Welcome to the BC Hydro Public EV Charging Rates Workshop

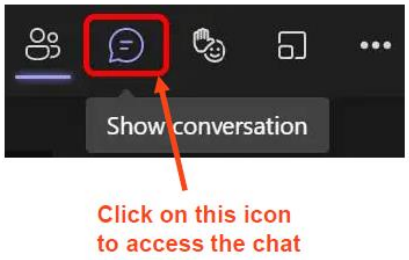
We'll be getting started shortly

How to participate

- Let us know you're here. **Please enter your first name, last name, and organization in the chat.**
- Video and microphone have been turned off to save bandwidth and eliminate background noise
- The chat function is available for questions and comments
- A copy of this presentation will made available following this session

Technical issues?

- Send an email to bchydroregulatoryfeedback@bchydro.com



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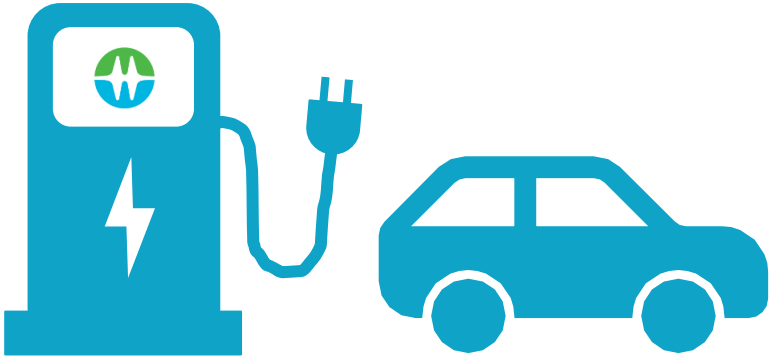
BC Hydro Public Electric Vehicle Charging Rates Workshop

May 26, 2023



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Workshop agenda

Time	Agenda Item	Presenter
1:00 – 1:10	Welcome	Chris Sandve, Chief Regulatory Officer
1:10 – 2:00	BC Hydro EV Charging Service, Jurisdictional Review and Customer Research	Mike Wenzlaff, Senior Program Manager, EV Services
2:00 – 2:30	BC Hydro EV Charging Service Deployment Plan	Mike Wenzlaff, Senior Program Manager, EV Services
2:30 – 2:45	Break	
2:45 – 3:00	Regulatory Background and Context	Chris Sandve, Chief Regulatory Officer
3:00 – 3:45	Proposed Public Electric Vehicle Charging Rates	Shiau-Ching Chou, Senior Manager Tariffs and Rate Design
3:45 – 4:00	Wrap Up and Next Steps	Chris Sandve, Chief Regulatory Officer

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Welcome

Chris Sandve

Chief Regulatory Officer

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Objectives for today's session

- Provide context and updates since we last met
- Provide an overview of BC Hydro's Public Electric Vehicle Charging Service
- Provide a summary of customer engagement to date and insights
- Provide a recent jurisdictional review of pricing for public Electric Vehicle Charging Service
- Provide an update to BC Hydro's public charging station deployment plan
- Review our public electric vehicle charging rates proposal
- Review next steps

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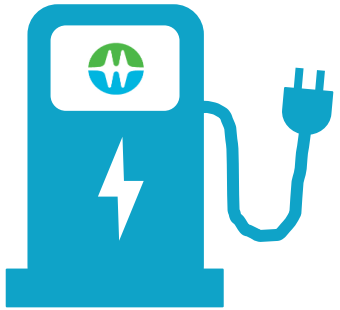
BC Hydro EV Charging Service, Jurisdictional review & Customer Research

Mike Wenzlaff, Senior Program Manager

EV Services



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EV Charging 101

Passenger vehicles

Level 1

- 1.3-2.4 kW AC
- Standard 120v receptacle
- 25-80hrs+ to fully charge car
- Residential charging only

Level 2

- 3-19 kW AC
- 240v J1772/Tesla connector
- 3-30hrs+ to fully charge car
- Residential, public, workplace and fleet depot charging

DC Fast Charging

- 22-350+kW DC
- CCS/CHAdeMO/Tesla connector
- 15mins-3hrs to fully charge a car
- Public and fleet depot charging

Public Level 2 and public DC charging will be discussed today

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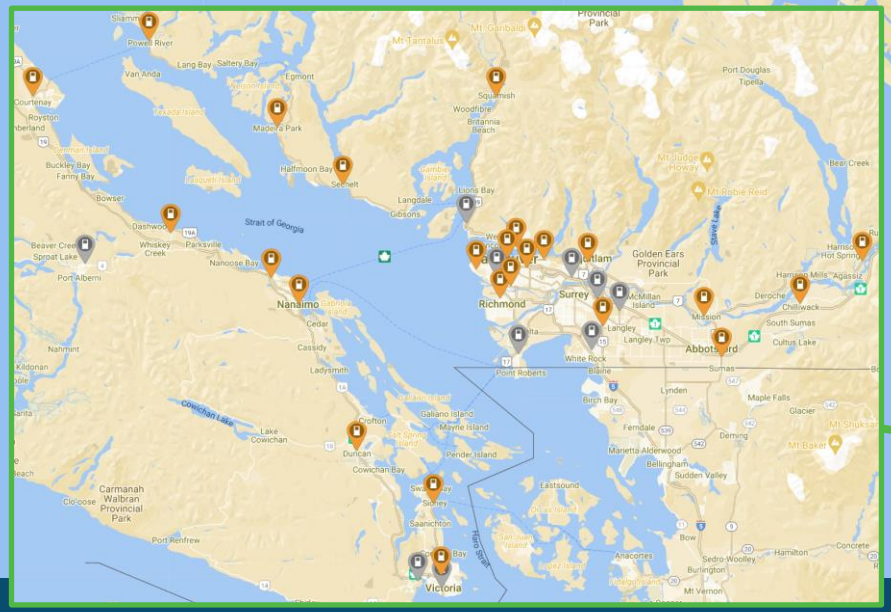
BC Hydro current EV Network map

141 DC ports across 83 sites at end of F2023



BC Hydro EV network history

Deployed B.C.’s first DC fast charger in 2013

- **Demonstration project, started in 2013 –** Seed a network of fast charging stations from Vancouver Island to the Interior
- **Regional travel focus –** Connect corridors and communities
- **Funding –** Majority of funding provided by Federal Natural Resources Canada and Province of B.C. EV infrastructure grant programs
- **Current rates started May 2021 –** Service was free before then
- **325 at 145 by 2025** – BC Hydro’s Electrification Plan established the current plan for 325 fast chargers (around 450 DC ports) at 145 sites by the end of 2025
- **We’ve been building EV driver confidence –** Equipment reliability and customer experience have greatly improved over last 7 years

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Recent progress

F2022 to F2023 focus areas – strengthen & expand network

- **Availability & standardization –** Upgrade original sites with second DCFC, accessibility, lighting upgrades
- **Geographic coverage** – Continue expanding BC's Electric Highway north
- **Reliability** – Provide an essential service EV charging network for British Columbians
- **Truck-ready** – Deployed amongst the first pull-through charging sites in North America
- **Increase power levels** – More 100kW DCFC's deployed
- **New division** – BC Hydro has created a new division to focus on EV services

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Recent progress

F2022 to F2023 Focus Areas – Strengthen & expand network

Recently upgraded/expanded sites	Recent new sites
• West Vancouver – Horseshoe Bay	• Burnaby – Kensington
• Surrey – Tynehead	• Cherryville
• New Denver	• Fauquier
• Port McNeill	• Sayward
• Mission – Superstore	• Nakusp
• Madeira Park	• Duncan
• Powell Rover	• McLeod Lake
• Williams Lake	
• 70 Mile House	
• Cache Creek	
• Clinton	
• Blue River	
• Ucluelet	
• Hixon	
• Whistler – Conference Centre	

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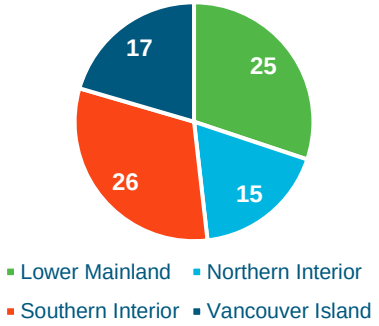
BC Hydro EV Network Statistics

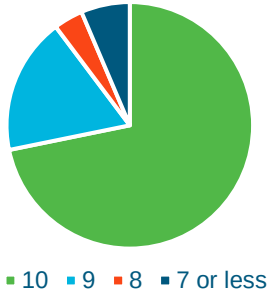
F2023 Key Stats (as of Mar 31, 2023)

Category / group	Sub-group	Stat
Public DC charging sites (ports)	Urban (population 30k+)	31 sites (56)
	Non-urban & corridor (<30k pop.)	52 sites (85)
Registered EV customers		50,000+
Utilization	Average (urban, non-urban)	10% (20%, 3%)
Customer satisfaction	EV Support (driver assistance)	80%
	BC Hydro EV network overall	76%
DC port power levels	25kW / 50kW / 100kW	4% / 82% / 11%
Essential service – repair metric	High priority cases resolved within 24 hours (situations where customer unable to charge)	93%
BC Hydro public EV charging market share	DC ports / L2 ports	~14% / <1%

