



Plug In BC

The Evolution of EVs

Clean Air Forum, Prince George June 5, 2018

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Supporting EVs in BC



Plug In BC

Representing groups and organizations that have been supporting the uptake of electric vehicles in BC. This is your hub to find out the latest on EVs.

Vehicle Deployment

Charging Infrastructure

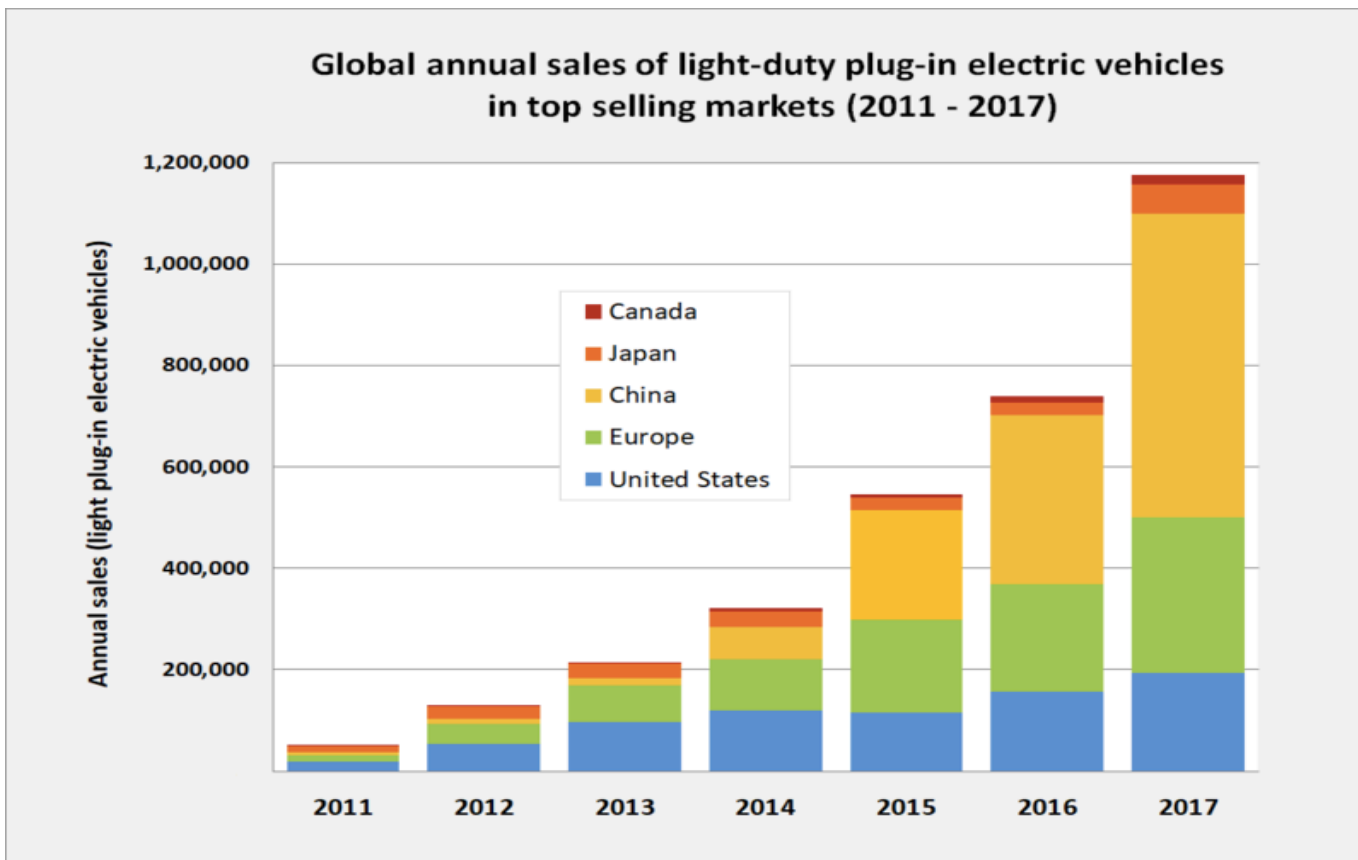
Outreach

Policy Development

Research

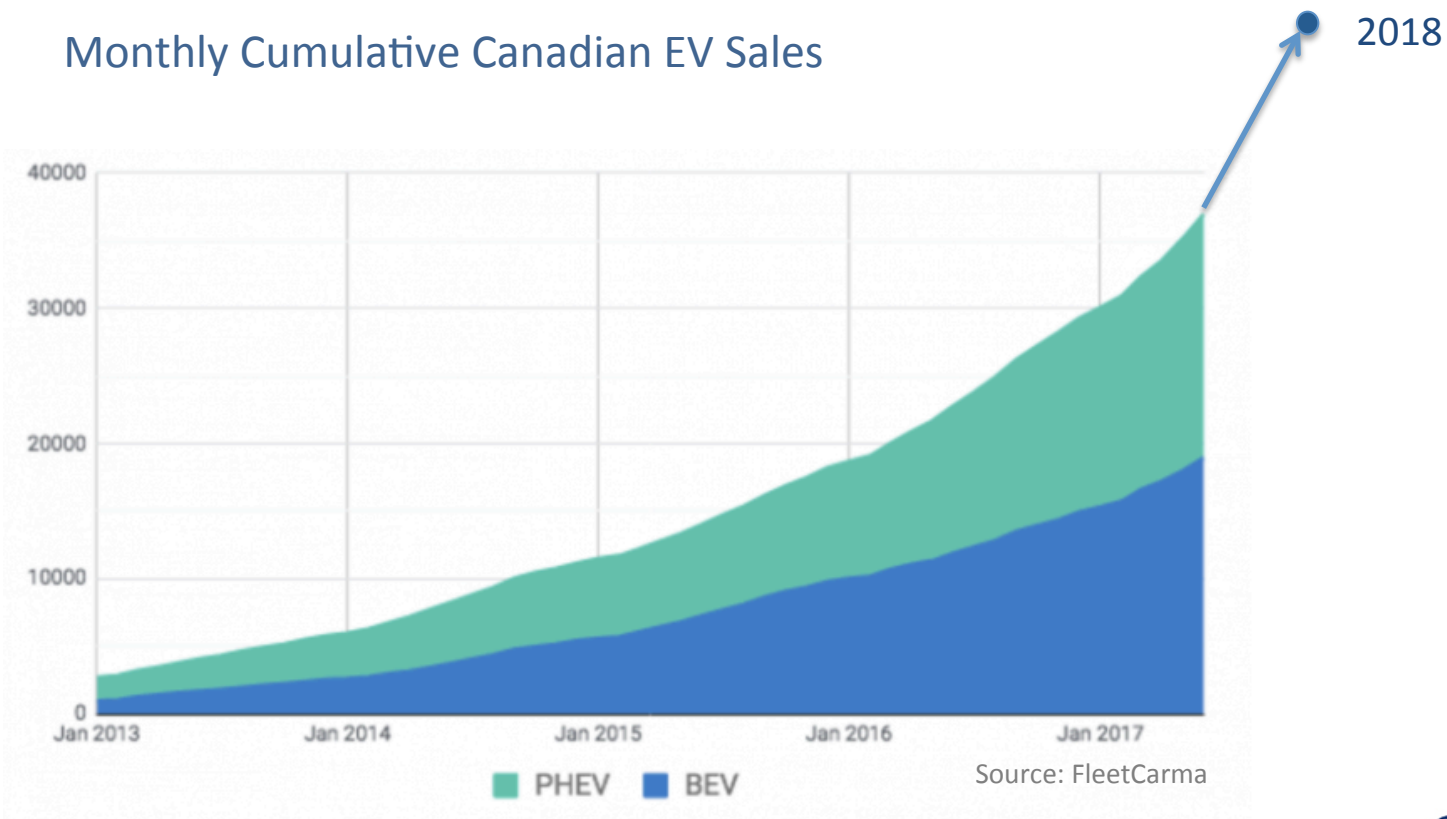
www.pluginbc.ca

Global Trends



Canadian Trends

Monthly Cumulative Canadian EV Sales



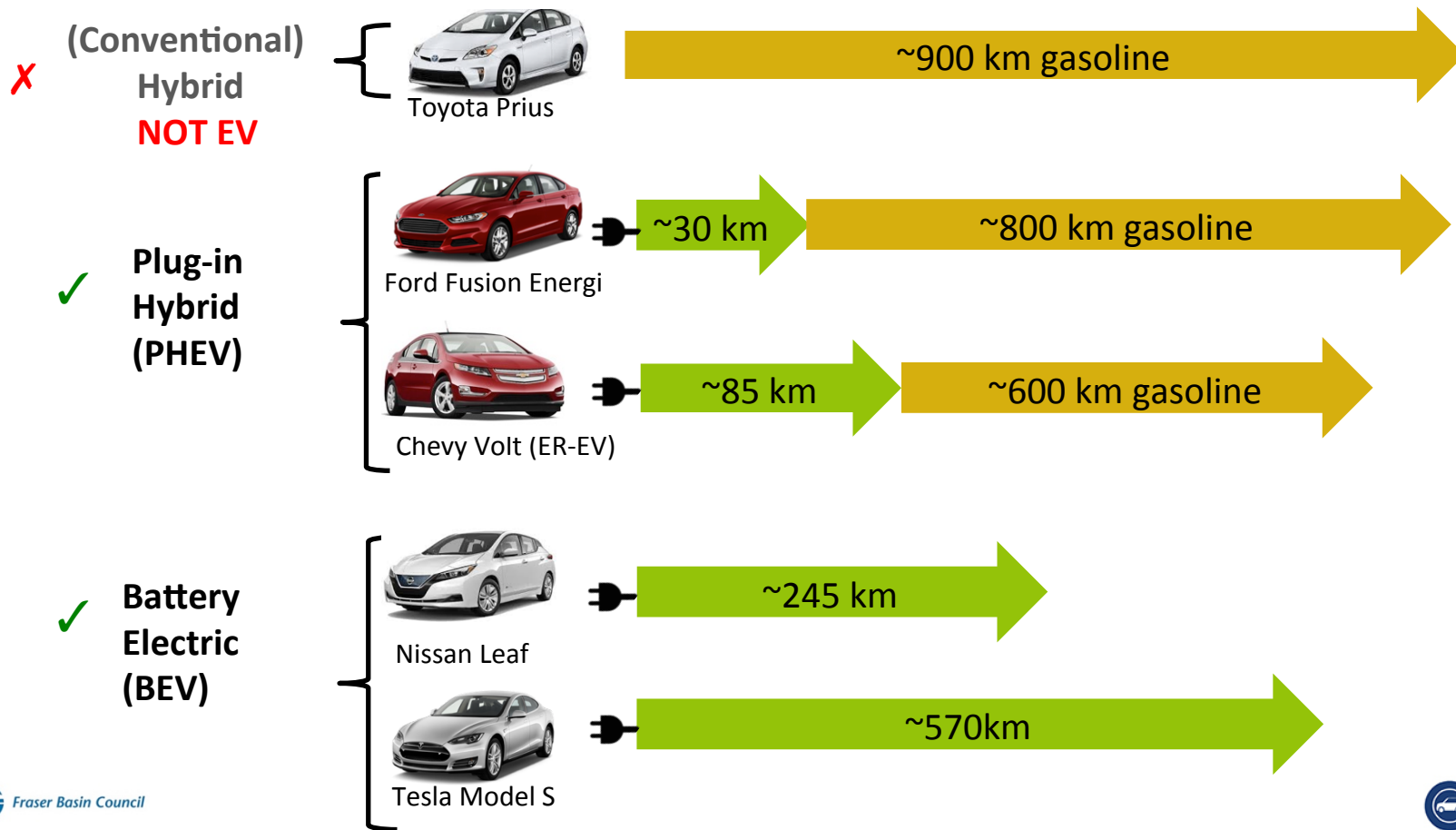
EVs Available in Canada

<p>Tesla Model S MSRP \$100,700-\$190,900</p>  <p>BEV Electric range: 338-539km Full range: 338-539km</p>	<p>Tesla Model X MSRP \$125,100-\$195,300</p>  <p>BEV Electric range: 322-475km Full range: 322-475km</p>	<p>Hyundai Tucson MSRP \$60,000</p>  <p>FCV-Fuel cell Electric range: 425km Full range: 425km</p>	<p>Chrysler PHEV Hybrid MSRP \$56,495</p>  <p>PHEV Electric range: 53km Full range: 911km</p>	<p>Kia Optima PHEV MSRP \$42,995</p>  <p>PHEV Electric range: 47km Full range: 982km</p>	<p>Hyundai Sonata MSRP \$29,649</p>  <p>PHEV Electric range: 43km Full range: 944km</p>
