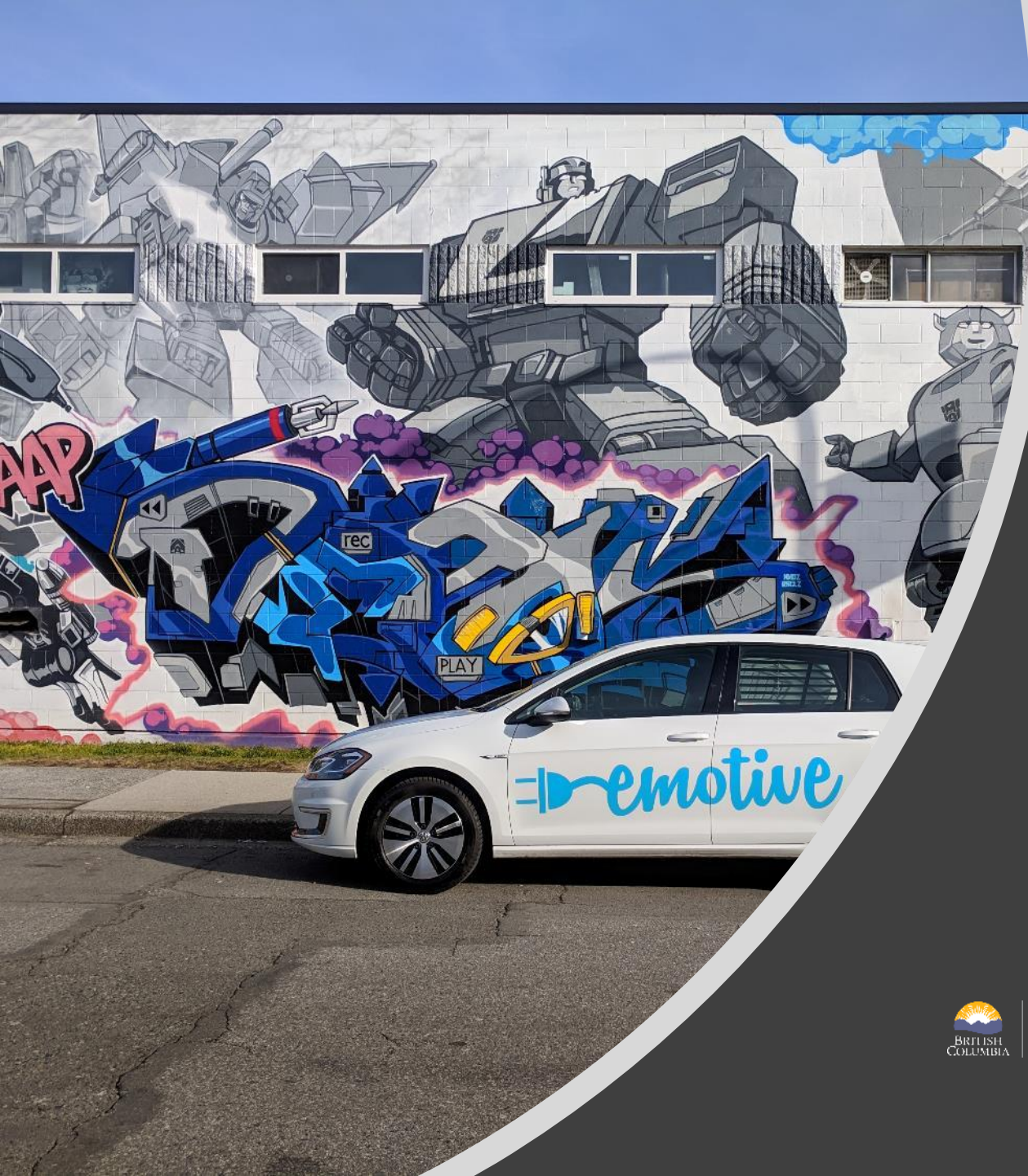




NEW EV TECHNOLOGY & TRAVELLING IN B.C.

- Introduction to Emotive
- Key Discussions
 - Rebates
 - Vehicles, current and future
 - Higher charging rates and long distance travel
- Q&A



Plug In BC



Fraser Basin Council

EMOTIVE CAMPAIGN



Emotive is one of a suite of programs offered under the Province of BC's CleanBC Go Electric Program.

The Emotive program is funded through the Ministry of Energy, Mines and Low Carbon Innovation and is administered by the Fraser Basin Council Society.

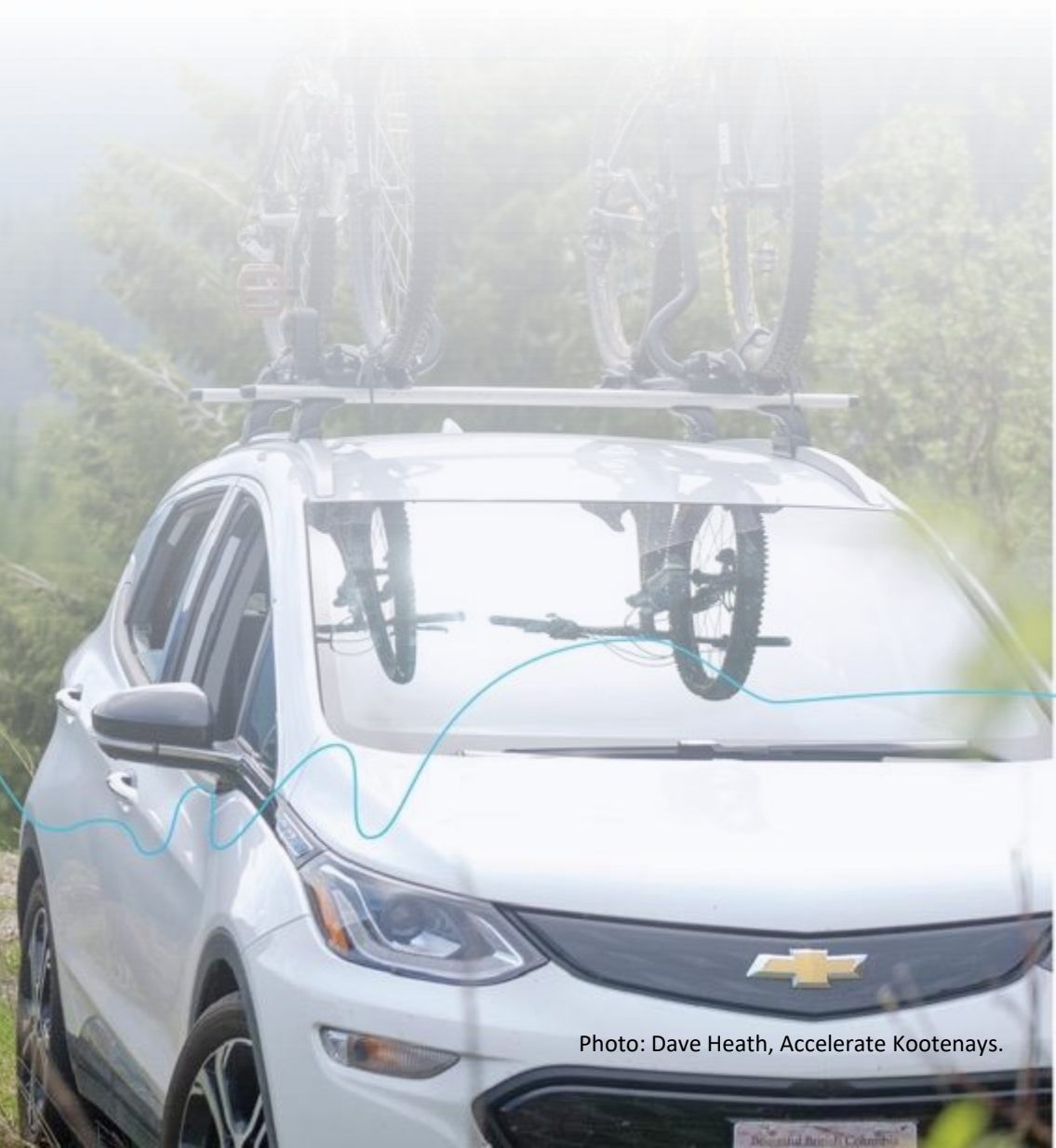


Photo: Dave Heath, Accelerate Kootenays.

The Electric Vehicle Experience

Emotive promotes electric vehicles through *experience* by focusing on their tactile and emotional appeal.

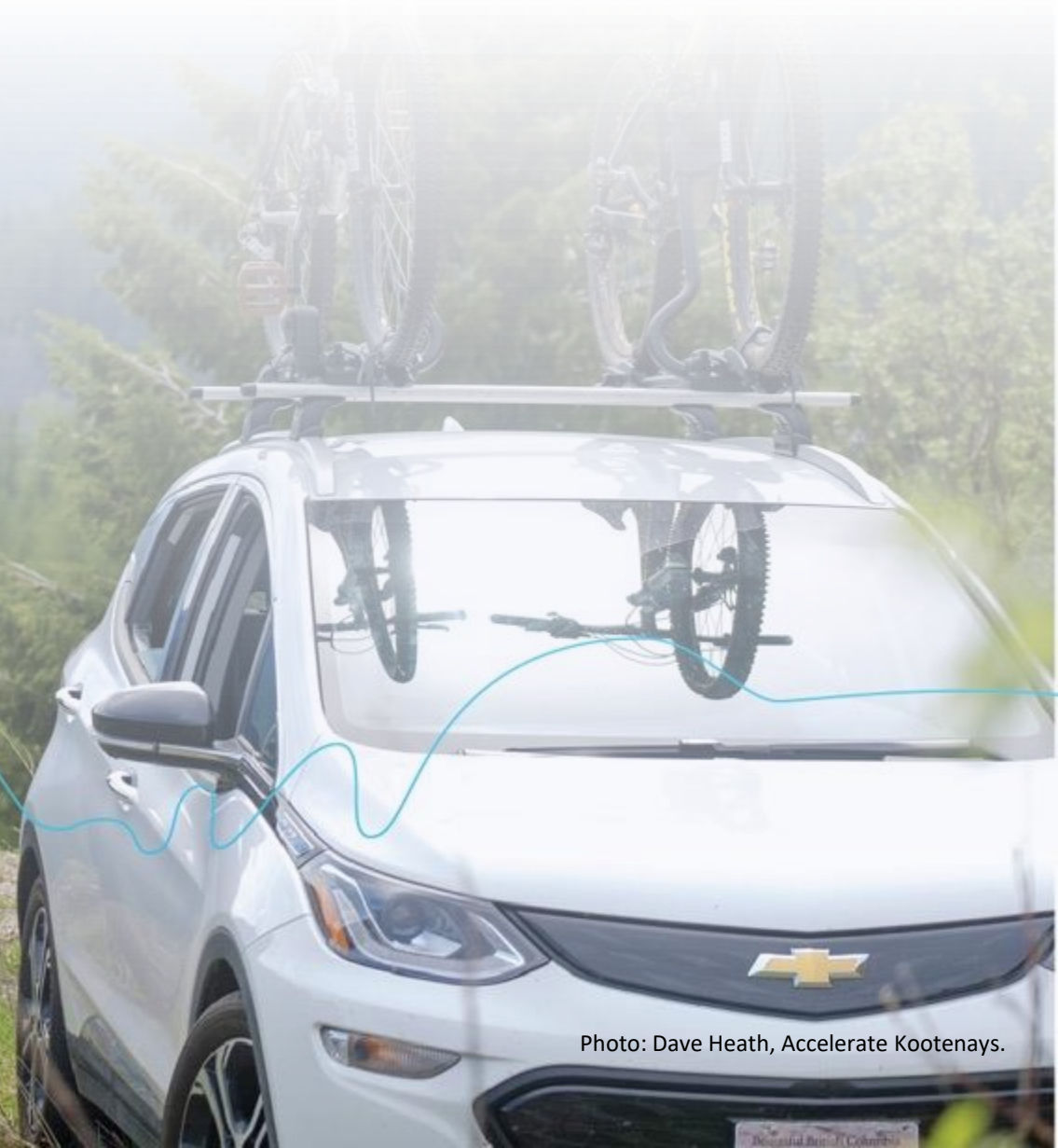


Photo: Dave Heath, Accelerate Kootenays.

