



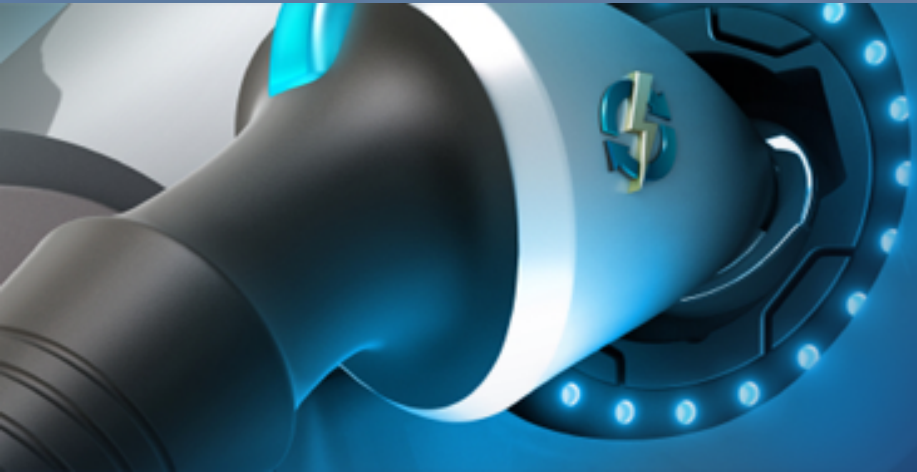
Electrifying Fleets: Trends, Barriers & Opportunities

Pete Thimmaiah
Transportation Analyst, Plug In BC

2019 Public Sector Climate Leadership Symposium

March 1, 2019 | Vancouver, British Columbia

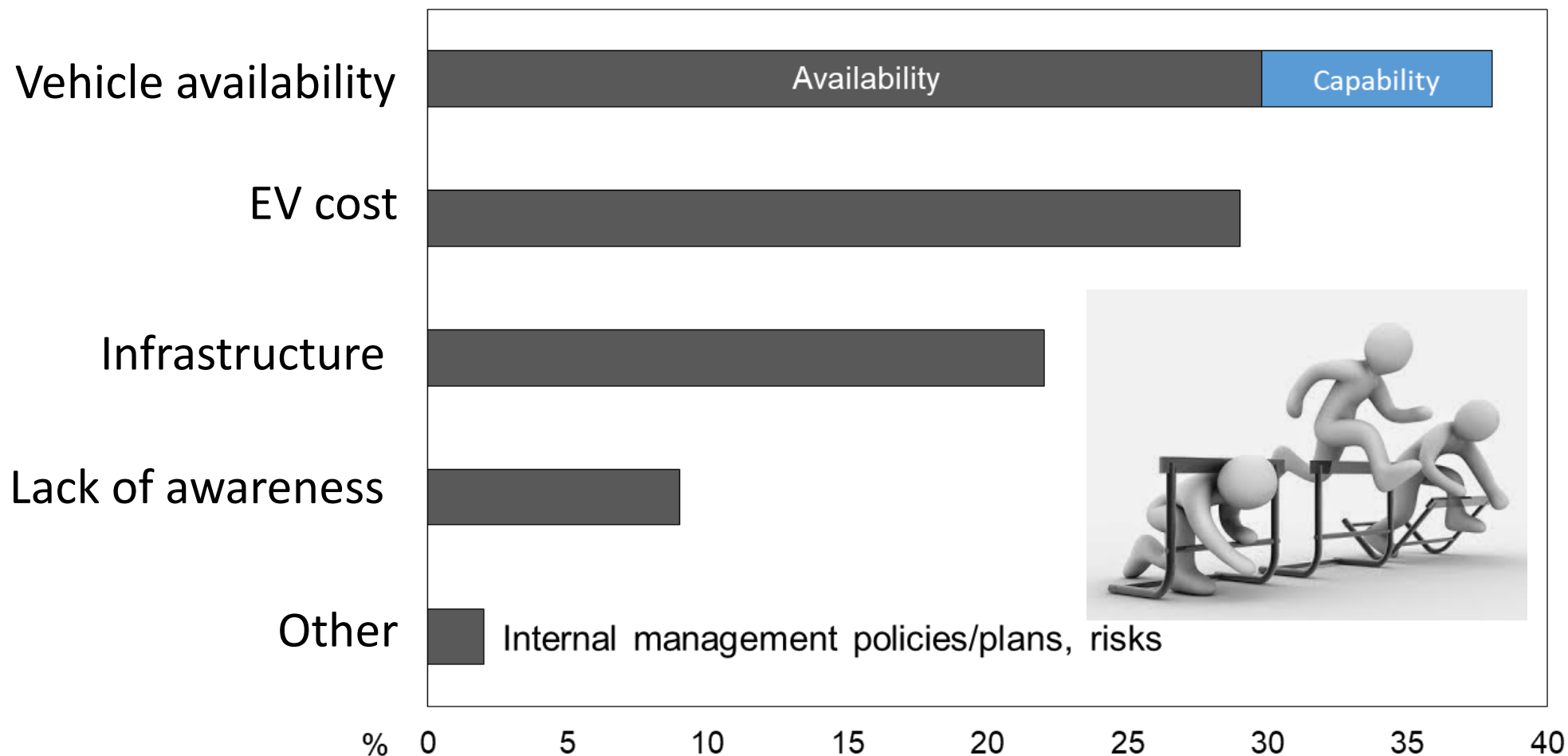
Accelerating Electrification in B.C. Fleets