<p>Chevrolet Bolt MSRP \$42,895</p>  <p>BEV Electric range: 383km Full range: 383km</p>	<p>Tesla Model 3 MSRP coming soon</p>  <p>BEV Electric range: coming soon Full range: coming soon</p>	<p>Hyundai IONIQ Electric MSRP \$35,649</p>  <p>BEV Electric range: coming soon Full range: coming soon</p>	<p>Hyundai IONIQ MSRP coming soon</p>  <p>PHEV Electric range: coming soon Full range: coming soon</p>	<p>Toyota Prius Prime MSRP coming soon</p>  <p>PHEV Electric range: 40km Full range: 1035km</p>	<p>Ford Fusion Energi MSRP \$42,088</p>  <p>PHEV Electric range: 35km Full range: 982km</p>
<p>Volkswagen e-Golf MSRP \$35,995</p>  <p>BEV Electric range: 201km Full range: 201km</p>	<p>Ford Focus Electric MSRP \$31,498</p>  <p>BEV Electric range: 185km Full range: 185km</p>	<p>BMW i3 MSRP \$47,500</p>  <p>BEV/ER-EV Electric range: 183km Full range: 183-303km</p>	<p>Ford C-Max Energi MSRP \$26,828</p>  <p>PHEV Electric range: 33km Full range: 917km</p>	<p>Porsche Panamera S E Hybrid MSRP \$97,300</p>  <p>PHEV Electric range: 26km Full range: 897km</p>	<p>Audi A3 e-tron MSRP \$45,900</p>  <p>PHEV Electric range: 26km Full range: 605km</p>