Sites by region

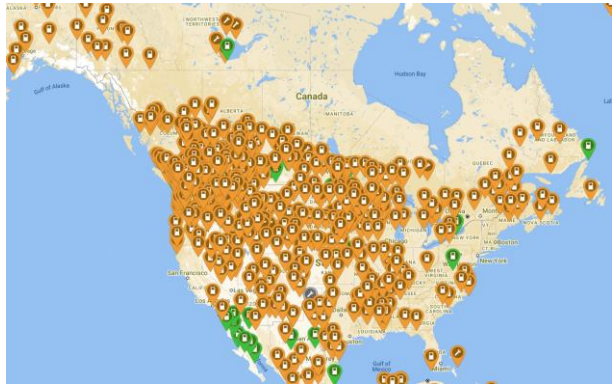


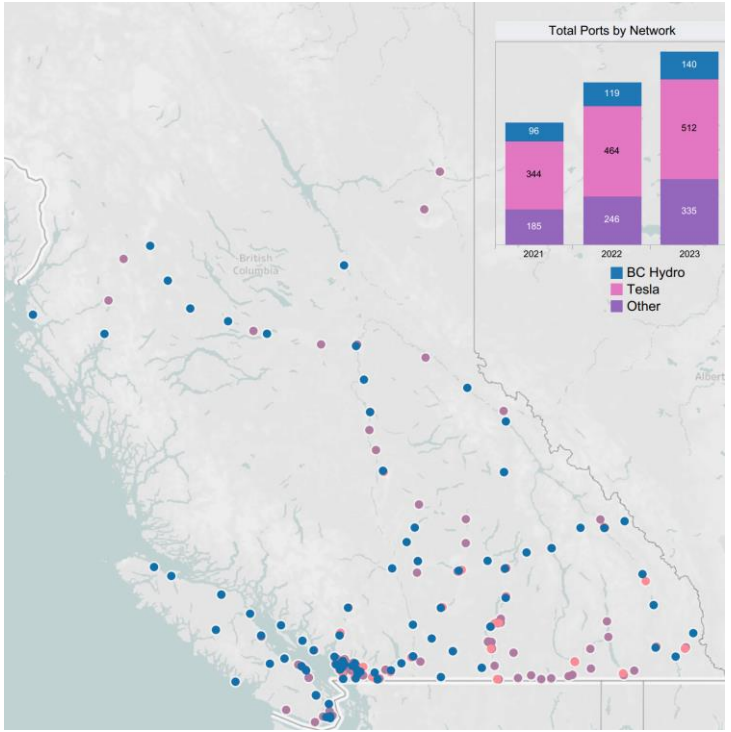
PlugShare (user) scores by site



Jurisdictional review

Summary of study by Kolesar Buchanan & Associates Limited, March 2023





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Jurisdictional review

Source: Kolesar Buchanan & Assoc. study Jan-March 2023

Summary

- **Rates vary considerably –** Retail rates for DCFC EV charging services vary significantly by service provider and location.
  - The retail DCFC rates in Canada ranged from 0 cents per minute for low wattage chargers to $1.65 per minute for a TESLA Supercharger.
  - Retail DCFC rates in Canada are all per-minute rates, subject to regulations imposed by Measurement Canada, although some rate schedules show hourly rates.
  - Rates also vary by the energy output of the charging station, increasing as the wattage of the charger increases.
  - Prices also vary by geographic region, and by location within a geographic region.
- **Rapidly changing market –** Because the retail EV charging market is a nascent market, pricing structures vary depending on the strategy of the service provider.

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Jurisdiction: B.C. – 1/2

Source: Kolesar Buchanan & Assoc. study Jan-March 2023

Station Owner	Service Network	DC Fast Charging Service(s) Offered & Location Types	Directly associated value-add station features & amenities	Tiered / Dynamic Pricing	Displayed rate includes sale tax?	Rate & Power Level (excluding sales tax)	Rate & Power Level (including 5% GST)	Number of Sites & Fast Chargers in B.C.
B.C. Ministry of Transportation	Non-networked or FLO	• 2x 25kw or 2x 50kW DCFC's per site • Highway rest stops • Level 2's at some locations	Restrooms at some locations	No	N/A	Free – all power levels	Free – all power levels	• 26+ sites • 34+ DC chargers
Chilliwack VW	ChargePoint	• Single 24 kW charger	Yes, restrooms, shopping	No	No	First 3 hours free on DCFC, $5/hr thereafter		• 1 site / 1 DC charger
City of North Vancouver	FLO	• Single 50 kW charger	N/A	No	Yes (5% GST)	19.05¢/min - 50 kW	20¢/min - 50 kW	• 1 site / 1 DC charger
City of Vancouver	ChargePoint	• Single or 2x 50 kW chargers • Curb-side	N/A	No	No	21¢/min – 50-62 kW	21¢/min – 50-62 kW	• 5 sites • 9 DC chargers
Electrify Canada	Electrify Canada	• 4x chargers up to 350 kW • Major retail parking lots	Ample lighting, weather shelters being install at all sites	Yes	No	27¢/min <90kW* 57¢/min >90kW* Up to 350 kW CCS, up to 100kW CHAdeMO *20% member discount available for $4/month	28.4¢/min <90kW* 59.9¢/min >90kW* Up to 350 kW CCS, up to 100kW CHAdeMO *20% member discount available for $4/month	• 10 sites • 24+ DC chargers
FortisBC	FLO	• Single or 2x 50 kW chargers • Highway stops & retail lots	N/A	No	No	Proposed: 26¢/min - 50 kW 54¢/min - 100 kW	Proposed: 27.3¢/min - 50 kW 56.7¢/min - 100 kW	• 22+ sites • 40+ DC chargers

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Jurisdiction: B.C. – 2/2

Source: Kolesar Buchanan & Assoc. study Jan-March 2023

Station Owner	Service Network	DC Fast Charging Service(s) Offered & Location Types	Directly associated value-add station features & amenities	Tiered / Dynamic Pricing	Displayed rate includes sale tax?	Rate & Power Level (excluding sales tax)	Rate & Power Level (including 5% GST)	Number of Sites & Fast Chargers in B.C.
MetroVancouver, Burnaby	Shell Recharge (Greenlots)	• Single – 50 kW • Major retail parking lot	N/A	Yes	Unknown	30¢/min – 50kW (> 30 min) 50¢/min – 50kW (30+ min) * Minimum rate $18 Unknown if sales tax is included in price or not		• 1 site • 1 DC charger
Nanaimo Airport	ChargePoint	• 4x 50kW chargers between two separate airport lots • Airport	N/A	No	Unknown	22¢/min – 50 kW Unknown if sales tax is included in price or not		• 1 site / 4 DC chargers
Parkland Corporation / Chevron	On-The-Run / Journie	• Single – up to 150 kW • 2x – up to 150 kW • Gas Station/Convenience Store	Ample lighting, on-site retail, restrooms, on-site staff	No	N/A	Free introductory price		• 9 sites • 15 DC chargers
Shell	Shell Recharge (Greenlots)	• Single, 2x – up to 180kW • 2x, 3x – 50 kW • Gas stations	Ample lighting, on-site retail, restrooms, on-site staff	No	Unknown	44¢ - 50¢/min – up to 180 kW Unknown if sales tax is included in price or not		• 4 sites • 8 DC chargers
Suncor	Petro-Canada	• Single, 2x – 50kW, up to 350 kW • Gas Stations	Ample lighting, on-site retail, restrooms & on-site staff	No	Unknown	50¢/min (50kW, up to 200kW or 350 kW CCS, up to 100kW CHAdeMO) Unknown if sales tax is included in price or not		• 12 sites • 22 DC chargers
Tesla	Tesla	• Proprietary stations (Tesla vehicles only) • Major retail parking lots	Ample lighting, many sites have more than a dozen charging stations	Yes	Unknown	27¢/min < 60 kW* 58¢/min – 60-100 kW* $1.03/min – 100-180 kW* $1.65/min – 180-250 kW* * rates may vary by site * Unknown if sales tax is included in price or not		• 40+ sites • 440+ DC chargers

Jurisdiction: Canada

Source: Kolesar Buchanan & Assoc. study Jan-March 2023

Network Name (Parent Company/ Utility)	Model	Charging Service(s) Offered	Tiered/ Dynamic Pricing	Rate* & Power Level	Number of Sites & Fast Chargers in Canada
Petro-Canada (Suncor)	Owner-Operator	CCS 350 kW chargers CHAdeMO 100 kW chargers	No	$0.50 per minute	105+ DCFC Ports 54+ DCFC Sites Operates in: QC, BC, ON, MB, AB, NS, NB
eCharge Network (NB Power)	Owner-Operator	CHAdeMO chargers SAE Combo Chargers	No	Level 2 Chargers - $1.50 per hour DCFC chargers - $15.00 per hour	26 DCFC Ports 26 DCFC Sites Operates in: NB
EcoCharge (Earth Day Canada)	Owner-Operator	125 kW DCFC Chargers	No	$22 per hour Quebec + $11 per hour idle fee $23 per hour New Brunswick + $11.50 per hour idle fee	70 + DCFC Sites 100 + DCFC Ports Operates in: QC, NB
takeCHARGE (NL Hydro + Newfoundland Power)	Owner-Operator	DCFC- CCS 62.5 kW chargers CHAdeMO chargers Level 2- J1772 7.2 kW Chargers	No	Level 2 Chargers- $1.50 per hour DCFC - $3.75 per 15 minutes	38 DCFC Ports 38 DCFC Sites Operates in: NL
Electrify Canada	Owner-Operator	CHAdeMO 50+ kW Chargers CCS 150-350+ kW chargers	Yes	0-90kW charging - $0.27 per minute 1-350 kW charging - $0.57 per minute *$4 monthly pass that gives a 25% discount on charging	32 DCFC Sites 100+ DCFC Ports Operates in: AL, BC, QC, ON
FLO	Network-Operator	Multiple varieties of DCFC and Level 2 Charging Stations	N/A	Prices are decided by station/site owners	200+ DCFC Sites Operates in: All Provinces
The Electric Circuit (Hydro-Quebec)	Owner-Operator	24, 50, and 100 kW DCFC charging ports	Yes	24kW - $7.31 per hour 50kW –$12.39/hr (<90%) / $24.78/hr (>90%) 100kW - $15.27-$35.79 per hour (tiered) >100kW - $35.79 per hour	700+ DCFC Chargers Operates in: BC, AL, ON, QC, MN, SK, MB, NB
ChargePoint	Network-Operator	Multiple varieties of DCFC and Level 2 Charging Stations	N/A	Prices are decided by station/site owners	100+ DCFC Sites 200+ DCFC Ports Operates in: All Provinces
IVY Charging Network (Hydro One/ Ontario Power Generation)	Owner-Operator	N/A	No	DCFC - $0.30 per minute Level 2 Chargers - $1.50 per hour	25+ DCFC Sites 100+ DCFC Ports Operates in: ON
SWTCH Energy	Owner-Operator	Multiple varieties of DCFC and Level 2 Charging Stations	No	Price varies by Station	10+ DCFC Sites Operates in: BC, ON