- ☐ Accelerating electrification has been a priority for Plug In BC.
- ☐ One of the main focuses is on zero emission fleet transportation

Major Barriers that have Prevented Fleets from Electrification

Plug In BC surveyed 100 fleets



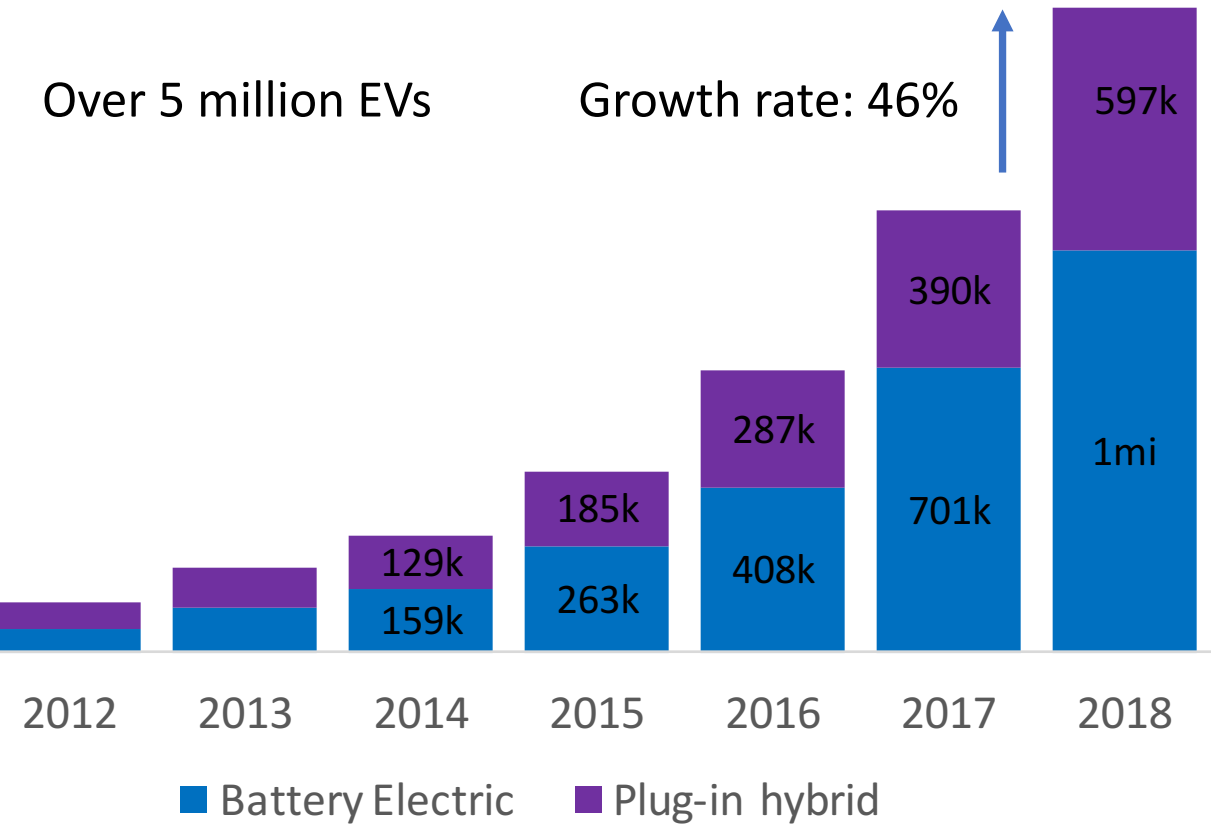
Breaking Barriers

Drivers

- ☐ Sustainability goals
- ☐ Lower cost of ownership
- ☐ Financial incentives
- ☐ Policy changes