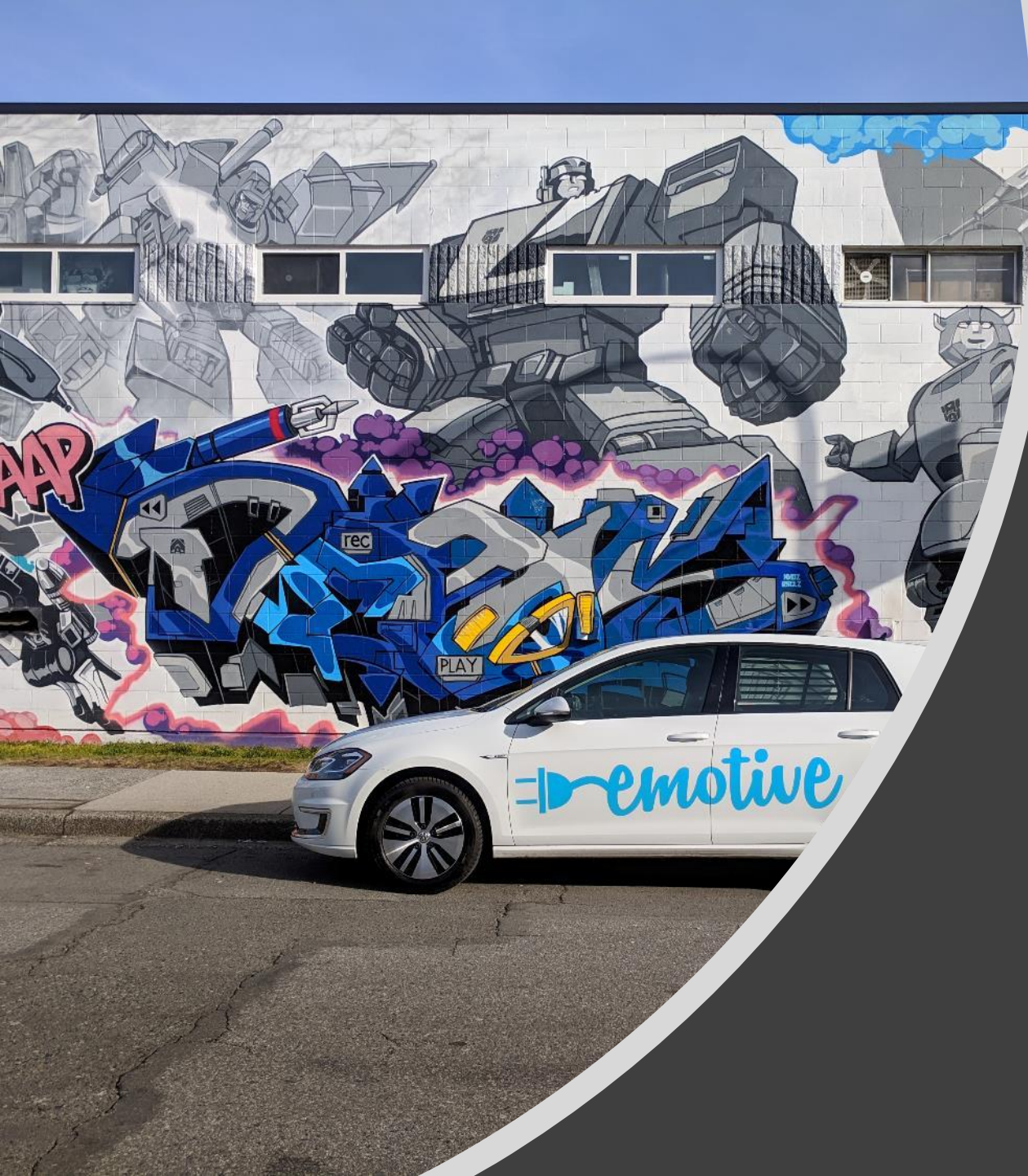
Raising awareness throughout BC

Emotive works with communities across the province and 200 EV Ambassadors:

- Test drive events
- Vehicle demonstrations
- Static displays
- EV101 sessions
- Short videos
- Print/web media



Emotive EV Ambassadors, Prince George, 2019.



- Emotive Campaign
- Key Discussions
 - Rebates
 - Vehicles, current and future
 - Higher charging rates and long distance travel
- Q&A

Upfront Cost Solutions



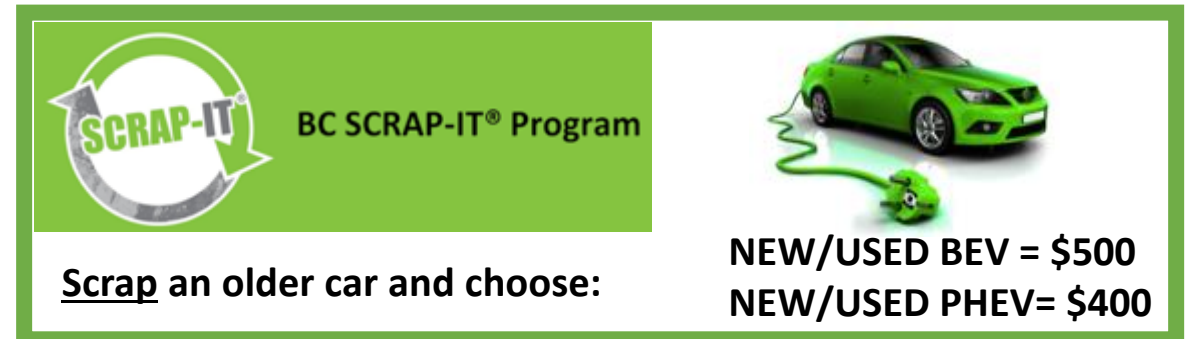
New passenger cars = \$1500 - \$3000



New passenger cars = \$2500 - \$5000



Specialty Use Vehicles = \$2000 - \$100,000



New or used passenger cars = \$400 - \$500

FEDERAL vs PROVINCIAL REBATES



- Federal iZEV: New vehicles. **\$2,500 - \$5,000** rebate.
- Base model must be below **\$45k**.
- “Packages” and accessories can be added.
- Point of sale, by dealership.
- Dealerships cannot charge a rebate fee.
- One rebate per individual per **calendar year**.



- Provincial CleanBC Go Electric rebate: New vehicles. **\$1,500 - \$3,000** rebate.
- Base model must be below **\$55k**.
- “Packages” and accessories can be added.
- Point of sale, by dealership.
- Dealerships cannot charge a rebate fee.
- One rebate per individual for the **life of the program**.

REBATE EXAMPLES



**Hyundai IONIQ 5
LR AWD w/ Ultimate
Package**

MSRP: \$59,999

Base model: \$44,999



**Polestar 2
Single Motor**

MSRP: \$49,900

Base model: \$49,900



Tesla Model 3 SR+

MSRP: \$58,610

Base model: \$58,610

Canada



cleanBC
GO ELECTRIC



cleanBC
GO ELECTRIC

COST OF OWNERSHIP

- The average vehicle purchase in Canada is now above \$40,000.
- Popular electric vehicles are now priced near or below the average *before* rebates.



Battery Electric Vehicles

These vehicles use a rechargeable battery to run. Simple!

Nissan Leaf / Leaf Plus



MSRP \$37,498-\$40,098
Range 243-363km

Chevrolet Bolt EV



MSRP \$38,198
Range 417km

Chevrolet Bolt EUV



MSRP \$40,198
Range 397km

Mini Cooper SE



MSRP \$40,990
Range 177km

Hyundai IONIQ



MSRP \$41,599
Range 274km

Mazda MX-30



MSRP \$42,150-47,150
Range 161km

Kia Soul EV



MSRP \$42,995-\$51,995
Range 248-383km

Hyundai Kona Electric



MSRP \$43,699
Range 415km

BMW i3



MSRP \$44,950
Range 246km

Kia Niro Electric



MSRP \$44,995
Range 385km

Volkswagen ID.4



MSRP \$44,995-49,995
Range 386-400km

Hyundai IONIQ 5



MSRP \$44,999-54,999
Range 354-488km

Polestar 2



MSRP \$49,900-56,900
Range 400-427km

Ford Mustang Mach-E



MSRP \$50,495-\$64,495
Range 360-505km

Tesla Model 3



MSRP \$58,610-\$65,610
Range 438-576km

Volvo XC40 Recharge



MSRP \$59,950
Range 359km

Tesla Model Y



MSRP \$75,610
Range 531km

Audi e-tron



MSRP \$86,600
Range 357km

Audi e-tron Sportback



MSRP \$89,100
Range 351km

Jaguar I-Pace



MSRP \$99,800
Range 357km

Porsche Taycan 4 Cross Turismo



MSRP \$119,900
Range 346km

Tesla Model S



MSRP \$120,610
Range 652km

Porsche Taycan 4S



MSRP \$121,700 - 128,060
Range 320 - 365km

Audi e-tron GT



MSRP \$129,900
Range 383km

Tesla Model X



MSRP \$131,610
Range 565km

Vehicles listed in order of price, by category. Price ranges indicate different battery sizes but do not account for additional trim levels. Current as of Nov 2021. There may be errors or omissions; please contact a dealership for current MSRP and vehicle availabilities.