<p>Nissan LEAF MSRP \$32,698</p>  <p>BEV Electric range: 172km Full range: 172km</p>	<p>smart fortwo ED MSRP coming soon</p>  <p>BEV Electric range: coming soon Full range: coming soon</p>	<p>Kia Soul EV MSRP \$35,395</p>  <p>BEV Electric range: 150km Full range: 150km</p>	<p>BMW i8 MSRP \$152,000</p>  <p>PHEV Electric range: 24km Full range: 533km</p>	<p>BMW 740e MSRP coming soon</p>  <p>PHEV Electric range: 23km Full range: 548km</p>	<p>Porsche Cayenne S E Hybrid MSRP \$89,000</p>  <p>PHEV Electric range: 23km Full range: 791km</p>
<p>Mitsubishi i-MiEV MSRP \$27,998</p>  <p>BEV Electric range: 100km Full range: 100km</p>	<p>Chevrolet Volt MSRP \$38,590</p>  <p>ER-EV Electric range: 85km Full range: 676km</p>	<p>Plug in BC Visit pluginbc.ca to find out more about EVs in BC.</p> 	<p>BMW 330e MSRP \$51,900</p>  <p>PHEV Electric range: 23km Full range: 580km</p>	<p>Mercedes-Benz S550e MSRP \$117,900</p>  <p>PHEV Electric range: 23km Full range: 725km</p>	<p>BMW X5 xDrive40e MSRP \$74,950</p>  <p>PHEV Electric range: 23km Full range: 886km</p>
			<p>Volvo xc90 T8 MSRP \$78,450</p>  <p>PHEV Electric range: 21km Full range: 550km</p>	<p>Mercedes-Benz GLE550e MSRP \$83,000</p>  <p>PHEV Electric range: 19km Full range: 738km</p>	<p>Mini Cooper SE Countryman MSRP coming soon</p>  <p>PHEV Electric range: coming soon Full range: coming soon</p>