*Rates are listed as per minute or per hour, based on how the network publicly communicates their pricing

Customer research

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General population – Electrification Survey April 2023

Note: Survey was conducted by a research firm that did not identify BC Hydro as the entity requesting feedback

Focus on this portion of the survey – perceptions by the general B.C. public on:

- how improved EV infrastructure would impact their EV purchase decision
- which entities should invest in public charging in B.C.
- what they should prioritize

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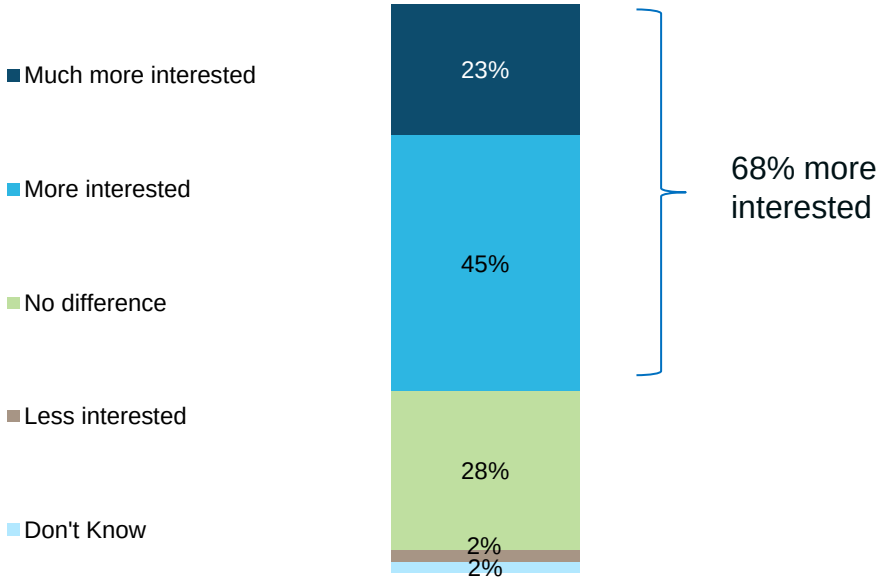
General population

EV Infrastructure to EV purchase decision

68% of those considering an EV say they would be more interested in owning an electric vehicle if there were more charging stations

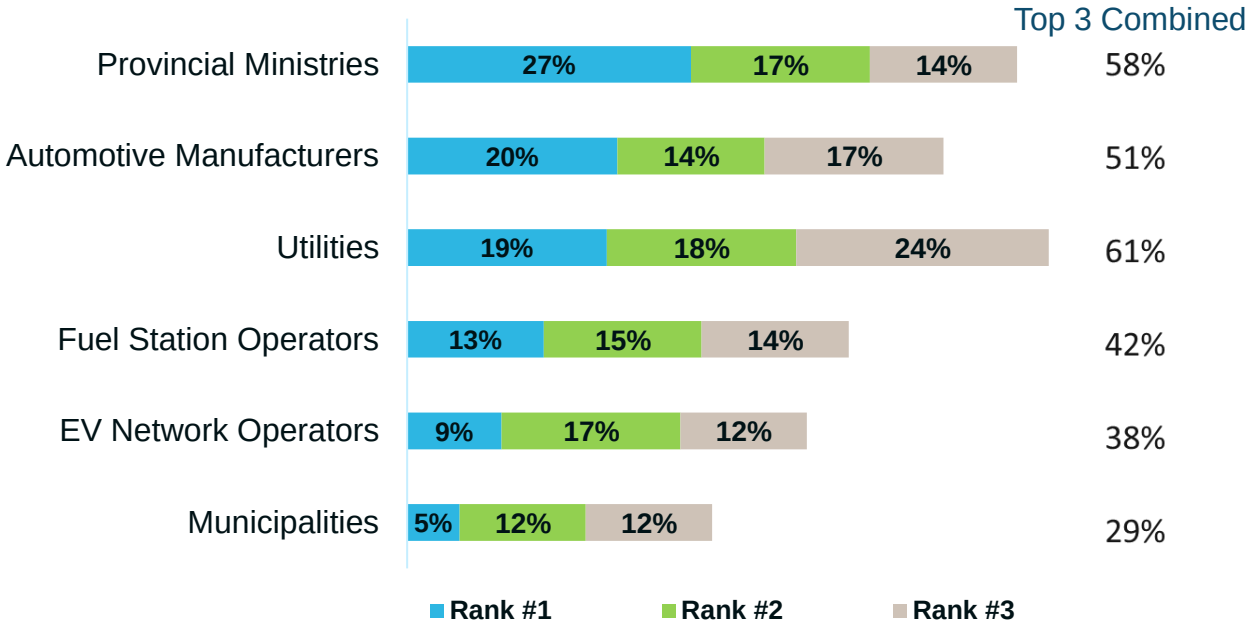


Q30. Would you be more interested in owning an EV if there were more public EV charging stations in BC, or would it make no difference? (n=244)

General population

Who should invest in public EV charging

British Columbians ranked the following organizations according to whether they should be the largest, second largest or third largest investor of public charging stations. While Provincial Ministries receive the most #1 rankings, Utilities receive the most overall ‘top 3 rankings’ combined. Utilities includes BC Hydro and Fortis BC.



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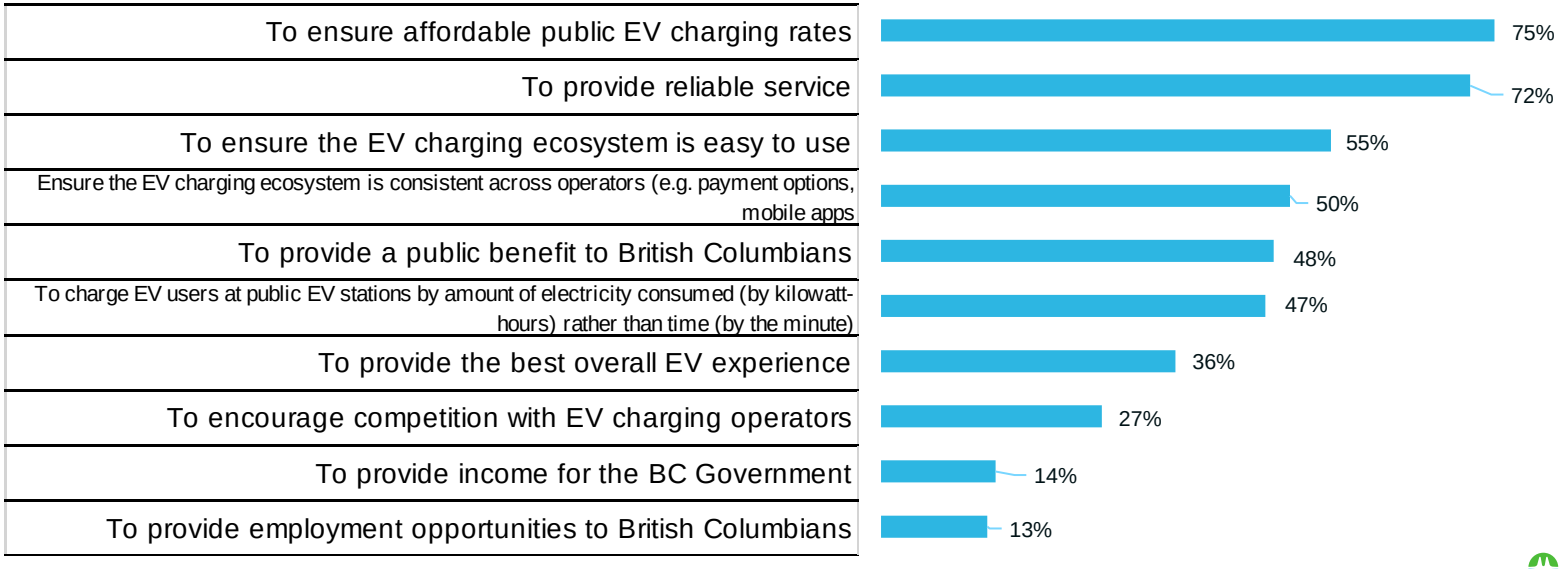
Q31. Of the following investor groups, please indicate which one you think should be the single largest, second largest, and third largest investor group of public EV charging stations in BC? (n=244)

General population

Top considerations for network operators

Affordability and reliability emerge as the top two considerations for operating charging stations, according to British Columbians, followed by ease of use



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Q32. What do you think are the top five things that public EV charging operators should consider when operating charging stations in BC? (n=244)

Customer research and Insights

BC Hydro EV Network Member Survey

Nov/Dec 2022

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EV customer engagement

Insights sought

As part of our annual EV driver survey, we reached out to our EV charging service customers to gather the following insights:

- How and where EV drivers charge their vehicles
- How and why EV drivers use BC Hydro charging stations
- The quality of the experience that EV drivers have at BC Hydro charging stations versus other public charging stations
- What charging station features EV drivers want BC Hydro to prioritize for future charging sites and stations
- Measure the impact BC Hydro charging station rates implemented in May 2021
- Assess what EV drivers are willing to pay at BC Hydro charging stations for charging at different power levels

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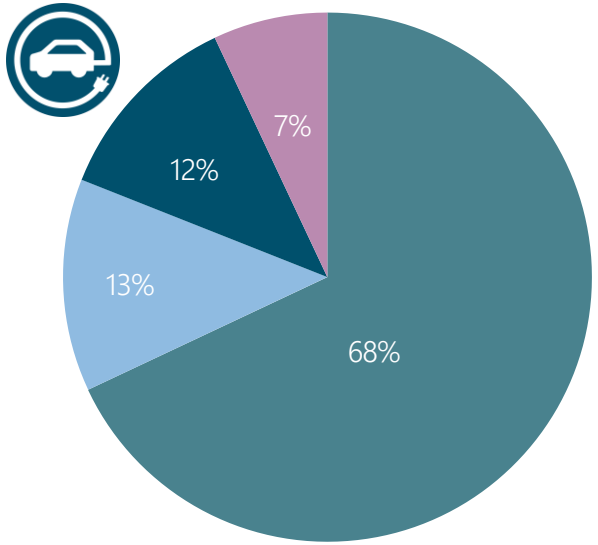
EV customer engagement

Primary charging location

This includes customers who do not have access to charging at home

- Home
- Other Public Charging Stations
- BC Hydro Charging Stations
- Work

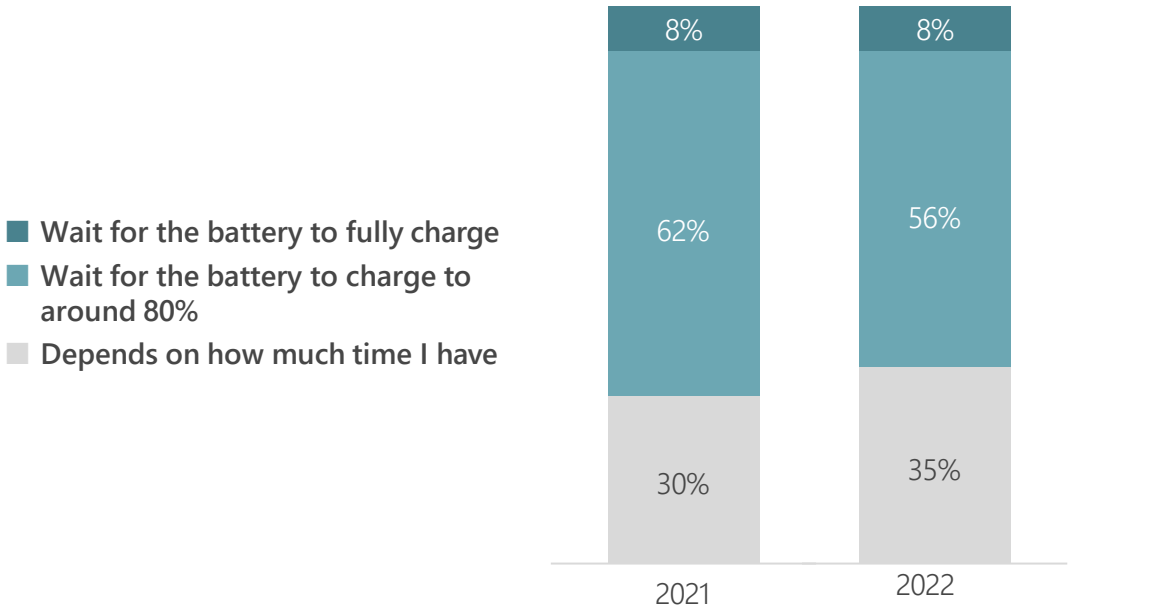
Percentage of charging by location



EV customer engagement

Charging at public stations

How EV drivers charge at public stations



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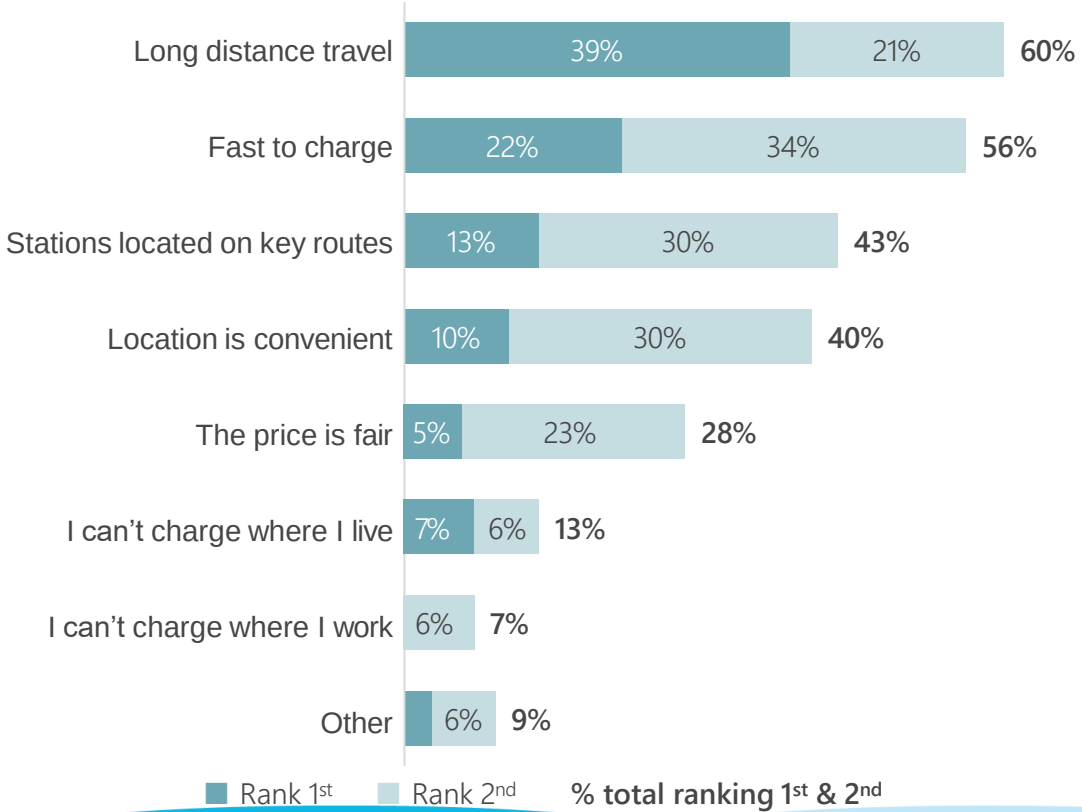
EV customer engagement

Reasons for charging at BC Hydro public stations



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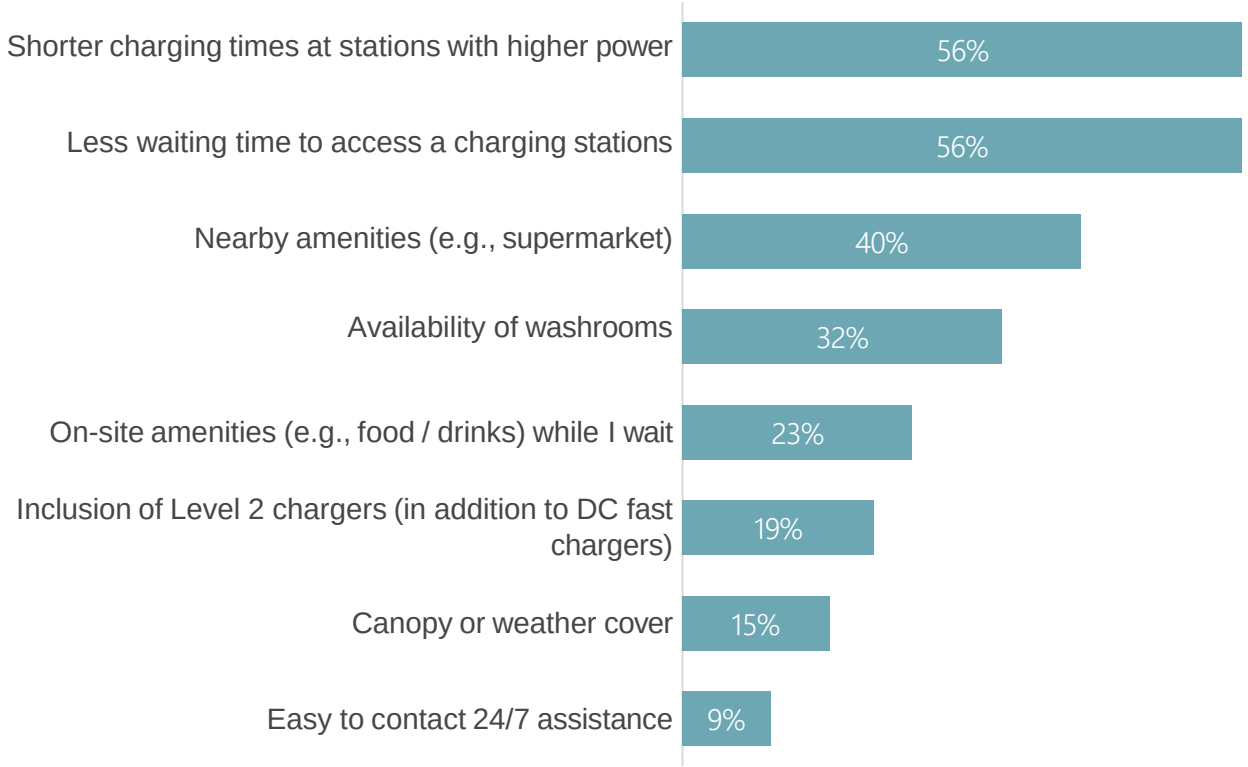
EV customer engagement