Setting the Scene: Sales Trend by Type

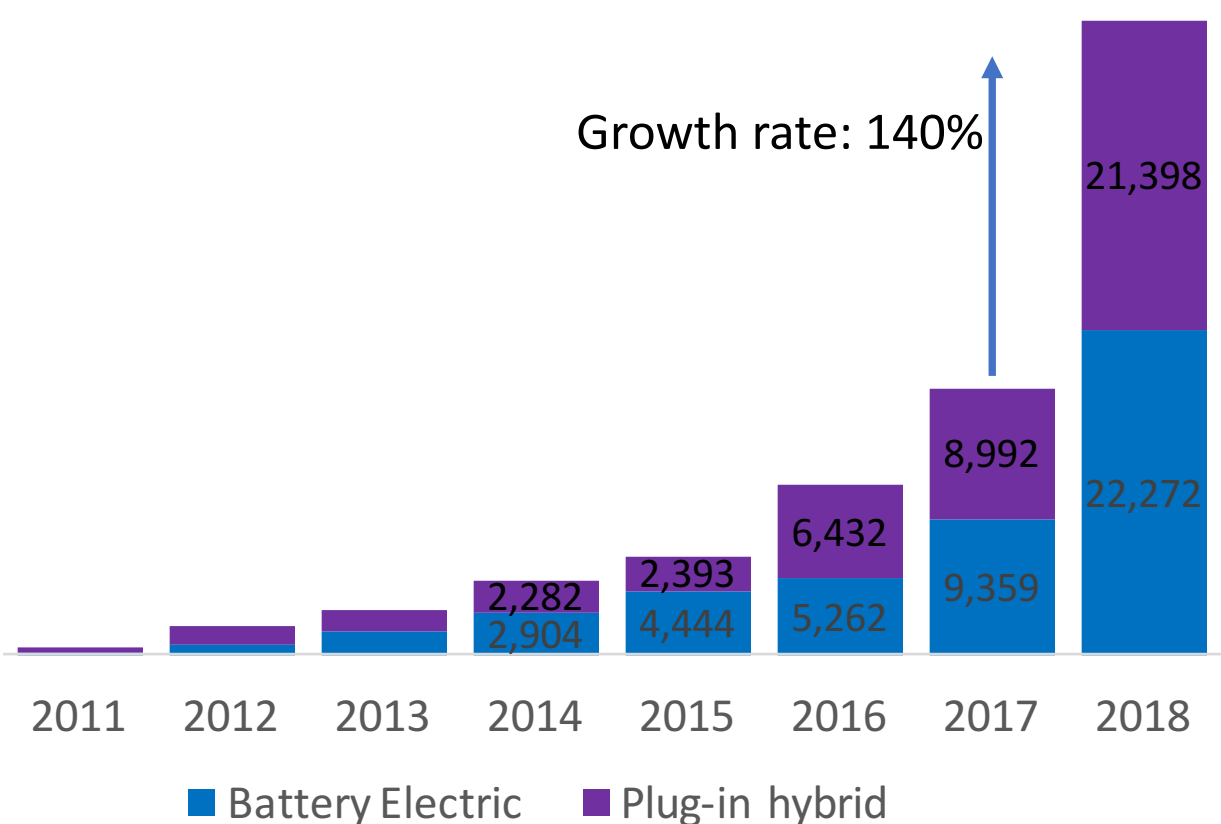
Global passenger EV sales



Bloomberg New
Energy Finance

In 2017, the global Fuel Cell car
stock surpassed 7200 units
compared to 3 million EVs