Plug-in Hybrids

These vehicles combine a battery with a gasoline backup, offering an electric commute and gas for long trips.

Hyundai Ioniq
Electric Plus



MSRP \$32,659
Range 47km (electric)
961km (full)

Toyota Prius Prime



MSRP \$33,350
Range 40km (electric)
1035km (full)

Kia Niro Plug-in



MSRP \$35,965
Range 42km (electric)
853km (full)

Ford Fusion Energi



MSRP \$36,930
Range 35km (electric)
982km (full)

Audi Q5 TFSI e



MSRP \$70,400
Range 32km (electric)
615km (full)

BMW 530e xDrive



MSRP \$70,899
Range 31km (electric)
500km (full)

Volvo V60 Recharge



MSRP \$71,100
Range 35km (electric)
816km (full)

Volvo S90 Recharge



MSRP \$76,050
Range 34km (electric)
795km (full)

Ford Escape PHEV



MSRP \$37,549
Range 60km (electric)
789km (full)

Audi A3 e-tron



MSRP \$40,900
Range 26km (electric)
623km (full)

Honda Clarity Plug-in



MSRP \$40,990
Range 77km (electric)
475km (full)

Kia Optima Plug-in



MSRP \$43,995
Range 47km (electric)
982km (full)

Volvo XC90 Recharge



MSRP \$77,600
Range 29km (electric)
842km (full)

Lincoln Aviator PHEV



MSRP \$80,500
Range 34km (electric)
747km (full)

Mercedes-Benz GLE
550e 4Matic



MSRP \$83,900
Range 19km (electric)
738km (full)

BMW X5 xDrive45e



MSRP \$83,500
Range 50km (electric)
600km (full)

Mitsubishi Outlander
PHEV AWD



MSRP \$44,198
Range 39km (electric)
470km (full)

Hyundai Sonata PHEV



MSRP \$44,899
Range 45km (electric)
925km (full)

Mini Cooper S E
Countryman All4



MSRP \$44,990
Range 29km (electric)
439km (full)

BMW 330e



MSRP \$44,990
Range 30km (electric)
556km (full)

Audi A7 TFSI e



MSRP \$89,300
Range 39km (electric)
668km (full)

Porsche Cayenne
E-Hybrid



MSRP \$93,800
Range 27km (electric)
666km (full)

Land Rover Range
Rover Sport PHEV



MSRP \$95,500
Range 51km (electric)
742 (full)

Porsche Panamera
E-Hybrid



MSRP \$117,800
Range 23km (electric)
768km (full)

Toyota RAV4 Prime



MSRP \$44,990
Range 68km (electric)
979km (full)

BMW i3 REx



MSRP \$53,600
Range 203km (electric)
319km (full)

Chrysler Pacifica
Hybrid



MSRP \$53,995
Range 50km (electric)
911km (full)

Jeep Wrangler 4xe



MSRP \$54,995
Range 35km (electric)
600km (full)

Mercedes-Benz S550e



MSRP \$117,900
Range 23km (electric)
725km (full)

Audi A8 L TFSI e



MSRP \$122,150
Range 29km (electric)
639km (full)

BMW 745Le xDrive



MSRP \$122,800
Range 27km (electric)
435km (full)

Karma Revero



MSRP \$149,000
Range 60km (electric)
328km (full)

Mercedes-Benz GLC
350e 4Matic



MSRP \$61,200
Range 21km (electric)
562km (full)

BMW X3 xDrive30e



MSRP \$59,900
Range 29km (electric)
512km (full)

Volvo XC60 Recharge



MSRP \$66,650
Range 31km (electric)
800km (full)

Volvo S60 Recharge



MSRP \$68,200
Range 35km (electric)
816km (full)

BMW i8



MSRP \$149,900
Range 37km (electric)
531km (full)

Bentley Bentayga
Hybrid



MSRP \$168,100
Range 29km (electric)
628km (full)

Polestar 1



MSRP \$197,000
Range 84km (electric)
756km (full)

Vehicles listed in order of price, by category. Price ranges indicate different battery sizes but do not account for additional trim levels. Current as of Sept 2021. There may be errors or omissions; please contact a dealership for current MSRP and vehicle availability.

VARIETY AND AVAILABILITY - TYPES OF ELECTRIC VEHICLES

POPULAR VEHICLES



Tesla Model 3

- Standard & Long Range
- RWD & AWD options
- 250 kW charging
- 423 – 568 km range
- 5th best selling vehicle in Canada (including ICEs)



Hyundai Kona EV

- FWD
- 77 kW charging
- 415 km range



Tesla Model Y

- Long Range & Perf
- AWD
- 250 kW charging
- 488 – 531 km range



Chevrolet Bolt EV

- FWD
- 55 kW charging
- 417 km range
- 240v charging cord

VARIETY AND AVAILABILITY - TYPES OF ELECTRIC VEHICLES

NEW VEHICLES



Ford Mustang Mach E

- Standard & Long Range
- RWD & AWD options
- 115 kW charging
- 240v charging cord
- Plug and Charge compatible



Hyundai IONIQ 5

- Standard & Long Range
- RWD & AWD options
- 250 kW+ charging
- Plug and Charge compatible



Polestar 2 Single Motor

- Lower cost than AWD
- FWD
- 434 km range
- 150 kW charging

VARIETY AND AVAILABILITY - TYPES OF ELECTRIC VEHICLES

NEW VEHICLES



Kia EV6

- Standard & Long Range
- RWD & AWD options
- 250 kW+ charging
- Plug and Charge compatible



Volkswagen ID.4

- RWD & AWD options
- 400 km range (RWD)
- 125 kW+ charging
- Plug and Charge compatible



Volvo XC40 Recharge

- AWD
- 360 km range
- 4.9s 0-60 mph
- 150 kW charging

VARIETY AND AVAILABILITY - TYPES OF ELECTRIC VEHICLES

NEW VEHICLES



Audi e-tron GT

- 4.1s 0-60 mph
- AWD
- 270 kW charging
- Plug and Charge compatible



Lucid Air

- 2.4s 0-60 mph
- AWD
- 835 km range
- 300 kW+ charging



Rivian R1T

- Quad motor AWD
- 505 km range
- 11,000 lb towing
- 200 kW+ charging
- 240v charging cord

VARIETY AND AVAILABILITY – FUTURE VEHICLES



Chevrolet Silverado EV



Ford F-150 Lightning



Tesla Cybertruck



Toyota bZ4X



Volkswagen I.D. BUZZ



Nissan Ariya

A SAMPLE OF VEHICLE CHARGING SPEEDS



50 kW



50 - 150 kW



150 - 250 kW



250 - 350 kW



CHARGING SPEED
IS THE NEW
RANGE.



TRANSITIONING TO HIGHER CHARGING SPEEDS

- DC Fast Charging Stations (DCFC or “Level 3”)
- Station output in kilowatts (kW), battery capacity in kilowatt hours (kWh).
- Example batteries in kWh:
 - Nissan Leaf, 40-62 kWh;
 - Tesla Model 3, 54-75 kWh;
 - Hyundai Kona EV, 64 kWh;
 - Chevrolet Bolt EV, 60-65 kWh.
- Tesla Superchargers output up to 250 kW
- Most public stations at 50 kW
- Vehicles have a “charging curve.” Lower speeds when the battery gets fuller.



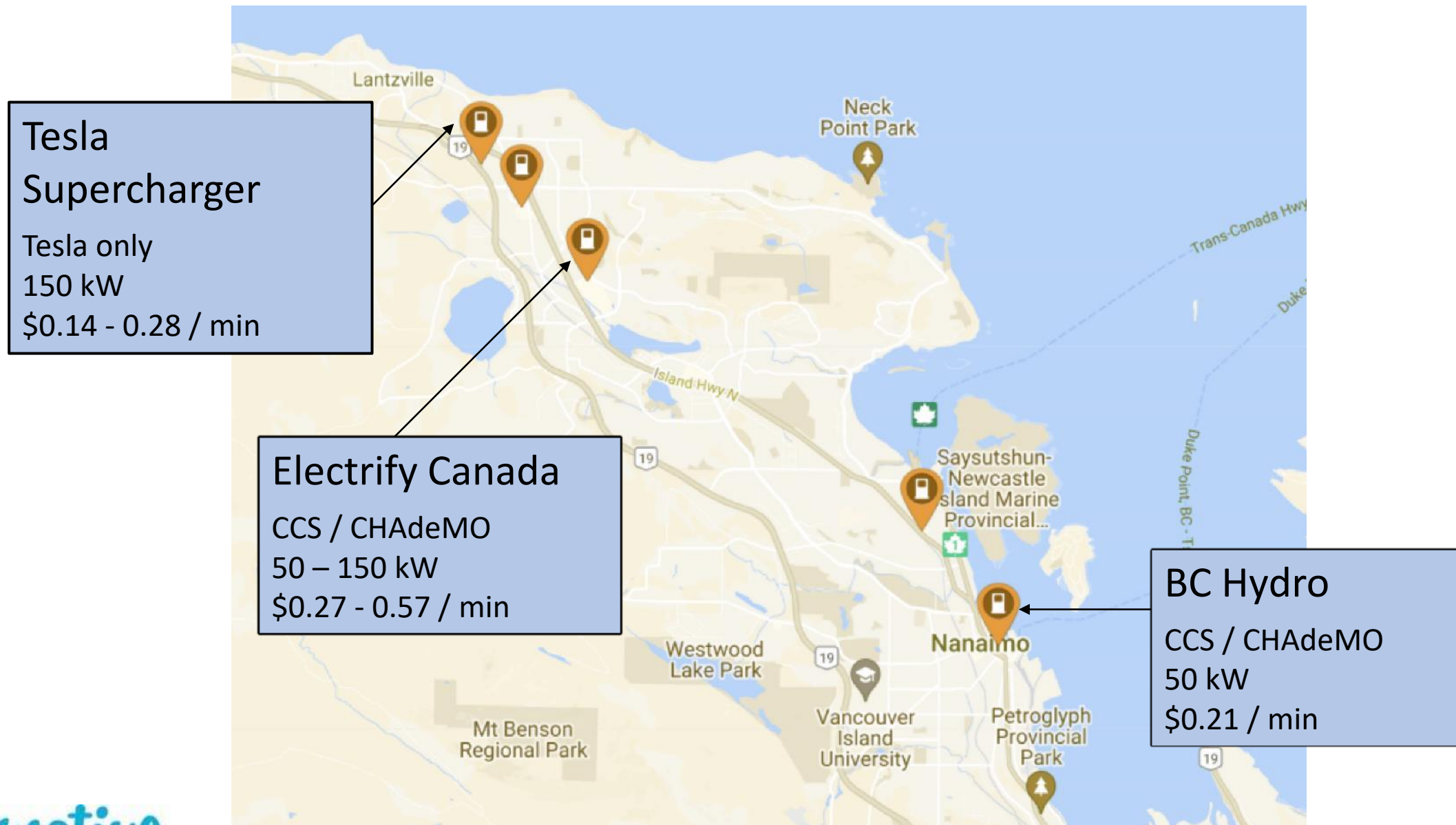
TRANSITIONING TO HIGHER CHARGING SPEEDS

- Increasing charging speed has a big effect on travel.
- In most cases, it is more important than increasing range.
- Higher charging speeds made possible by:
 - Larger batteries,
 - New 800v platforms (instead of 400v),
 - Battery management, cooling and heating,
 - Optimized battery chemistries