Suggested priorities for the BC Hydro EV network



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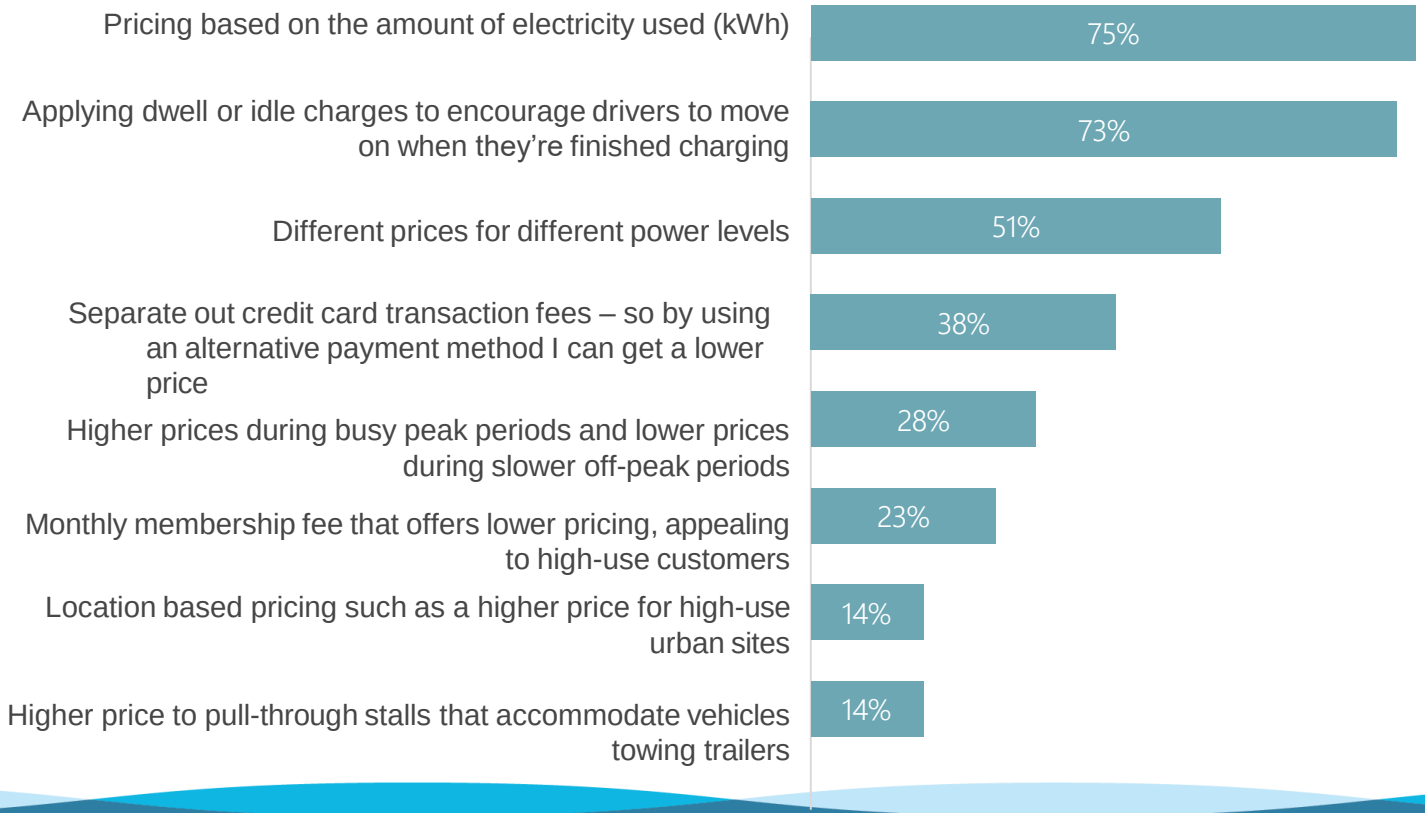
EV customer engagement

Preferred pricing methods



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Other survey insights

EV customer needs continue to evolve

- **Faster charging –** Increase in customers wanting a faster charge, even if the price is higher
- **Wide range of power levels preferred –** Customer preferences on public charging power levels range from Level 2 to 200kW or higher based on their individual needs, with about 1/3 preferring 50-100kW given the capability of their vehicle
- **Less patience to wait** – Most in urban areas willing to wait no more than 10 minutes for an available charging port, whereas more are willing to wait for a non-urban/corridor charging port
- **Daytime is most popular for public charging** – Over 2/3 charge from 7am to 4pm and over 1/3 charge from 4pm to 11pm
- **Willingness to pay has increased –** Over 1/3 of those charging at 50 to 100kW say they'd be willing to pay $13 to $15 for a 30-minute charge
  – this jumps to nearly 2/3 for charging at 200kW

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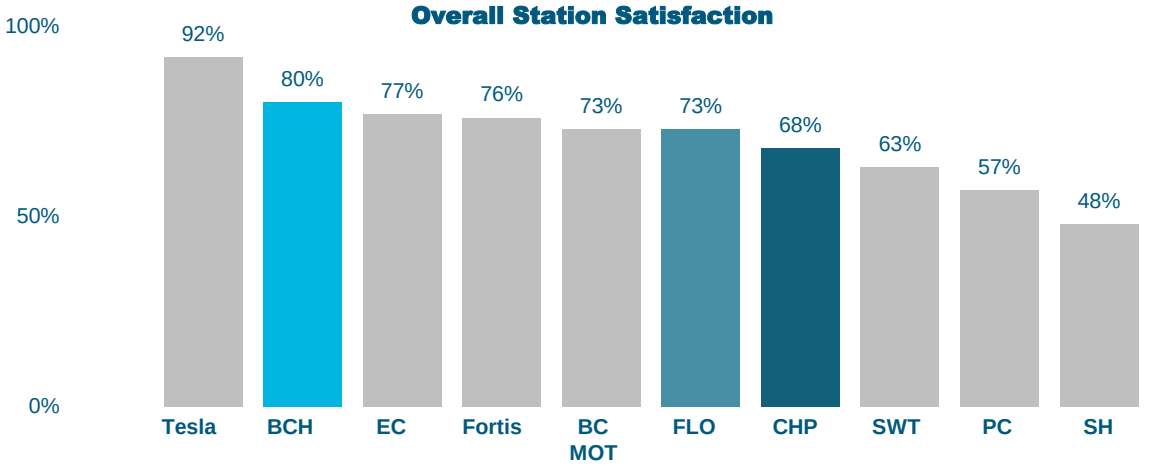
EV customer engagement

Satisfaction benchmarking



Sample size	132	798	212	67	92	590	590	65	279	54

Q: Overall, how satisfied are you with each of the following charging stations?
Tesla=Tesla SuperCharge, Fortis=FortisBC, BCH= BC Hydro, EC = Electrify Canada, BC MOT = BC Ministry of Transportation, Flo=Flo, CHP = ChargePoint, SWT = Swtch, PC= Petro-Canada, SH= Shell Recharge

Note: FLO and ChargePoint have roaming with BC Hydro EV, thus FLO and ChargePoint users can activate BC Hydro charging stations

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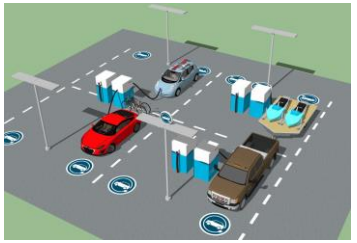
BC Hydro EV Services
Deployment plan