Canada passenger EV sales



CanadaEVsales.com /Matthew, Plug In BC

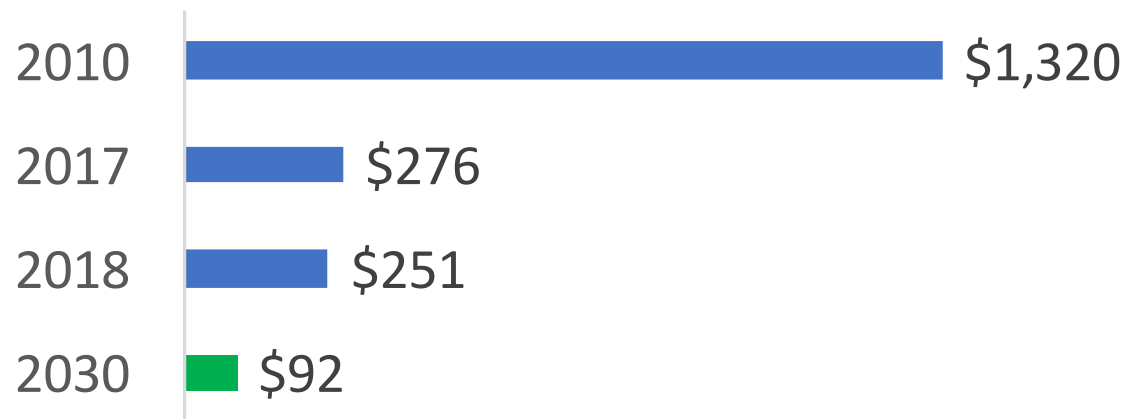


Global Trends: Setting the Scene

Important factors driving the EV market forward:

- ☐ Lithium-ion battery prices have fallen in recent years.
- ☐ Policy support
- ☐ Rising commitments from automakers