Image: Kyle Fields, Clean Technica

CHARGING INFRASTRUCTURE



SAMPLE TRIPS



A Better Routeplanner

Starting point
Nanaimo City Hall, 455 Wallace St, Nanair

Waypoint
Victoria, Capital, British Columbia

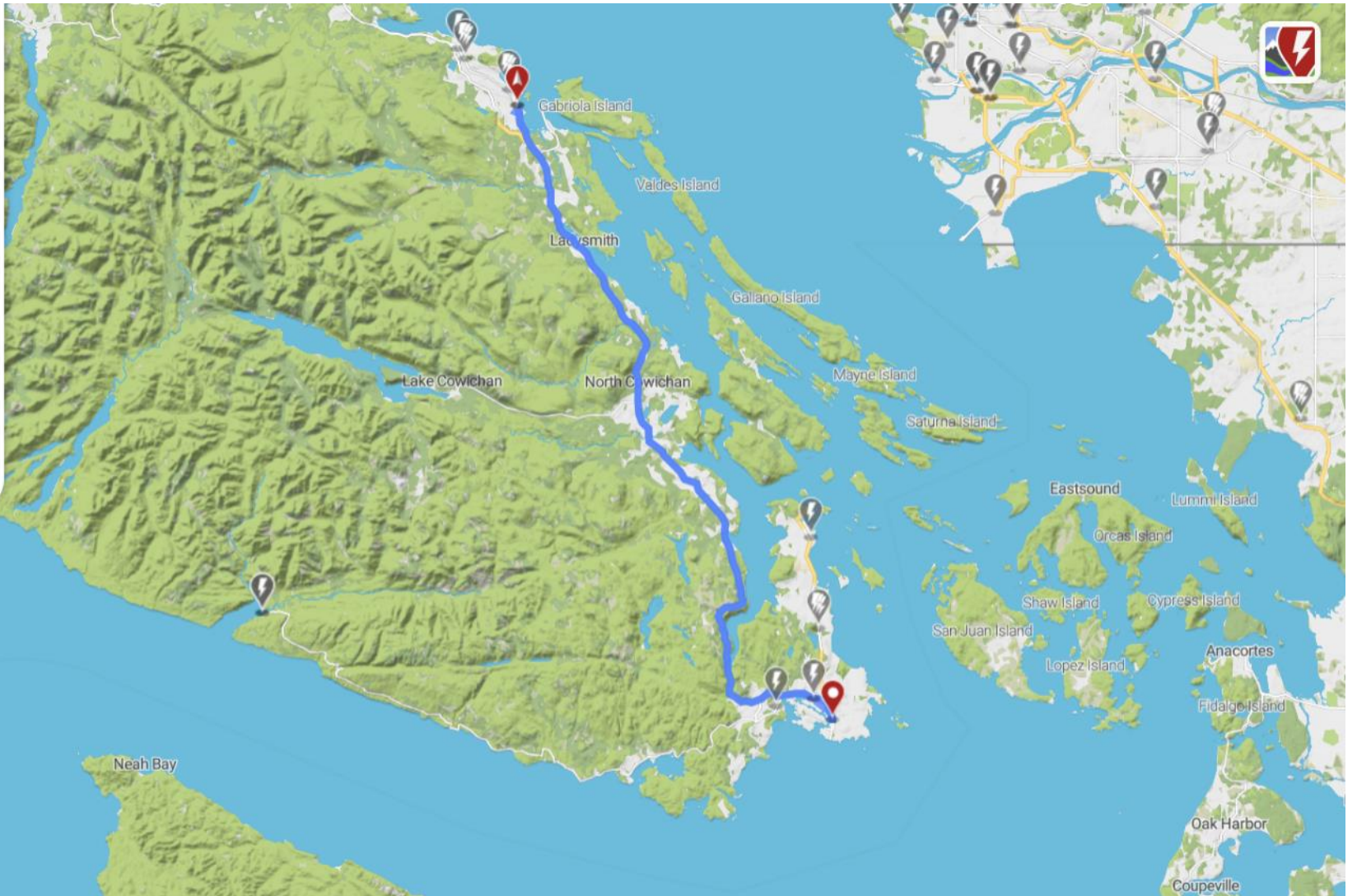
Destination
Nanaimo City Hall, 455 Wallace St, Nanair

Add waypoint

Settings

Clear

Amenity



SAMPLE TRIP – NANAIMO TO VICTORIA AND BACK



Nissan Leaf
240km range
50kW charging

3 h 40 min

3 h 7 min
223 km

33 min
2 charges

Step by step

- City of Nanaimo, 455 Wallace St, Na...
90% 05:52 PM
- 1 h 26 min (107 km)
- BC Hydro - Saanich Plaza [BCHYD...]
07:19 PM → 07:39 PM (20 min)
23% → 63% (12.8 kWh)
- 7 min (4 km)
- Victoria, Capital, British Columbia
60% 07:46 PM
- 1 h 54 min (112 km)
- 51 min (61 km)
- Island Savings Centre [GreenLots]
08:37 PM → 08:50 PM (13 min)
22% → 46% (8.1 kWh)
- 42 min (50 km)
- City of Nanaimo, 455 Wallace St, Na...
15% 09:35 PM
- 1 h 45 min (111 km)



Hyundai Kona
415km range
77kW charging

2 h 57 min

2 h 57 min
221 km

0 min
No charges

Step by step

- City of Nanaimo, 455 Wallace St, Nan...
90% 05:47 PM
- 1 h 29 min (110 km)
- Victoria, Capital, British Columbia
55% 07:16 PM
- 1 h 29 min (110 km)
- 1 h 28 min (111 km)
- City of Nanaimo, 455 Wallace St, Nan...
20% 08:45 PM
- 1 h 28 min (111 km)



Tesla M3 SR+
423km range
250kW charging

2 h 57 min

2 h 57 min
221 km

0 min
No charges

Step by step

- City of Nanaimo, 455 Wallace St, Nan...
90% 06:03 PM
- 1 h 29 min (110 km)
- Victoria, Capital, British Columbia
54% 07:32 PM
- 1 h 29 min (110 km)
- 1 h 28 min (111 km)
- City of Nanaimo, 455 Wallace St, Nan...
17% 09:00 PM
- 1 h 28 min (111 km)

SAMPLE TRIP – VICTORIA TO CAMPBELL RIVER



Chevrolet Bolt
417km range
50kW charging

3 h 20 min



3 h 7 min
268 km



13 min
One charge

Step by step

- Victoria, Capital, British Columbia
90% 09:53 AM
 - 1 h 36 min (122 km)
 - Canadian Tire - Electrify Canada [Ele...
11:30 AM → 11:43 AM (13 min)
52% → 66% (9.3 kWh)
 - 1 h 30 min (146 km)
 - Campbell River, Strathcona, British C...
15% 01:13 PM
- 3 h 20 min (268 km)



Hyundai Kona
415km range
77kW charging

3 h 18 min



3 h 7 min
268 km



11 min
One charge

Step by step

- Victoria, Capital, British Columbia
90% 09:48 AM
 - 1 h 36 min (122 km)
 - Canadian Tire - Electrify Canada [Ele...
11:25 AM → 11:36 AM (11 min)
50% → 68% (11.2 kWh)
 - 1 h 30 min (146 km)
 - Campbell River, Strathcona, British C...
15% 01:06 PM
- 3 h 18 min (268 km)



Tesla M3 SR+
423km range
250kW charging

3 h 13 min



3 h 5 min
267 km



8 min
One charge

Step by step

- Victoria, Capital, British Columbia
90% 09:46 AM
 - 1 h 37 min (124 km)
 - Nanaimo, BC Supercharger [Tesla]
11:23 AM → 11:32 AM (8 min)
48% → 68% (9.6 kWh)
3.21 \$
 - 1 h 27 min (143 km)
 - Campbell River, Strathcona, British C...
15% 01:00 PM
- 3 h 13 min (267 km)

SAMPLE TRIP – NANAIMO TO CALGARY (INCLUDING FERRY)