Not Just Passenger Cars!



Definitions (EV or PEV or ZEV or CEV = PHEV + BEV)



Charging Infrastructure Types

Level 1 (120 v)



HOME

Level 2 (208/240 v)



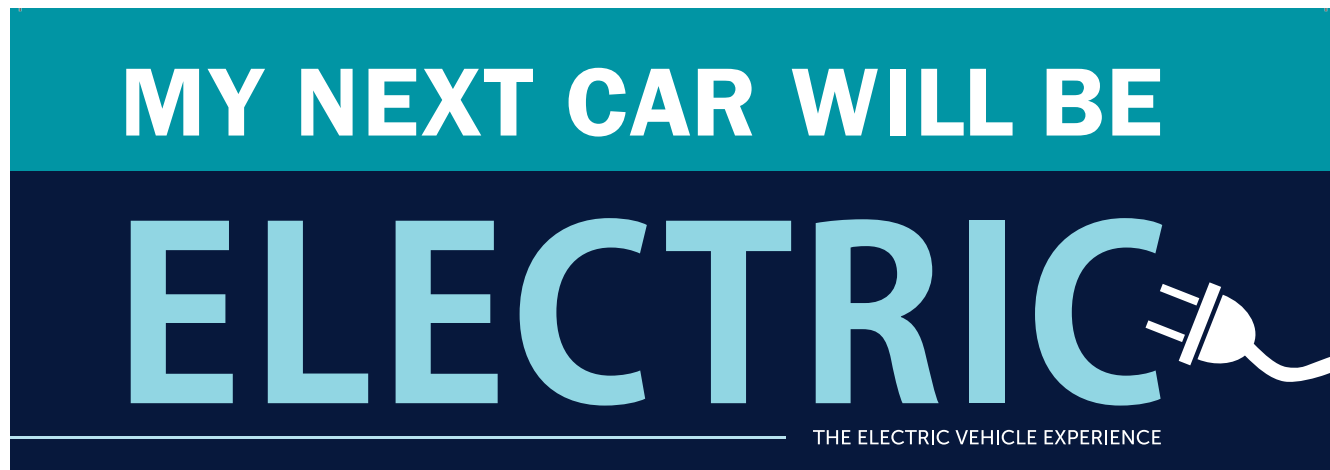
HOME, WORK, OUT & ABOUT

DC Fast Charge (500 VDC)