Mike Wenzlaff, Senior Program Manager

EV Services



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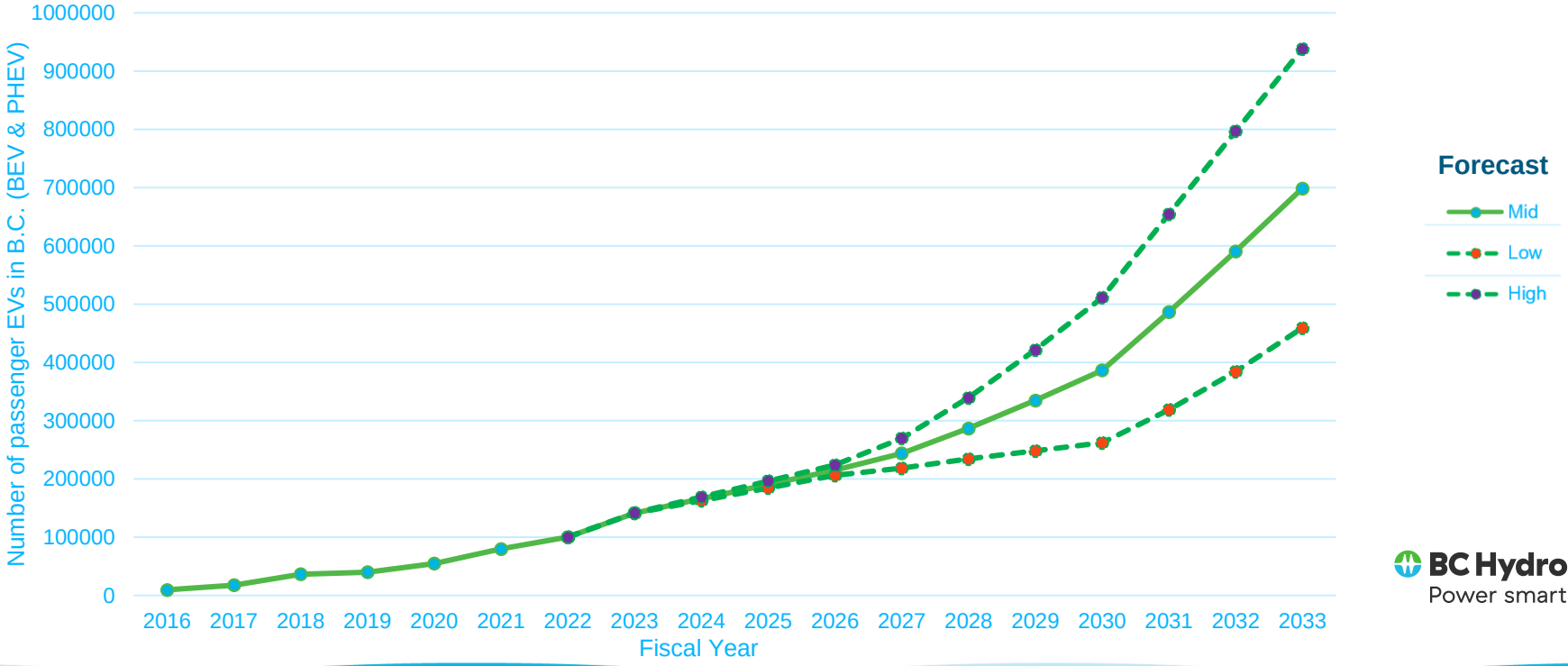
Historical and forecast EV stock in B.C.

B.C. at the forefront of rapid transportation electrification



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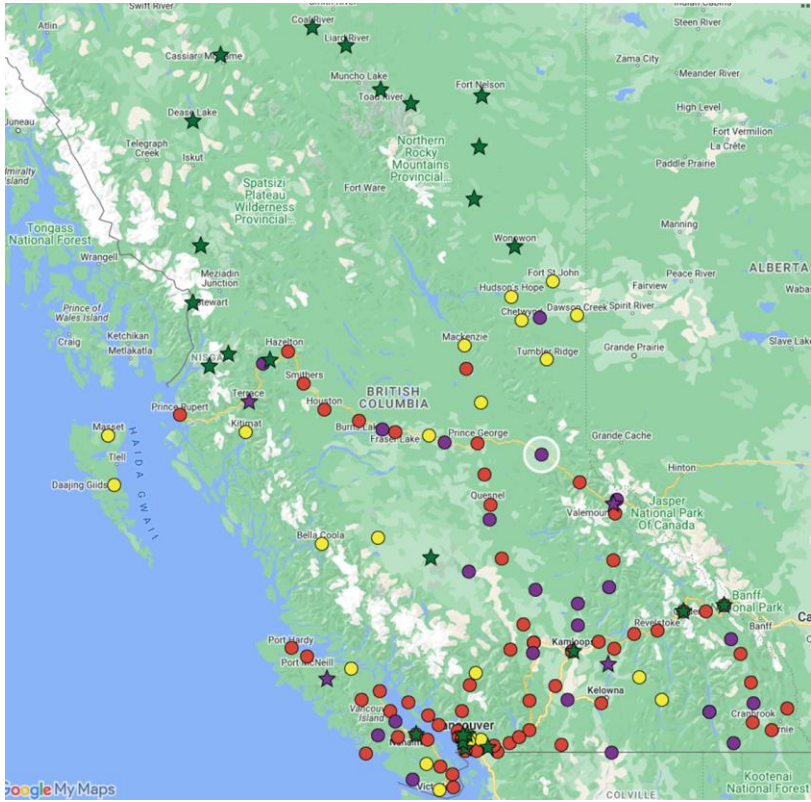
2023 - 2025 expansion

As currently planned

- **Grow to 325 DC chargers across 145 sites** (about 450 DC ports)
  - **Geographic coverage** – Haida Gwaii, Northern B.C. & reach Yukon border
  - **Urban densification** – fill in gaps to meet the needs of EV drivers
- **300 L2 ports in 2023-2024 –** Community Charging Pilot with NRCan/other partners – utility-grade equipment, MC grade metrology, hydro-pole mount trial
- **Technology platform improvements** – Support $/kWh rates, user experience improvements, operational improvements, additional payment options
- **Site improvements** – accessibility, lighting, pull-through charging, hub sites
- **Increasing power levels** – F2024 will be predominately 100kW and 180kW units
- **Increasing number of DC ports per site** – from 2-4 ports to up to 12 ports per site depending on location

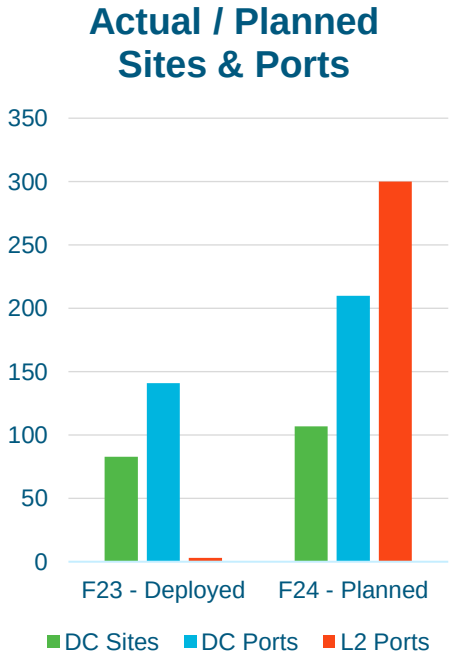
Geographic Coverage Plan

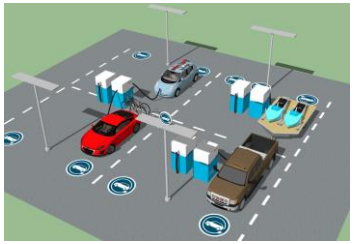


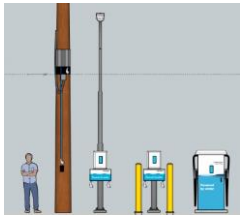
2023 - 2024 expansion highlights

Upcoming construction this year

- **North –** focus on new sites for geographic coverage
- **Lower Mainland –** focus on upgrading/expanding many existing sites and creation of new larger hub sites, plus pilot Level 2 charging deployment
- **Vancouver Island** – mix of upgrading existing sites and new sites
- **South Interior** – mix of upgrading existing sites and new sites







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10-year deployment plan considerations

Principles for input – please respond in post-workshop feedback form

1. **Ratio of DC vs. L2 charging –** Our reference plan indicates a build out ratio of 1.6 DC ports for every 1 L2
2. **UBCM Resolution #EB74 –** Local governments have requested BC Hydro deliver much more public charging Supporting and aligning with regional charging needs assessments
3. **Partnership approaches** – We need to work collectively to meet the CleanBC goals
4. **BC Hydro's role vs. other EV charging operators** – BC Hydro currently operates 14% of public DC ports in B.C.
5. **Power levels** – In 2023-2024, BC Hydro will predominantly deploy 100kW and 180kW DC units
6. **Hubs sites vs. greater number smaller sites** – Larger hub sites tend to have a lower cost per port and higher utilization
7. **Further engagement & consultation** – DC charging, community charging and medium/heavy duty charging

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For feedback form input

10-year deployment plan

Based on customer feedback – for rate design purposes and stakeholder input

Assumptions:

1. **Build ahead through 2030, then dial back**
2. **75% urban / 25% non-urban** (+corridor)
3. **Passenger vehicle focus** (medium/heavy duty considered in a future update)
4. **Private sector / other EV charging entities will ramp up**
5. **BC Hydro's current F2025-F2026 deployment plan must change**
6. **Regular adjustment to BC Hydro's plan**

Public EV charging ports	
B.C. Current	~4,300*
CleanBC 2030 Target	10,000

*Source: NRCan Alternative Fuel Locator

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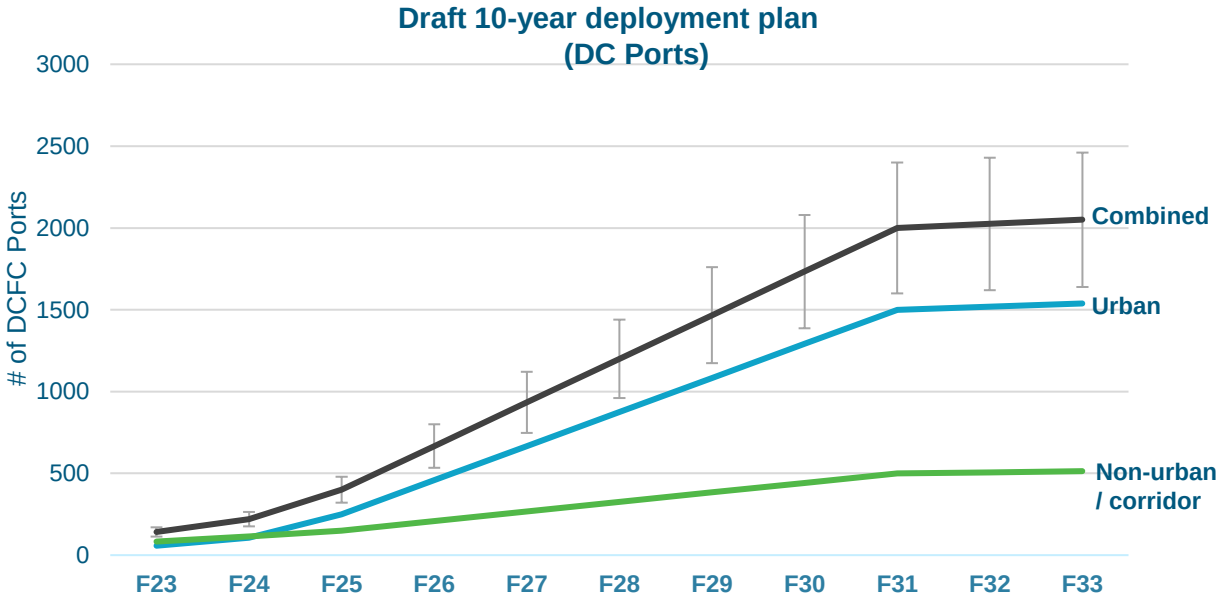
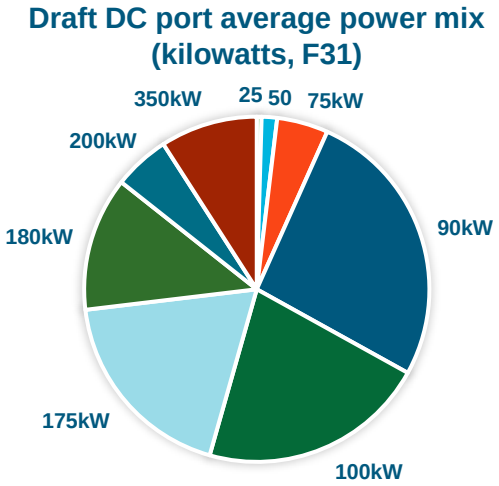
10-year deployment plan