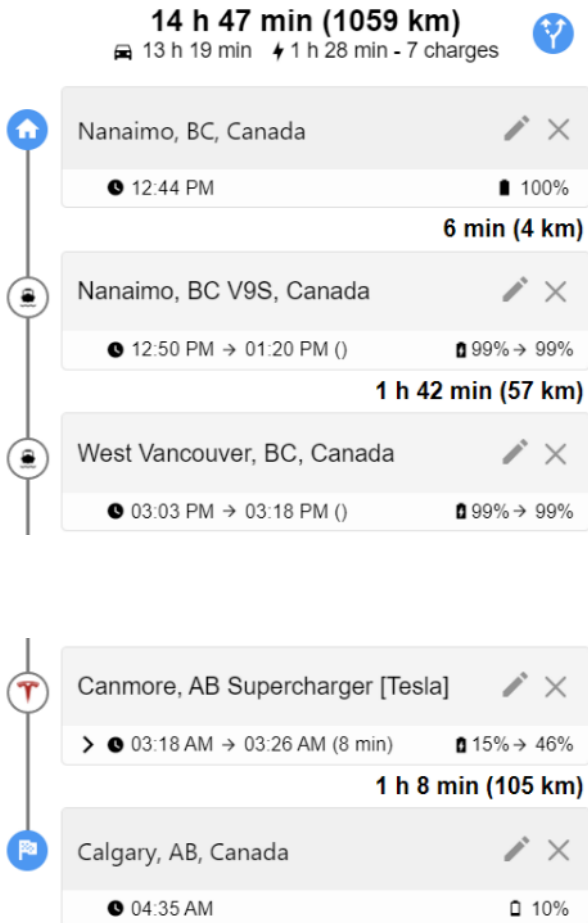
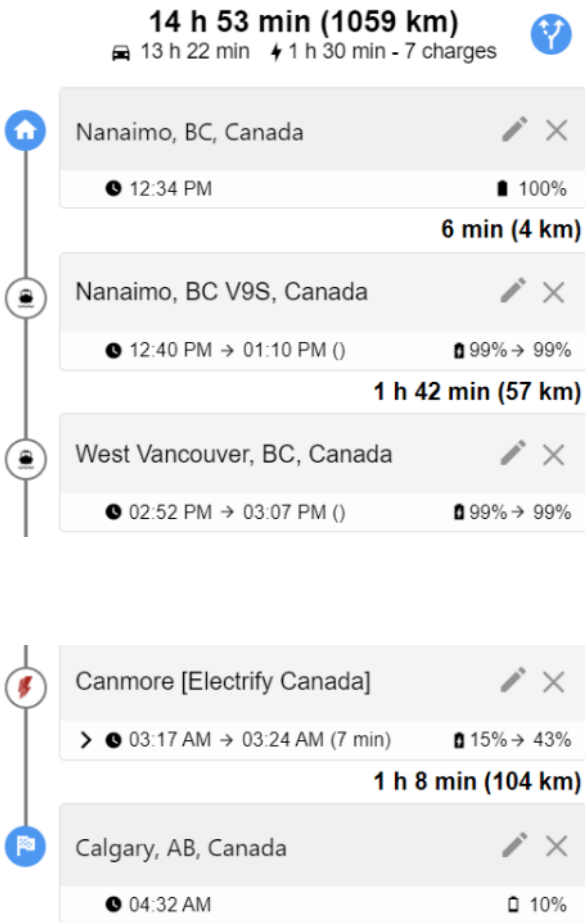
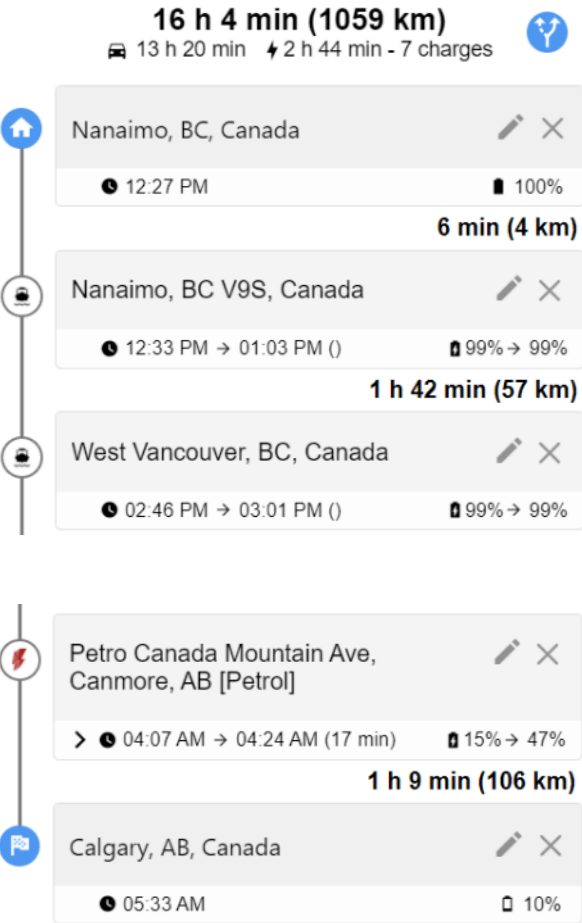
Hyundai Kona
415km range
77kW charging



Hyundai IONIQ 5 LR RWD
480km range
250kW+ charging



Tesla M3 SR+
423km range
250kW charging



SAMPLE TRIP – NANAIMO TO CALGARY (INCLUDING FERRY)



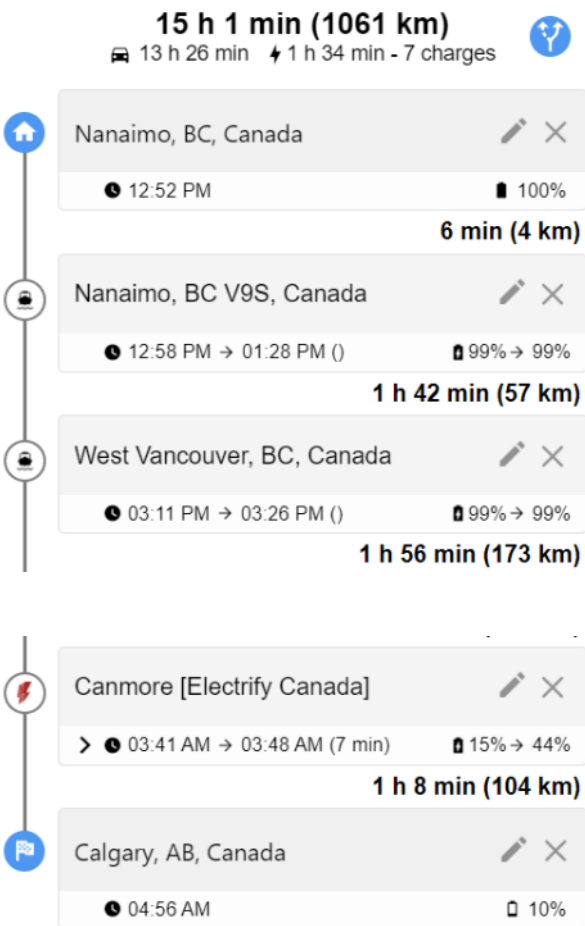
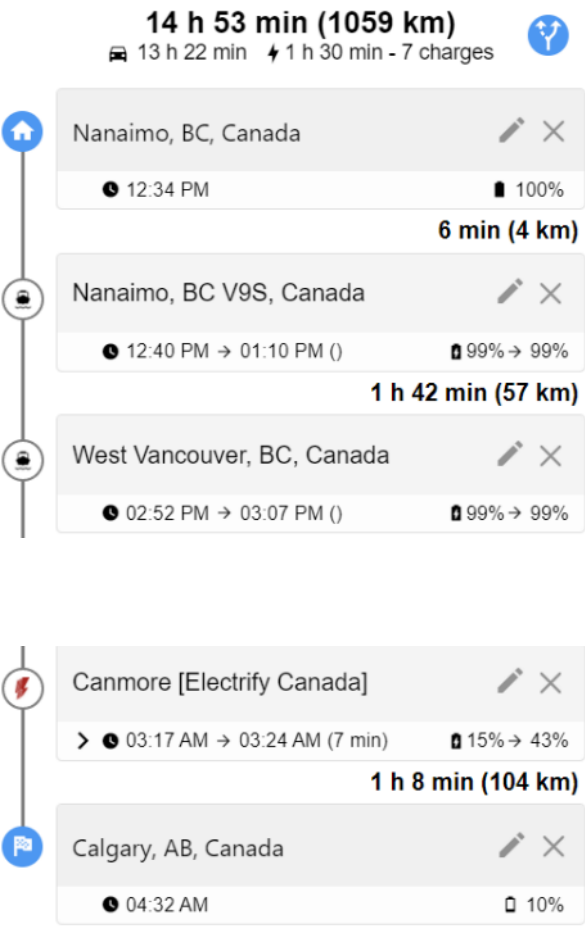
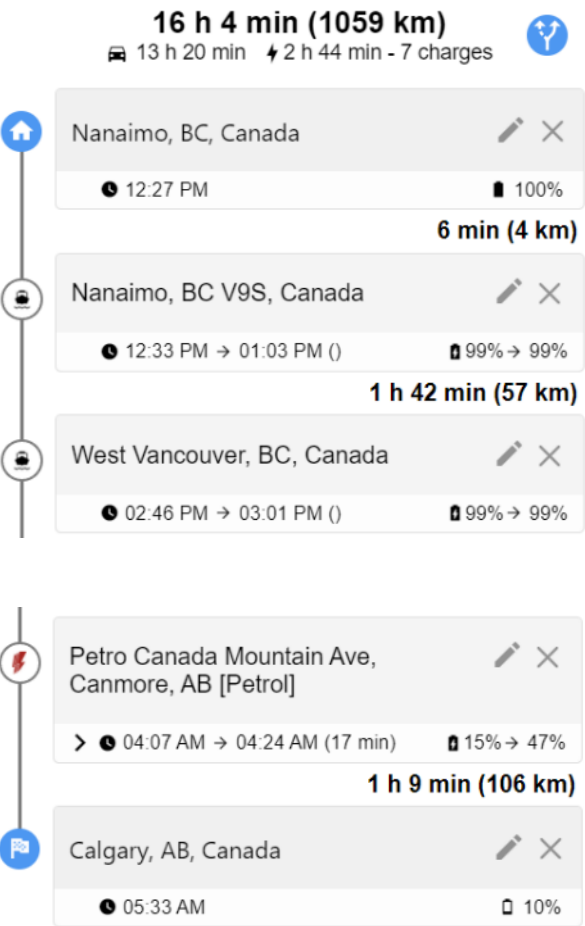
Hyundai Kona
415km range
77kW charging



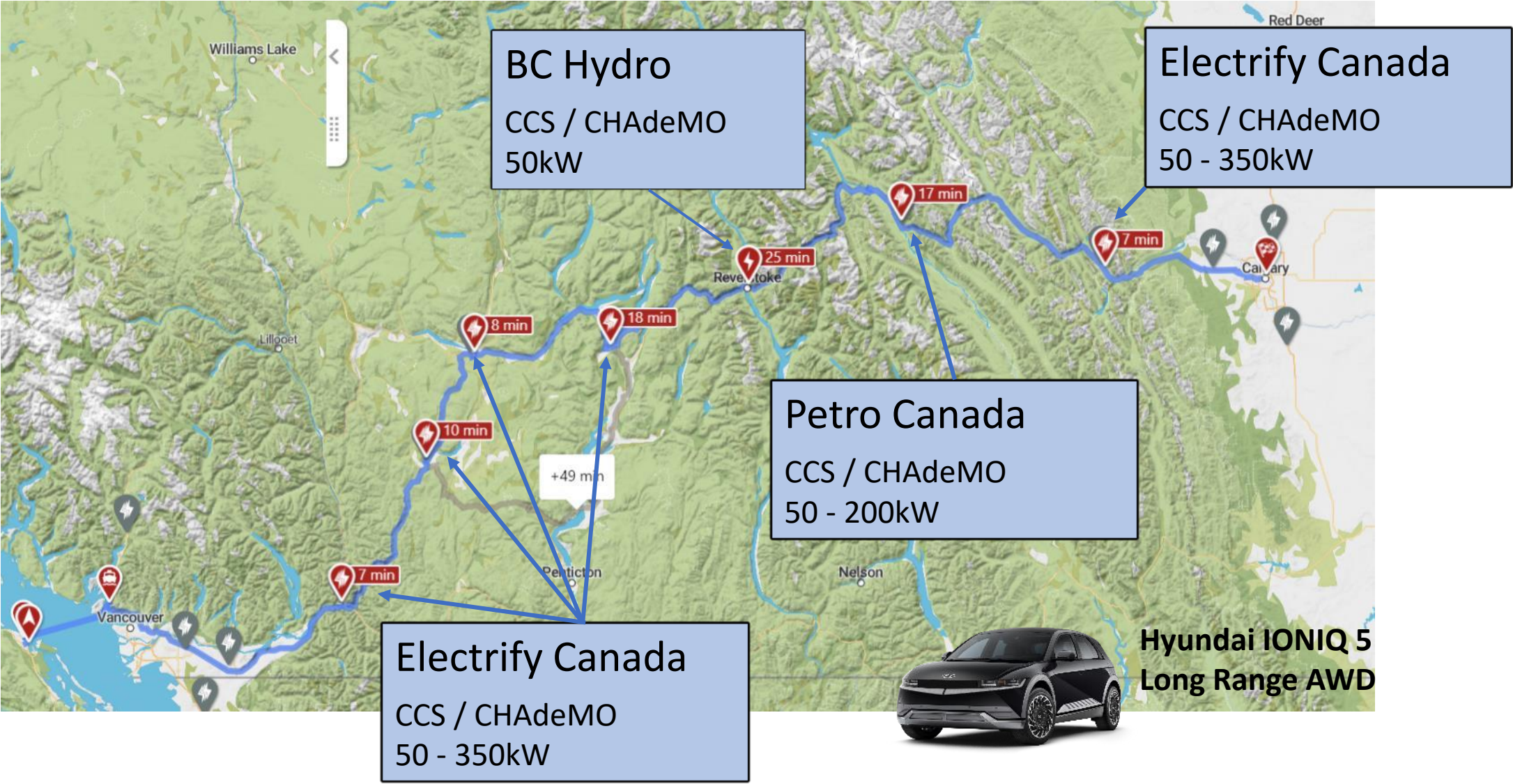
Hyundai IONIQ 5 LR RWD
480km range
250kW+ charging