ON THE GO

Benefits of EVs

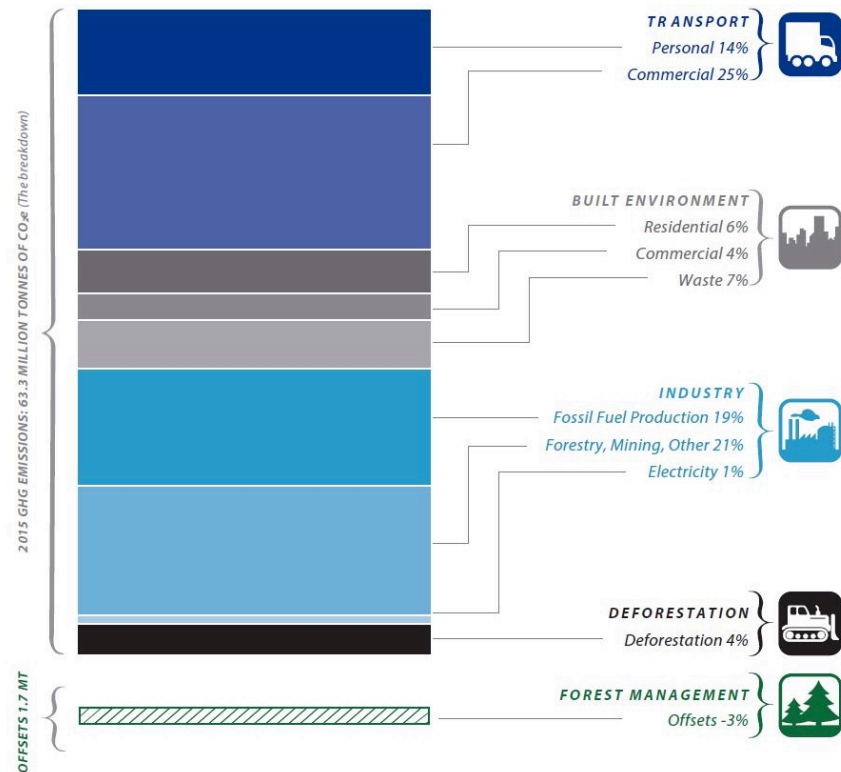


Benefits of EVs: GHG Reduction

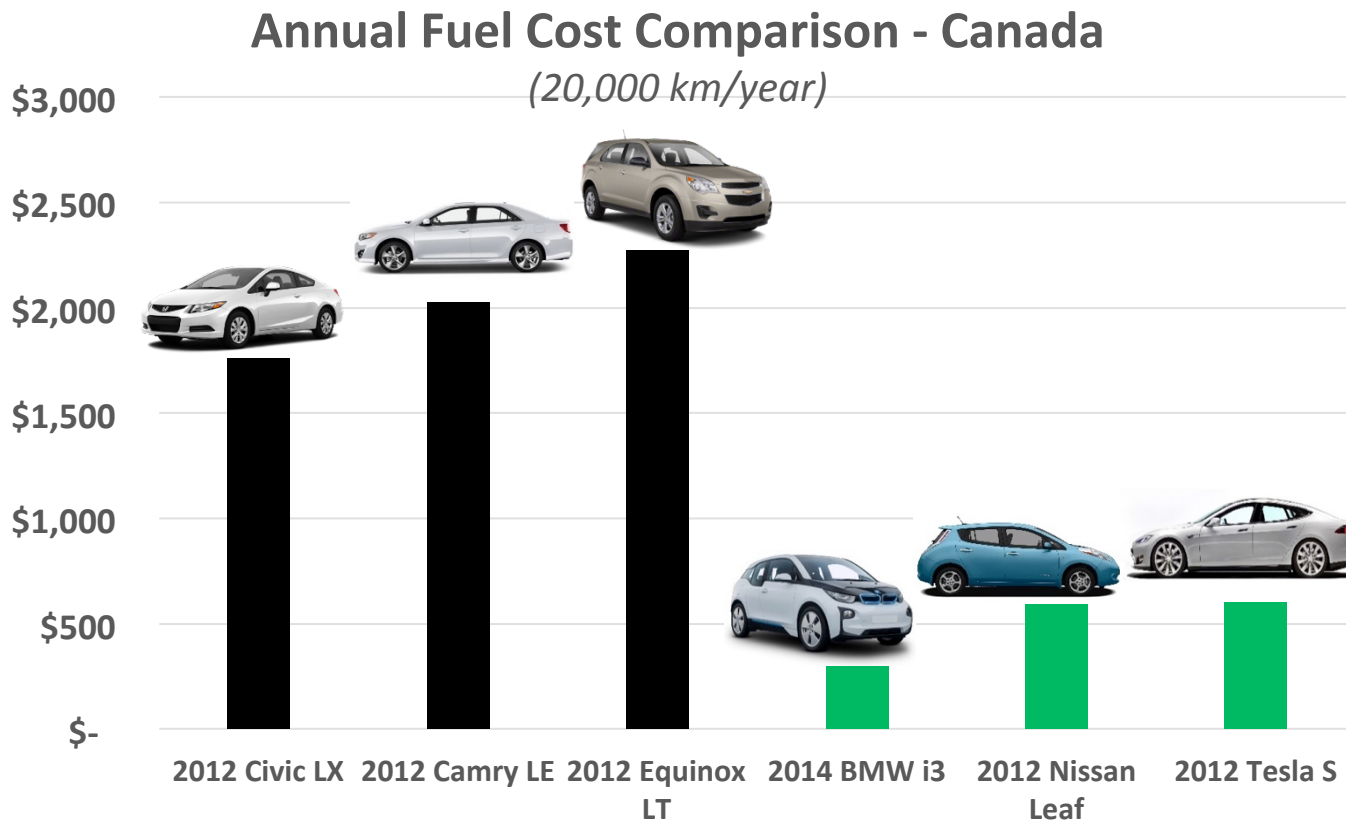
45% - 98% reduction in ghg emissions*
Up to 100% reduction of particulate matter



*Lifecycle emissions reductions in Canada compared to average gas vehicle



Benefits of EVs: Cost Savings (GAS!)



Benefits of EVs: Cost Savings (Maintenance!)

Gearboxes or automatic transmissions

Exhaust pipes

Engine blocks (although they need the casings)

Air flow meters

Knock sensors

Flywheels

Clutches

Shift linkages

Vacuum reservoirs or traditional brake boosters

Fan/drive belts

Spark plugs

A multitude of different gaskets

High tensile bolts for things like the heads rods or crank
(which are also redundant)

Universal joints other than in driveshafts

Fuel and oil tanks

Fuel and oil lines

Fuel level sensors

Cam chains or belts

Air, fuel and fuel filters

Spark plug leads

Distributors

A multitude of hall effect sensors



Benefits of EVs: Fleets



BC FLEET CHAMPIONS PROGRAM

Program supporting the West Coast Electric Fleets initiative

WEST COAST
ELECTRIC
FLEETS

- Demonstrated Benefits for **Fleets**
- 13 BC Fleets received EV suitability assessments (Local governments, university, car share, taxi, health authority, delivery service, utility, airport...)
- 285 gas vehicles tracked



BC FLEET CHAMPIONS PROGRAM

Program supporting the West Coast Electric Fleets initiative

WEST COAST
ELECTRIC
FLEETS

101 BEVs
recommended



84 PHEVs
recommended

100 vehicles

not recommended for replacement

- Average fleet would save ~ **\$53,000** each operating year (**\$477,000** over 9 years)
- Average expected savings per vehicle per year would be ~ **\$2,750**
- Average emissions reduction would be **600 tonnes** over service life
- Average emissions reduction per vehicle per year ~ **4.5 tonnes**

Benefits of EVs: Great Performance!