Based on customer feedback – for rate design purposes and stakeholder input

Draft 10-year plan: increase BC Hydro EV deployment to 2050 DC ports & 1255 L2 ports





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Public EV charging is only one aspect of BC Hydro's many activities to support EV adoption

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Supporting EV adoption

Strong results as B.C. amongst highest EV adoption in North America

- Continued investment in EV awareness
- Rebate & incentive programs
- Key Account Managers
- Collaboration
- Publish guidelines & best practices
- Roaming
- Powertech Labs for EV industry

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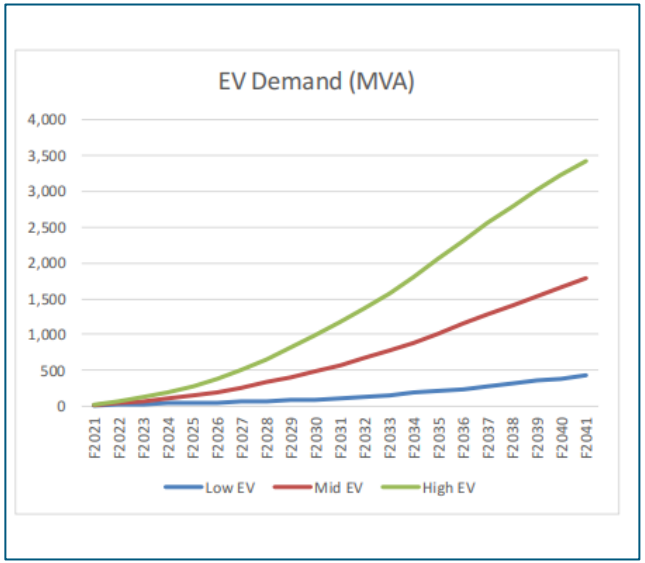
Grid readiness

Electric vehicles have been in BC Hydro's load forecast since 2011

- BC Hydro's 2021 Integrated Resource Plan (IRP) considers the influx of EV's onto the BC Hydro system
- Over-night charging is a key attribute of the IRP
- More information: www.bchydro.com/irp



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BREAK

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Regulatory background & context

Chris Sandve

Chief Regulatory Officer

BC Hydro
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BC Hydro's rate design objectives

Affordability

Measured by bill impacts associated with a rate design

Economic efficiency

Measured by how closely the energy charge reflects our marginal cost

Decarbonization

Measured by how much the rate design encourages switching from fossil fuels to clean electricity

Flexibility

Measured by the ability to respond to changes in the economic and policy environments and anticipate the need for greater product and service differentiation in rate design

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BC Hydro's current Public EV Fast Charging Rate

Rate schedule	Charging level	Rate
RS 1360	25 kW	12.19 ¢ per minute
RS 1560	50 kW	21.33 ¢ per minute
RS 1561	100 kW	27.43 ¢ per minute

F2024 Rates

1. BC Hydro proposed rates for our Public EV Fast Charging Service in the 2021 Public Electric Vehicle Fast Charging Rate Application.
2. The proposed rates were approved by the Commission on an interim basis and were implemented on May 1, 2021.

2021 application commission decision

The Commission rejected BC Hydro's proposed rates because:

1. Rates do not recover the full costs of providing EV public charging service and would contribute to an uneven playing field for exempt providers
2. Would consider approving a rate based on levelized cost recovery (including previous years' under recoveries)
3. Would consider subsidized rates in locations with no other provider
4. Determined energy-based rates are fairer
5. Directed BC Hydro to establish a separate rate class
6. Would consider a wholesale rate for exempt providers or BC Hydro should apply the same costs to itself that exempt provides pay when setting retail rates

Commission decision on BC Hydro's 2021 application

Directed BC Hydro to file a permanent rate application that includes:

- Station utilization by power level and factors that impact it
- Financial models with actual and forecast revenue and costs and updated assumptions
- An overview and comparison of Canada and US market
- A proposal for a depreciation rate for DCFC charging stations

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December 2022 extension application

BC Hydro submitted an extension request to file the permanent Public EV Charging Rate Application by June 30, 2023 because:

- Key policy matter regarding whether or not Low Carbon Fuel Credit (LCFC) revenue can be counted for rate-setting purposes was not clear at the time.
- Measurement Canada had not issued a temporary dispensation on kWh-based billing using public EV chargers
- Actual cost recovery of BC Hydro's Public EV Charging Service was better than anticipated:

Whether LCFC is included	Revenue to cost ratio	Number of sites
Exclude LCFC	**33%**	
Include LCFC	**65%**	
Urban	99%	47
Other	30%	56
New	38%	15

October 1, 2021 to September 30, 2022

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Commission decision on BC Hydro's Fiscal 2023 to Fiscal 2025 Revenue Requirements Application

Directed BC Hydro to:

- Transfer the F2022 EV fast charging service revenue from the Load Variance Regulatory Account to the EV Costs Regulatory Account;
- Remove the Test Period forecast revenue, including the Low Carbon Fuel Credits revenue, and costs related to its EV fast charging service, including finance costs associated with the EV fast charging capital assets, from the revenue requirement;
- Commencing in F2023, and until directed otherwise by the BCUC, defer the actual revenue, including the Low Carbon Fuel Credits revenue, and costs related to its EV fast charging service, including finance costs associated with the EV fast charging capital assets, to the EV Costs Regulatory Account; and
- Change the name of the EV Costs Regulatory Account to the EV Fast Charging Regulatory Account

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kWh measurement & billing update

Many steps required to enable $/kWh public charging rates

Key prerequisites:

- **Measurement Canada dispensation** – process commenced
- **Accuracy testing of current charging stations** – underway
- **EV Network / IT system that supports kWh billing** – procurement underway
- **Approved rates** – approved $/kWh public charging rates, along with $/min rates for non-compatible equipment
- **Customer communications** – ensure customers understand bill impact from $/min to $/kWh rates – will be varied based on vehicle and environmental conditions

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BC Hydro's pricing proposal for Public EV Charging Service

Shiau-Ching Chou

Senior Regulatory Manager, Tariffs & Rate Design

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There are many uncertainties

- EV stock forecast
- EV public charging market development and pricing
- EV charger technology and costs
- EV charging technology
- The continuation of government funding
- The amount and value of Low Carbon Fuel Credit
- Cost allocation
- Third party vendor fees

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Public EV Charging Rate Design objectives

- Recovers cost of service from Public EV Charging Service customers
- Ensures a level playing field for exempted service providers
- Provides flexibility to adapt to technology development
- Achieves customer understanding and acceptance
- Updates the Electric Tariff to include considerations for Public EV Charging Service
- Seeks efficiency in future rate updates

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For feedback form input

Key assumptions in Rate Design Model

- Continued electric vehicle adoption
- Ongoing government funding availability
- Station utilization to increase grow in proportion to EV adoption in urban centres
- Continued low utilization in non-urban areas
- Relatively stable market for low carbon fuel credits
- Regression model to convert per minute charging to per kWh based on actual charging data analyzed

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2023 Public EV Charging Rate Modelling assumptions

Assumption	Rate Model scenario
EV stock forecast (# of EV's by 2033)	**~800,000**
Deployment plan	**3,305** DCFC: 2,050 Level 2: 1,255
Urban stations	**77%**
Utilization Rate - Urban	**10% - 30%**
Utilization Rate - Other	**2% - 30%**
Government funding	**Ends in F2030**

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Illustrative 2023 Public EV Charging Service Rates

Power level	Current rate (¢ / min)	Reference cost (¢ / min)	Proposed rate* (¢ / min)	(¢ / kWh)
Level 2	–	~ 4	~ 2 – 3	~30 – 40
Up – 25 kW	12.19 (25 kW)	~ 19	~13 – 15	~40 – 45
25 – 50 kW	21.33 (50 kW)	~ 25	~ 25 – 27	~40 – 45
50 – 100 kW	27.43 (100 kW)	~ 23	~ 30 – 33	~40 – 45
100 – 200 kW	–	~ 62	~ 65 – 70	~80 – 85
> 200 kW	–	~ 149	~ 135 – 150	~150 – 170

* Prices shown are not final proposed rates.