Hyundai IONIQ 5 LR AWD
415km range
250kW+ charging



SAMPLE TRIP – NANAIMO TO PRINCE GEORGE (INCLUDING FERRY)



SAMPLE TRIP – NANAIMO TO PRINCE GEORGE (INCLUDING FERRY)



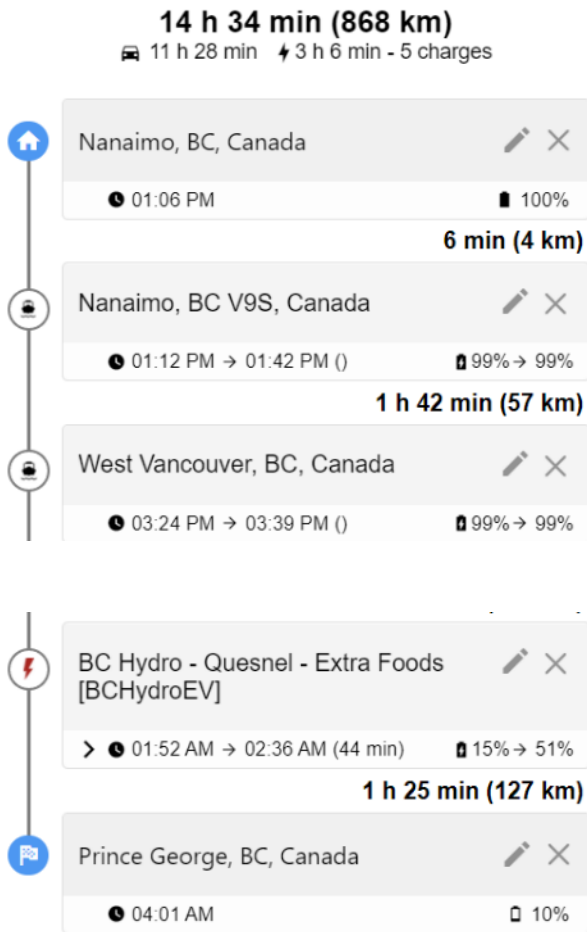
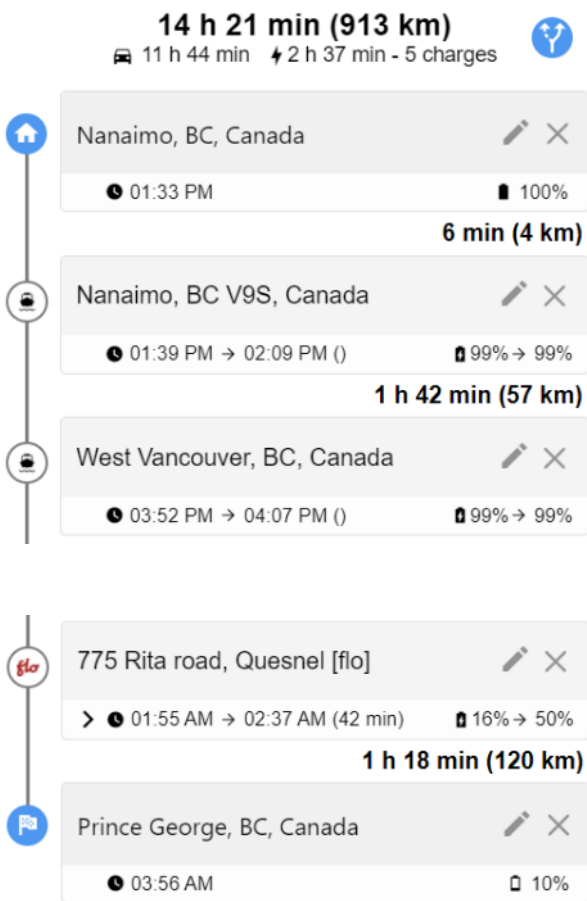
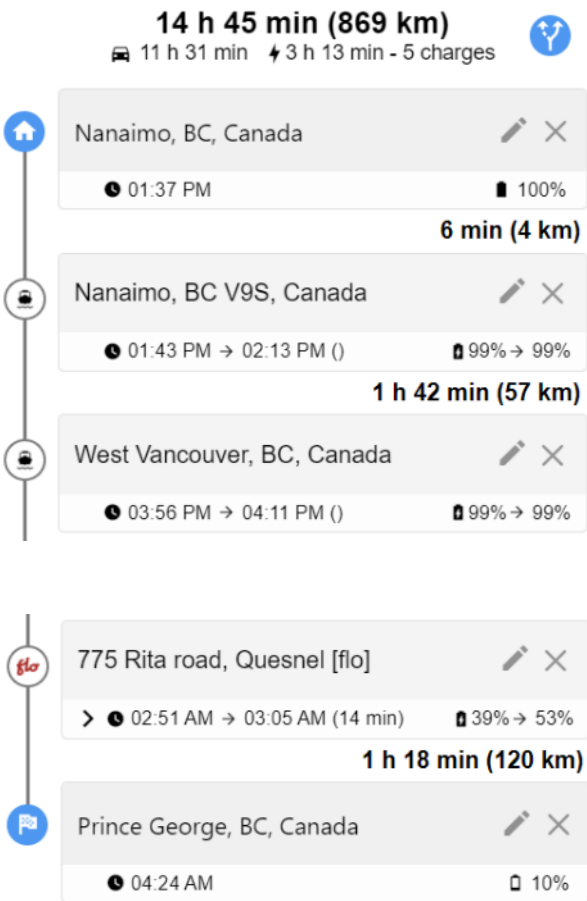
Hyundai Kona
415km range
77kW charging



Hyundai IONIQ 5 LR RWD
480km range
250kW+ charging



Hyundai IONIQ 5 LR AWD
415km range
250kW+ charging



SAMPLE TRIP – NANAIMO TO PRINCE GEORGE (INCLUDING FERRY)



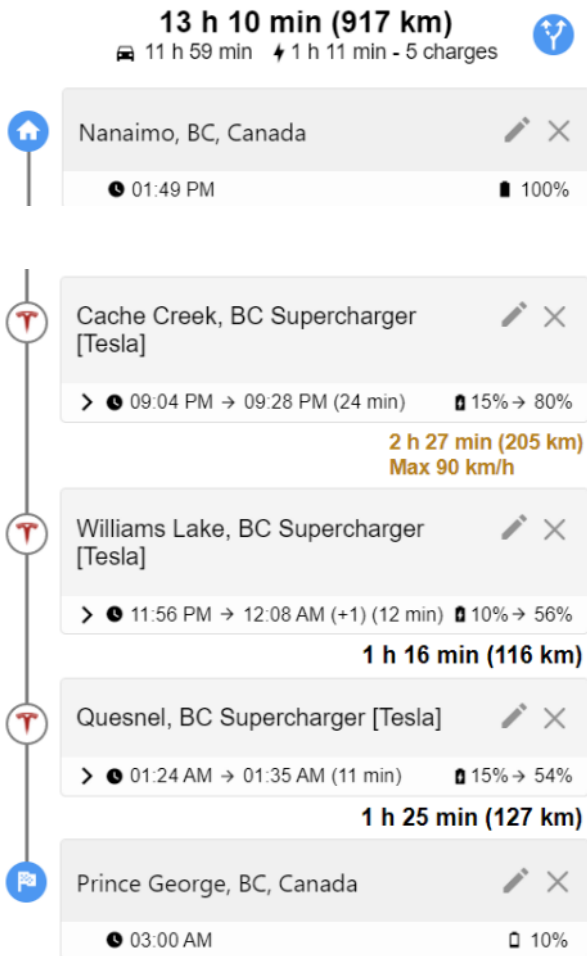
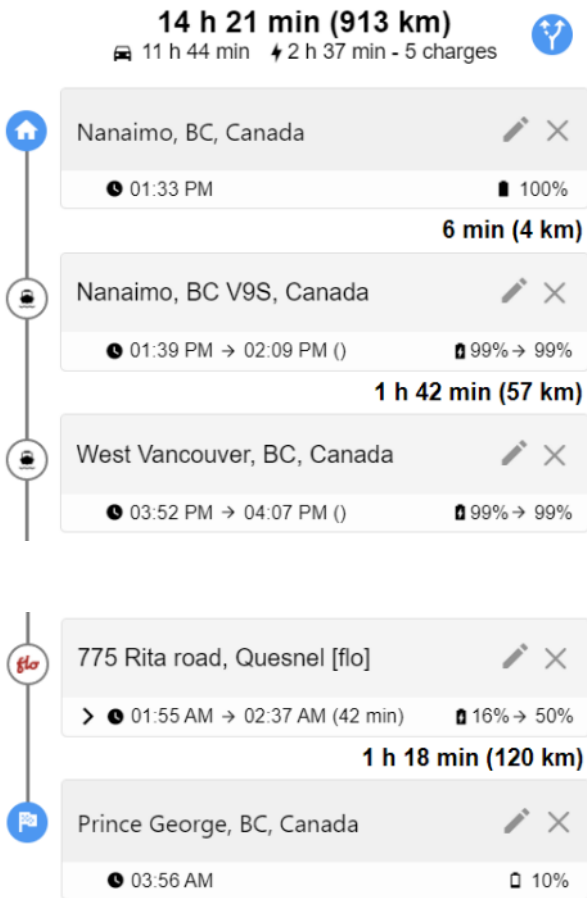
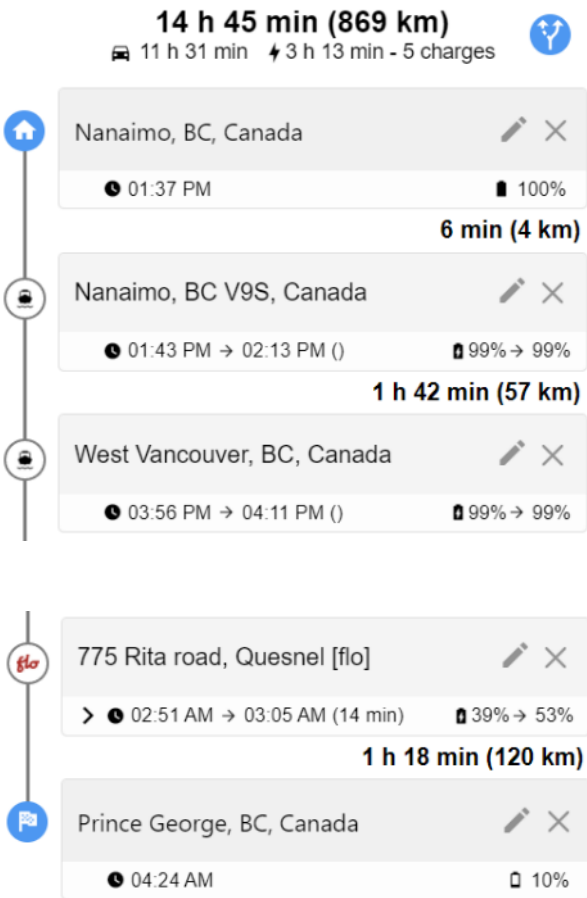
Hyundai Kona
415km range
77kW charging