Benefits of EVs: Great Performance!

Even in Canada?



Accelerate Kootenays

Barriers to EV Adoption

1. Upfront **Cost** (and cost perception)
2. Charging **Infrastructure** / Range
(and Range Anxiety)
3. Lack of **Awareness**
4. Vehicle **Supply**

Upfront Cost Solutions

A screenshot of the CEV for BC website. The header features the logo "CEV for BC" with a power button icon, followed by "Clean Energy Vehicles for British Columbia". Below this, the text states "\$2,500 for PHEVs 4kWh-15kWh or \$5,000 for BEV or >15kWh". To the right is a green sports car with a "PROGRAM EXTENDED" badge. Further right is a navigation menu with links like "CEV Program", "Charging & Refueling Locations", "Dealers", "Incentive Funds Available", "About Us", "Contact Us", and "Media". Below the menu are icons for "Clean ENERGY", "Electric Vehicles", "Hydrogen Fuel Cells", and "Find A DEALERSHIP". A "FIND NOW >" button is also present.

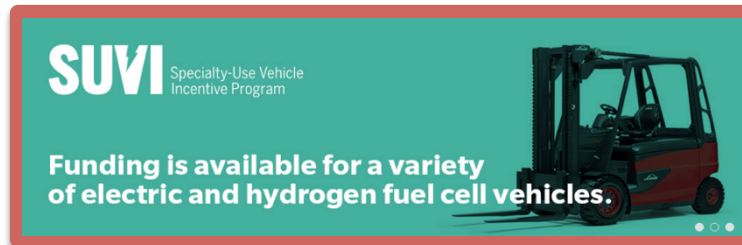
CEV for BC
Clean Energy Vehicles for British Columbia

\$2,500 for PHEVs 4kWh-15kWh
or
\$5,000 for BEV or >15kWh

PROGRAM EXTENDED

Find A DEALERSHIP
FIND NOW >

New passenger cars

A banner for the SUVI (Specialty-Use Vehicle Incentive Program). It features the "SUVI" logo in large white letters on a teal background, with "Specialty-Use Vehicle Incentive Program" in smaller text to the right. Below the logo, the text reads "Funding is available for a variety of electric and hydrogen fuel cell vehicles." To the right is a red and black forklift.

SUVI Specialty-Use Vehicle Incentive Program

Funding is available for a variety of electric and hydrogen fuel cell vehicles.

New “non passenger cars”

A banner for the BC SCRAP-IT Program. On the left is a green box with a circular arrow icon and the text "SCRAP-IT" and "BC SCRAP-IT® Program". Below this, the text says "Scrap an older car and choose:". To the right is a green car with a plug icon. Below the car, the text states "NEW EV = \$6,000 or USED EV = \$3,000".

SCRAP-IT BC SCRAP-IT® Program

Scrap an older car and choose:

NEW EV = \$6,000
or
USED EV = \$3,000

New or used passenger cars

Upfront Cost Solutions



• Eligible Vehicles

- Low Speed Electric \$2,000 - \$5,000
- Motorcycle \$2,000
- Electric Car Demo \$5,000
- Forklifts \$5,000
- Medium/Heavy Duty \$20,000 - \$50,000
- Airport/Port Specialty \$20,000 - \$50,000

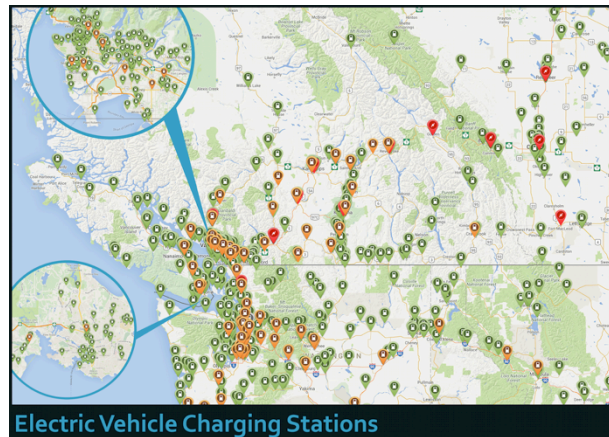


Barriers to EV Adoption

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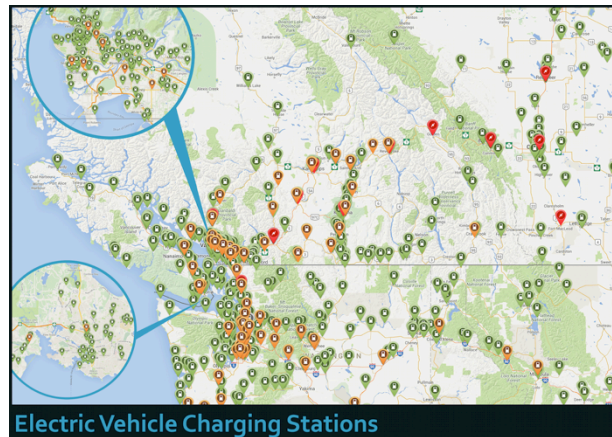
Charging Infrastructure Solutions

