

6.0 Re: NRCan funding obligations: Section 8: REPAYMENT OF CONTRIBUTION – 8.1

For a period of ten (10) years commencing on the day immediately following the Project Completion, the Proponent shall pay to Canada annually the Profit arising from the Project in the same ratio as that of Canada's Contribution to the Total Project Costs, except that Canada's share shall not exceed its Contribution.

1.6.1 To fully assess the cost recovery expectations as established in the application, please provide your expectations for the 10-year business model – pricing, utilization, and costs

RESPONSE:

As described in section 4 of the Application, BC Hydro does not yet have enough information to estimate the station utilization after a rate is in place because the interim rate for the fast charging station service has just been implemented, commencing on May 1, 2021. As described in section 5 of the Application, BC Hydro plans to conduct monitoring and evaluation and potentially apply to the BCUC in 2024 for repricing. As such we are unable to provide a ten-year expectation for pricing, utilization and costs at this time.

6.0 Re: NRCan funding obligations: Section 8: REPAYMENT OF CONTRIBUTION – 8.1

For a period of ten (10) years commencing on the day immediately following the Project Completion, the Proponent shall pay to Canada annually the Profit arising from the Project in the same ratio as that of Canada's Contribution to the Total Project Costs, except that Canada's share shall not exceed its Contribution.

1.6.2 Please outline at what year, using your proposed rate structure, you will be profitable, and therefore begin to make repayment of the federal loan provided, as outlined in section 8 of your agreement with Natural Resources Canada

RESPONSE:

BC Hydro expects it to be a number of years before revenue from the fast charging station service is sufficient to fully cover its costs of service. Please also refer to BC Hydro's response to SUNCOR IR 1.6.1 and RCIA IR 1.1.3.