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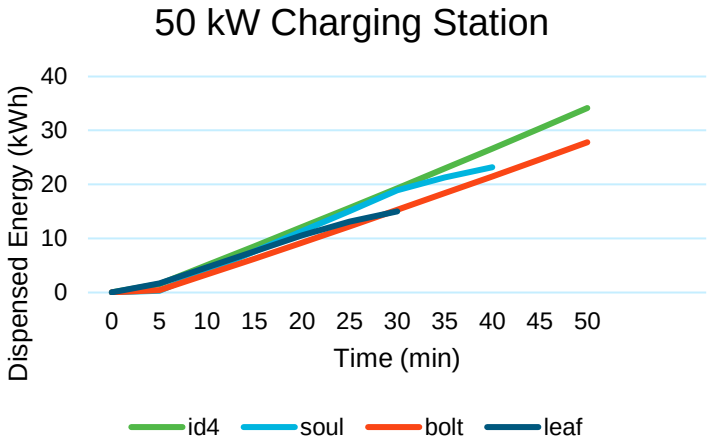
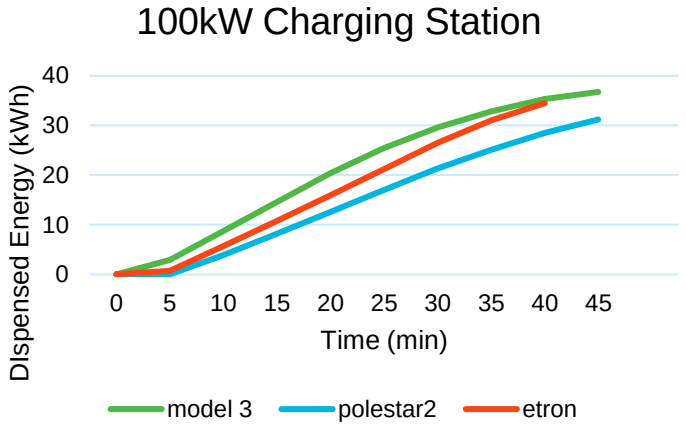
Illustrative charging profiles by vehicle

Switching to kWh based rates will have different impacts to different vehicles





- Factors including charger port power level, temperature, battery state of charge at start of charging session, session duration and battery capacity have an impact on energy delivered per session.

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BC Hydro's proposal recovers cost of service

- Proposed pricing is set to achieve full cost recovery over the longer-term (10-year levelized) **on a portfolio basis**
- Includes both time and energy-based rates

  BC Hydro will convert individual stations and charger models to energy-based rates when they meet Measurement Canada dispensation requirements and have been updated to enable energy-based billing (expected to start in early 2024)
- Considers market prices
- Accounts for available Federal and Provincial funding for station deployment
- Accounts for the Low Carbon Fuel Credit revenue generated from the public EV charging service

Public EV Charging Service revenue & costs

EV charging revenue		Other revenue	
• EV charging revenue • Extended stay fee		Low Carbon Fuel Credit	
Capital costs	**Operation and maintenance costs**	**Electricity costs**	**Regulatory account recovery**
• Amortization of station capital and installation costs • Amortization of service connection costs • Federal Funding • Provincial Funding	• Program development and management • Customer and operational support • Station maintenance • Other third-party costs	• Applicable General Service rates	• Under recovery of EV Fast Charging Service up to end of F2023 (March 31, 2023)

2023 Public EV Charging Rate Proposal Cost Recoveries

In $Millions	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031	F2032	F2033	10 Year Total
Location											
Urban	94%	131%	121%	119%	121%	126%	128%	132%	150%	173%	**137%**
Other	19%	19%	17%	16%	15%	15%	15%	15%	16%	17%	**16%**
Power Level											
Level 2	15%	32%	37%	46%	58%	72%	81%	92%	133%	166%	**72%**
DC	72%	90%	86%	87%	89%	93%	96%	99%	112%	128%	**102%**
R/C Ratio	**56%**	**76%**	**78%**	**83%**	**87%**	**92%**	**95%**	**99%**	**113%**	**129%**	**100%**

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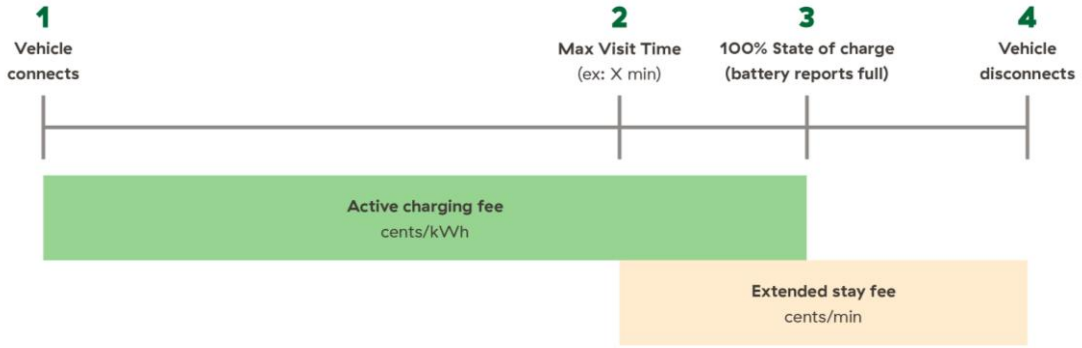
Extended Stay Fee

73% of drivers surveyed were in favour of applying dwell or idle charges to encourage drivers to move on when they're finished charging



- Average charging session duration for 50kW and 100kW stations is 30 min
- 75% of all charging sessions are ended by the 41 minutes mark
- Approximately 90% of charging sessions ended by 55 minutes

Proposed structure – 50kW DC or above:

- Equal to the per-minute rate for the relevant power level
- 40 minutes after start of charging session and still connected (email or text alert with 5 minutes warning)
- Applies 7am to 11pm – 7 days a week

Proposed structure – Level 2 and DC under 50kW:

- Equal to the per-minute rate for the relevant power level
- 2 hours after start of charging session and still connected (email or text alert with 5 minutes warning)
- Applies 7am to 11pm – 7 days a week

For feedback form input

Third party fees

Potential pass-through / additional fees

Examples of additional fees:

- RFID card (existing)
- Roaming via 3rd party aggregator
- Credit card tap
- Parking fee / parking taxes

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BC Hydro's proposal ensures A level playing field

- BC Hydro is **not** proposing a wholesale public EV charging service rate
- Instead, we included the same costs and funding as exempt service providers to ensure a level playing field, for example:
  - Service connection charges
  - Electricity charges (based on General Service Rates)
  - Low Carbon Fuel Credit
- BC Hydro's proposal can fully recover costs in urban areas where there are exempt providers offering public EV charging services
- BC Hydro will start establishing **a new rate class** in our Fiscal 2023 fully allocated Cost of Service Study for Public EV Charging Service

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Pricing provides flexibility and customer understanding

- BC Hydro's proposal includes charging power level ranges to accommodate future charger technology development.
  - New chargers have higher power levels
  - New chargers have multiple ports that can be configured at different power levels individually
- BC Hydro's proposal references costs and considers value of service and market prices for customer understanding and acceptance

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Update the Electric Tariff to consider Public EV Charging Service

EV Charging Service customers may choose to participate in an "Electric Vehicle Charging Billing Agreement"

- EV Charging Service customers that also have an account with BC Hydro may choose to pay on the spot using a credit card or may select on-bill payment via BC Hydro's standard residential and general service billing (post-pay). A customer choosing on-bill payment will be subject to the Electric Tariff Terms and Conditions including, but not limited to:
  - Section 2.4 (Refusal to Provide Service and Termination by BC Hydro)
  - Section 2.6 (Security for Payment of Bills)
  - Section 5.3 (Payment of Bills)
- Various minor additional updates to the Electric Tariff Terms and Conditions may also require to include the considerations of Public EV Charging Service

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Future rate updates

Public EV Charging is a competitive service which requires timely price responses to market conditions

- BC Hydro observed that some exempt service provide frequently updated rates.
- If BC Hydro's permanent Public EV Charging Rates are approved by the Commission and no significant changes to the rate structure are sought, we request the Commission to consider a streamlined regulatory review process for BC Hydro's future public EV Charging Service rate updates.
- Example scenarios that require updating rates include, but not limited:
  - BC Hydro's rates are significantly over or under collecting costs
  - BC Hydro's rates are significantly higher or lower than market rates
  - Energy based rate conversion assumptions require updates due to charger or car technology changes

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Ongoing evaluation and monitoring

BC Hydro proposes a three-year evaluation report to assess the performance of the rates

- With the rapid changes in the public EV charging service and marketplace, BC Hydro will continue to evaluate and monitor our service performance and cost recovery of the new pricing
- BC Hydro will submit a three-year evaluation report to the Commission providing an update on the performance new public EV charging rates.
- The evaluation report will include, but not limited to:
  - Actual stations deployed, costs and revenue
  - Updates to forecast deployment plan, cost, revenue and any other changes in assumptions
  - Customer satisfaction
  - Any other updates that impact Public EV Charging Service

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For feedback form input

Wrap up and next steps

Chris Sandve

Chief Regulatory Officer

BC Hydro
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Closing remarks

- In late June, we will apply to the BC Utilities Commission (BCUC) for approval of permanent Public Electric Vehicle Charging Rates
- BC Hydro values your participation and feedback on our rate designs.
- Please contact BC Hydro Regulatory Group with any questions about the regulatory or engagement process: bchydroregulatoryfeedback@bchydro.com
- Remember to submit your feedback by June 8, 2023.
- The presentation materials will be posted and a link to the online feedback form will be emailed mid-next week.

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Q&A

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