2. Charging Infrastructure / Range (and Range Anxiety)



Charging Infrastructure Solutions

2. Charging Infrastructure / Range (and Range Anxiety)



CHARGING SOLUTIONS & INCENTIVES



Charging Infrastructure Solutions

CHARGING SOLUTIONS & INCENTIVES



CHARGING INCENTIVES
for ***homes***

- 75% of costs up to \$750



CHARGING INCENTIVES
for ***residential buildings***

- 75% of costs up to \$4,000



CHARGING INCENTIVES
for ***workplaces***

- 50% of costs up to \$4,000 (L2)
- 50% of costs up to \$2,000 (L1)

Charging Infrastructure Solutions

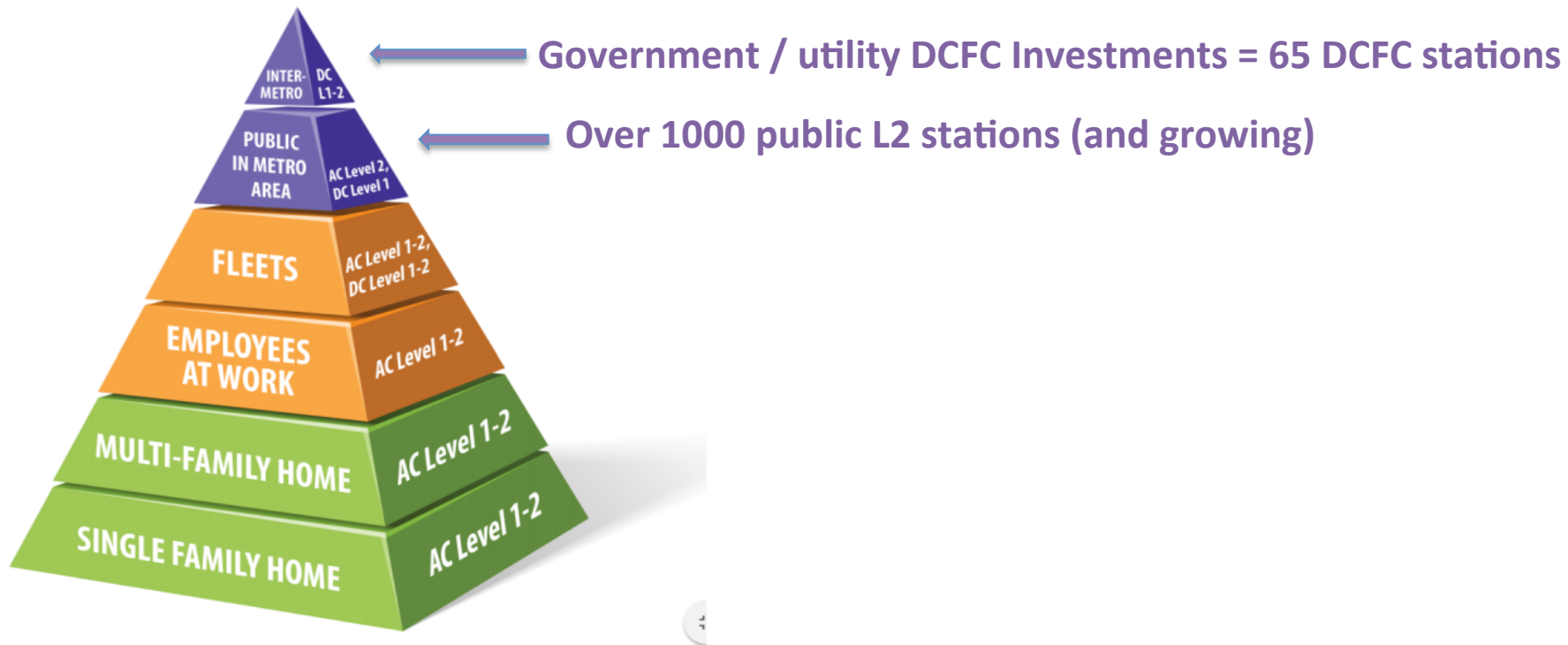


Local government policy/ bylaws for new builds

- City of Richmond (100% L2)
- City of Vancouver (100% L2)
- District of North Vancouver (20% L1 + 100% L1)
- City of North Vancouver (20% L2)
- City of Port Coquitlam (100% L2)
- District of Squamish (30% L2)
- District of West Vancouver (100% L1)
- City of Burnaby (100% to come)