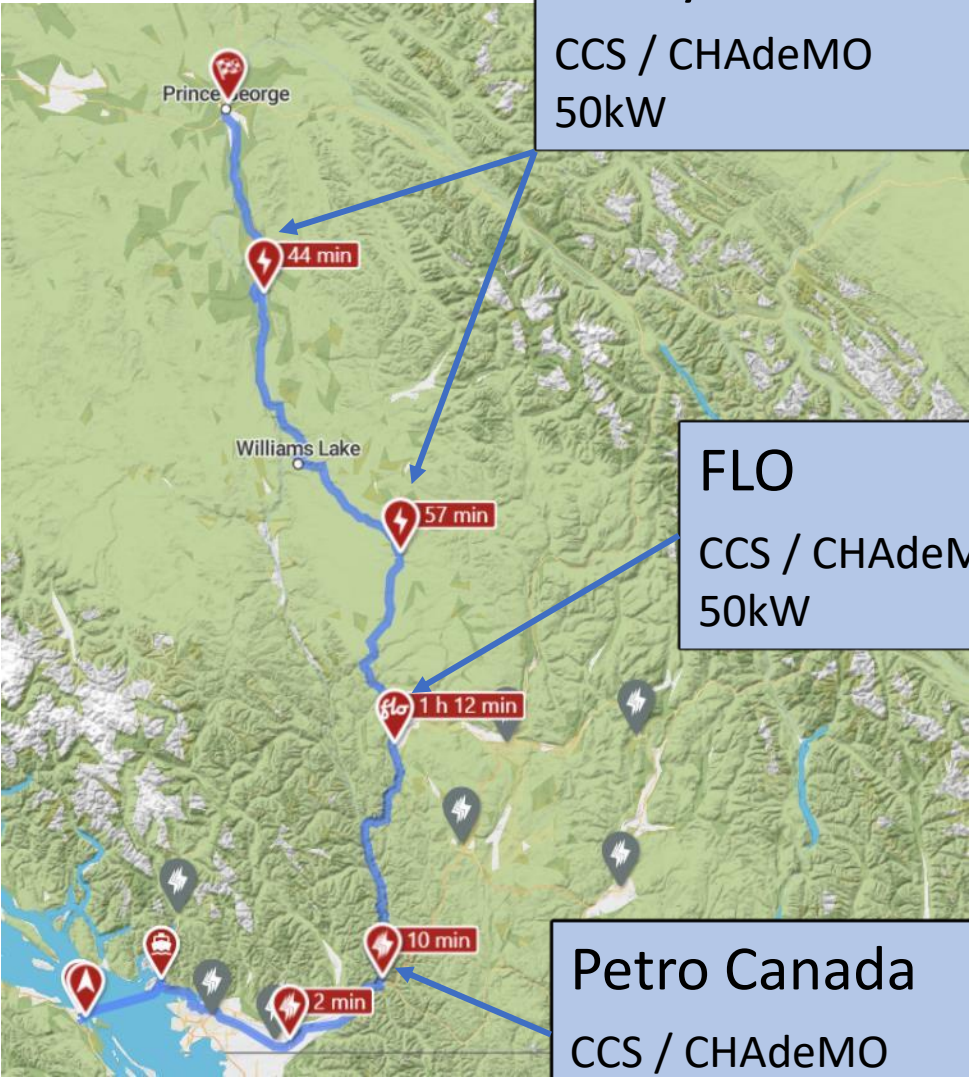
Hyundai IONIQ 5 LR RWD
480km range
250kW+ charging



Tesla M3 SR+
423km range
250kW charging



SAMPLE TRIP – NANAIMO TO PRINCE GEORGE (INCLUDING FERRY)



BC Hydro
CCS / CHAdeMO
50kW

FLO
CCS / CHAdeMO
50kW

Petro Canada
CCS / CHAdeMO
50 - 200kW



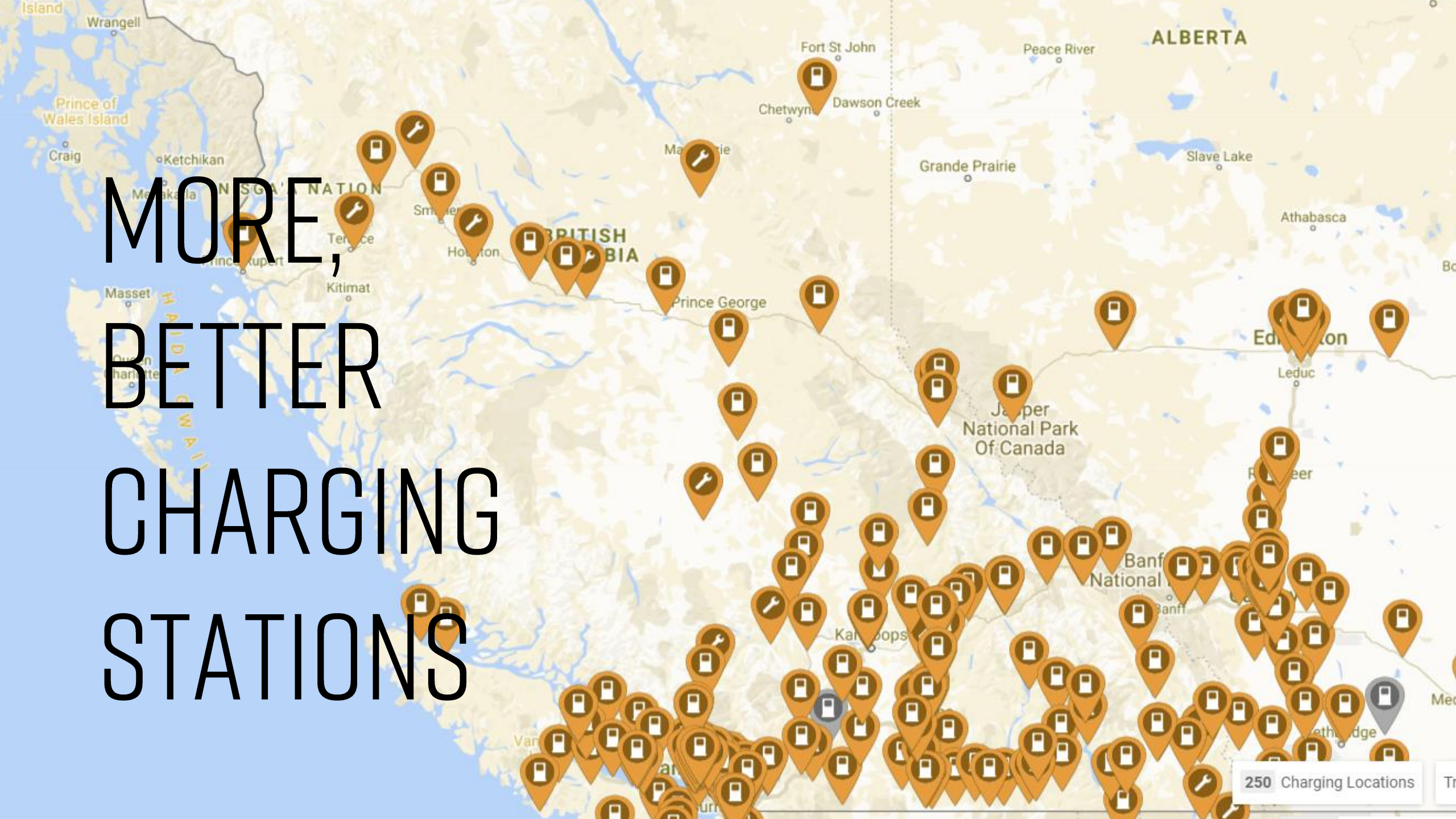
**Hyundai IONIQ 5
Long Range AWD**

TRANSITIONING TO HIGHER CHARGING SPEEDS

- Travelling in an ultra-high-speed charging network, or Supercharger network is a big deal.
- Higher charging speeds begin to trivialize range increases.
- Consumers need to know about the different types of charging stations (kW) and vehicle capabilities.
- Increased range is still a benefit outside of ultra-high-speed networks.
- So how do we get better charging stations?