Charging Infrastructure Solutions



14

Electric Vehicle Charging Station Corridors of Western Canada

Northern BC Network

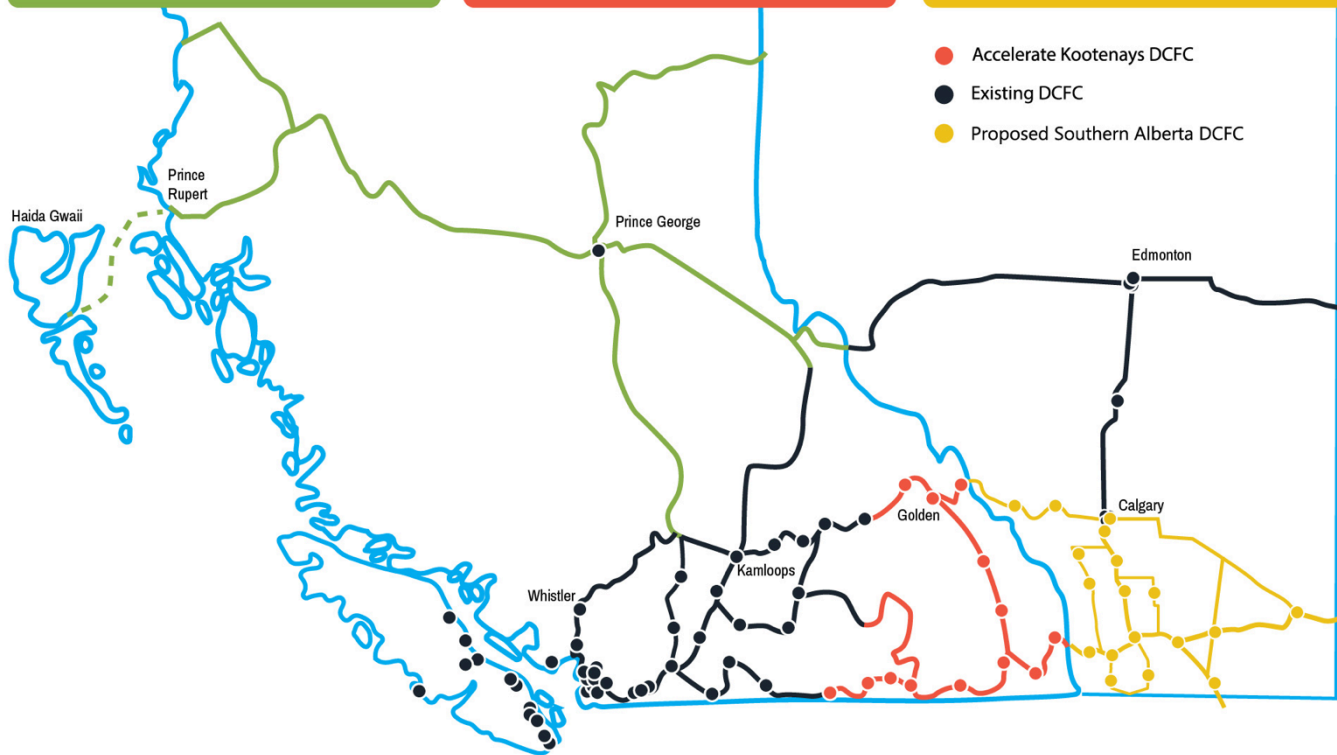
2018-2019: Detailed plan & prep capital
2019-2020: Charger deployment
1,240km plus evaluation of extensions

Accelerate Kootenays Network

13 DCFC | 40 Level 2's
2018 DCFC network complete
1,800km of highway

Southern Alberta Network

2017: Detailed plan & prep capital
2018: Capital applied for, partial infrastructure funding confirmed
2018/2019: Deployment



Highway 16/97 Electric Vehicle (EV) Network Feasibility Study

- Community-led project, directed by **5 regional governments**
- Planning and implementation facilitated by **Community Energy Association**
- Working collaboratively with **31 local governments** along the route from Kamloops to Haida Gwaii
- Creating an electric vehicle (EV) charging station network over **1,240 km**



Charging Infrastructure Solutions



A network designed to....

- support local priorities
- decrease community-wide greenhouse gas emissions
- drive economic development through EV tourism
- increase transportation choices for corridor residents and businesses
- reduce transportation costs and vehicle maintenance for new EV owners
- take a collaborative approach

Individual communities will decide the best locations for stations based on local priorities and feasibility, the capital structure, the ownership and operation model and overall project direction.



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It's time to
#EVolveToElectric

10 reasons to start driving an electric vehicle



emotive
THE ELECTRIC VEHICLE EXPERIENCE

emotive

THE ELECTRIC VEHICLE EXPERIENCE



MY NEXT CAR WILL BE

ELECTRIC

THE ELECTRIC VEHICLE EXPERIENCE

ASK ME IF I MISS

gas stations

THE ELECTRIC VEHICLE EXPERIENCE

EV Awareness Solutions



NEW Apply for EV Outreach Funding through the Community Outreach Incentives!

- Up to \$5000 towards EV events OR Plug In BC staff event support
- \$15000 towards broader EV campaign



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Representing groups and organizations that have been supporting the uptake of electric vehicles in BC. This is your hub to find out the latest on EVs.

www.pluginbc.ca

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E: cargue@pluginbc.ca

Sign up to test drive a PHEV Mitsubishi Outlander today!