MORE,
BETTER
CHARGING
STATIONS



250 Charging Locations

CHARGING STATION TECHNOLOGIES

PlugShare

EN Login Register

X Search for a Charging Location

Tesla (Fast) CCS/SAE CHAdeMO

J-1772 Tesla Tesla (Roadster)

NEMA 14-50 Wall

Location Filters (3 of 5)

- Show Locations That Require Payment ☒
- Show In-Use Locations ☒
- Show Restricted Locations ☐
- Show Residential Locations ☐
- Show Coming Soon Locations ☒

Minimum Power (0 kW)

0 50 70 120 200

Locations shown are not being filtered by kilowatts

Networks (25 of 25)

Temporary Filters (0 of 10)

Map Terrain Satellite

250 Charging Locations

CHARGING STATION TECHNOLOGIES

PlugShare

EN Login Register

X Search for a Charging Location

Tesla (Fast) CCS/SAE CHAdeMO

J-1772 Tesla Tesla (Roadster)

NEMA 14-50 Wall

Location Filters (3 of 5)

- Show Locations That Require Payment ☒
- Show In-Use Locations ☒
- Show Restricted Locations ☐
- Show Residential Locations ☐
- Show Coming Soon Locations ☒

Minimum Power (70 kW)

0 50 70 120 200

Locations shown are being filtered by kilowatts

Networks (25 of 25)

Temporary Filters (0 of 10)

Map Terrain Satellite

97 Charging Locations

CHARGING STATION TECHNOLOGIES

PlugShare

EN Login Register

X Search for a Charging Location

 Tesla (Fast)	 CCS/SAE	 CHAdemo
 J-1772	 Tesla	 Tesla (Roadster)
 NEMA 14-50	 Wall	

Location Filters (3 of 5)

- Show Locations That Require Payment ☒
- Show In-Use Locations ☒
- Show Restricted Locations ☐
- Show Residential Locations ☐
- Show Coming Soon Locations ☒

Minimum Power (70 kW)

0 50 70 120 200

Locations shown are being filtered by kilowatts

Networks (25 of 25)

Temporary Filters (0 of 10)

Map showing charging locations in British Columbia and Alberta, Canada. The map displays various cities and regions, including Vancouver, Prince George, and Edmonton. The interface includes a search bar, a list of charging networks, and a map view showing the distribution of charging stations.

45 Charging Locations Traffic

Map Terrain Satellite

GIVE US MORE AND MAKE THEM FASTER

- High powered charging stations require expensive infrastructure.
- Difficult (expensive) to install in rural locations: highway rest areas, small gas stations, tourist stops, etc.
- Operators face high demand charges for infrequent but intense electricity use.
- How can we overcome these obstacles?



Image: 25 kW charging stations at Slim Creek Rest Area, HWY 16 East

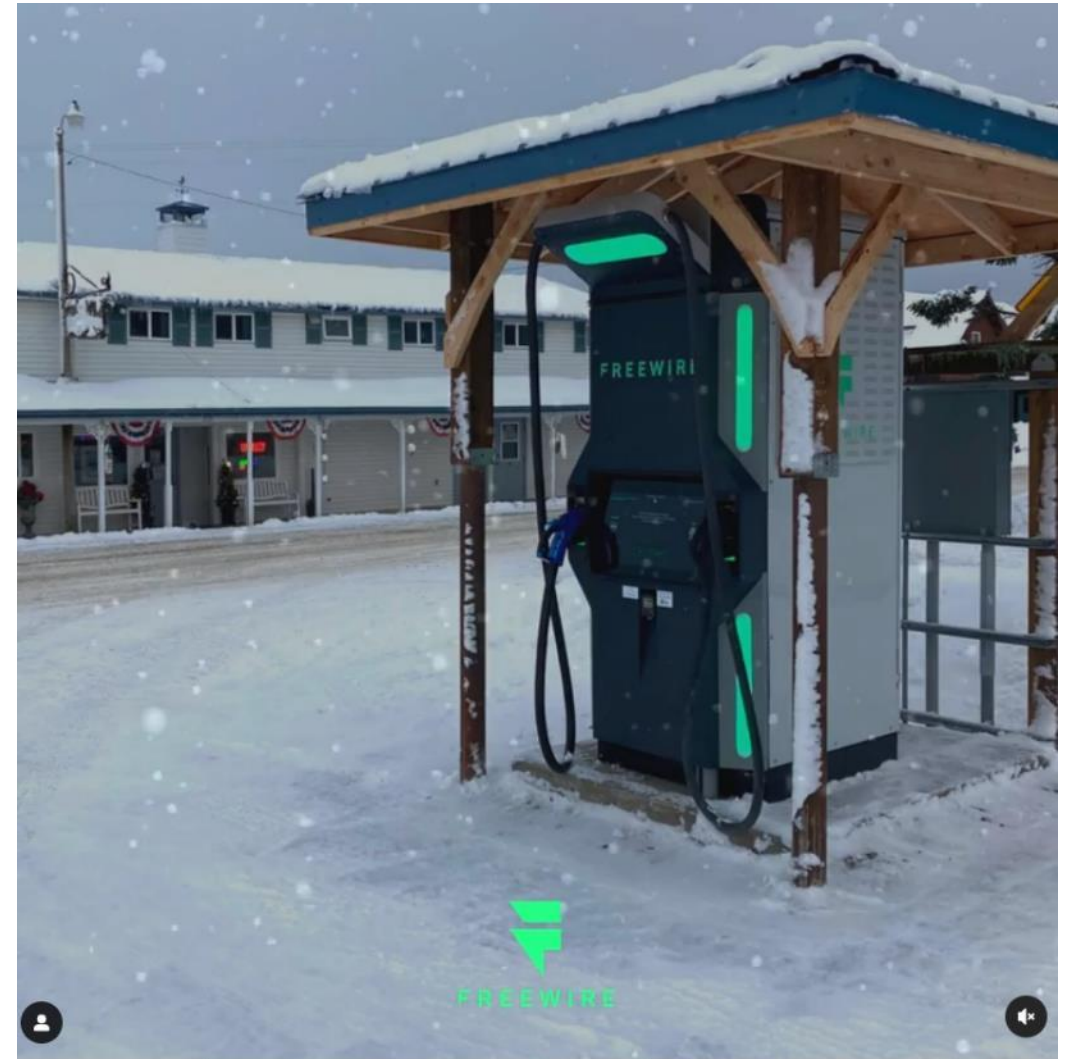
BATTERY POWERED FAST CHARGING STATIONS

- Use batteries that charge “slowly” when not in use (under 30 kW).
- ~150 kW output.
- Can split output to charge 2 vehicles at once.
- Can be self powered during power outages.



BATTERY POWERED FAST CHARGING STATIONS

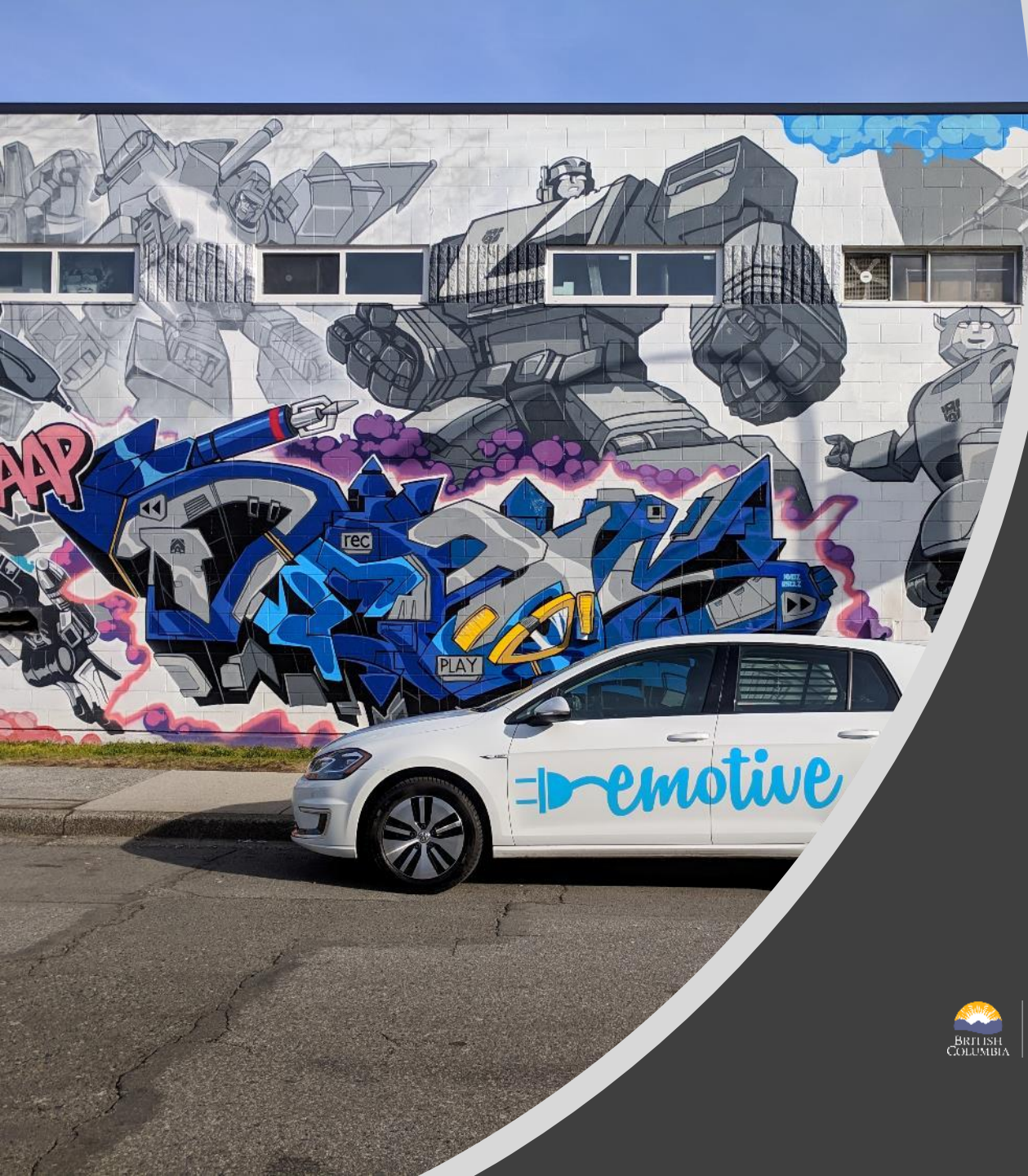
- Higher cost per station.
- Less expensive and faster installation.
- Lower operating cost.
- Easier to move or re-use.
- Can use any network.



PLUG AND CHARGE PROTOCOL

- A cross-brand charging protocol that automates activation and payment.
- Easy, predictable charging station experience.
- Like Tesla and Supercharger network.
- Charging station and vehicle must be Plug and Charge enabled:
 - Porsche Taycan
 - Volkswagen ID.4 (2022)
 - Ford Mustang Mach E
 - Hyundai IONIQ 5
 - Rivian R1T





EMOTIVE EV 101

Questions?

- Ask an EV Ambassador
- Use the message form at [Emotivebc.ca](https://emotivebc.ca)
- Email emotive@pluginbc.ca



Fraser Basin Council