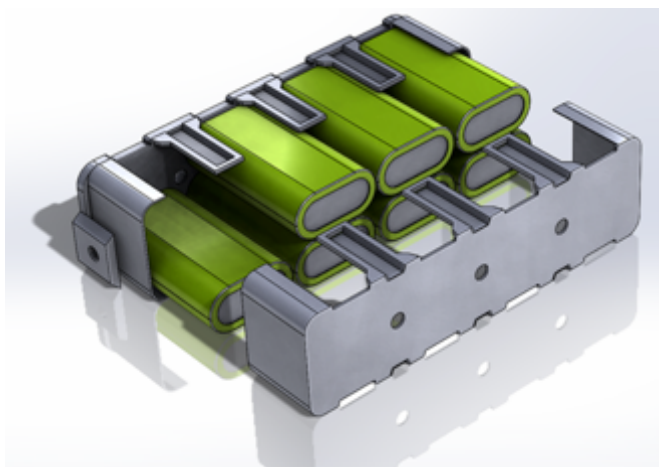
Battery Prices



CAD/kWh

Bloomberg
NEW ENERGY FINANCE
PREDICTION 2030

63% DROP



2010

Prices
Dropped
81%

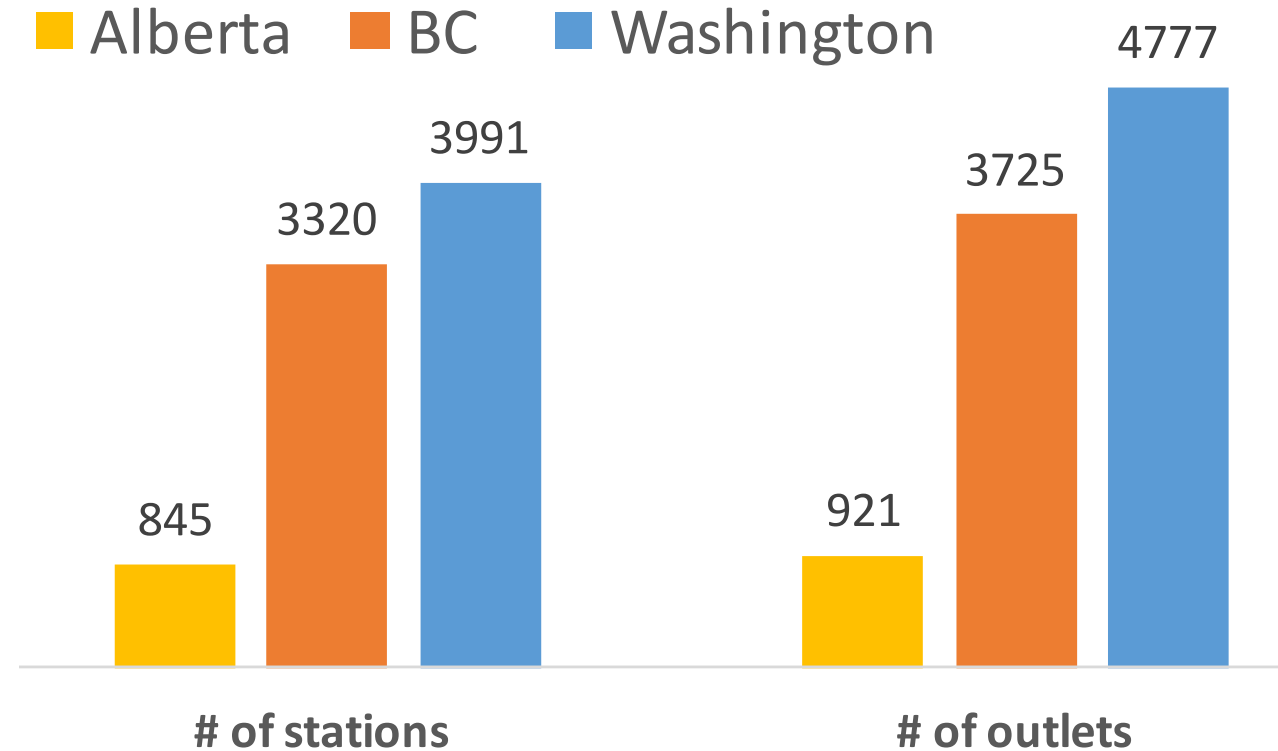
Energy Density
Improved
5-7% Per
Year



2018

Policy Support

- EV purchase incentives, to keep the market rolling
- Charging station incentives
- Local and international bans of ICEVs



Demand side

Clean BC
Policy

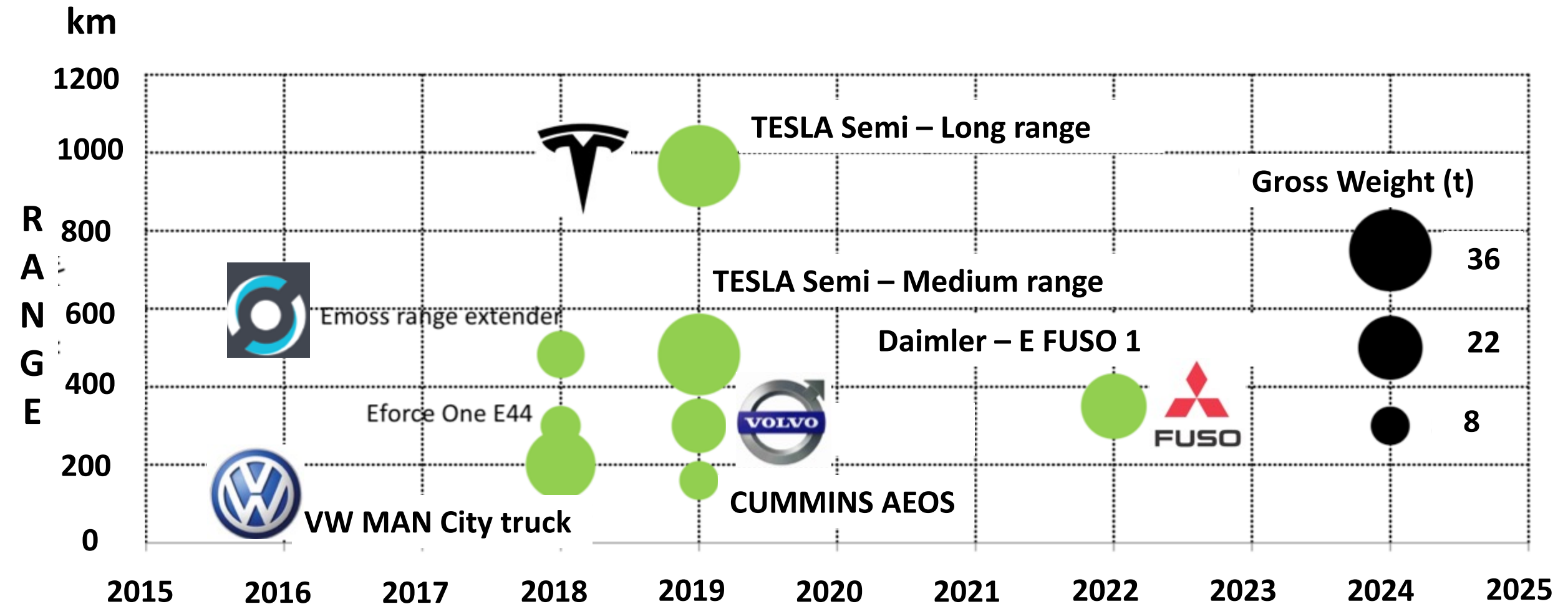
Supply side

Policy Support

- ❑ 100,000 EVs on road
- ❑ 21,000 publicly accessible chargers
- ❑ Ratio of 5 EVs for every plug-in point



Rising Commitments from Automakers



BNEF: 2018 EV Outlook

- A growing number of electric freight truck models will soon hit the market, offering larger sizes and wider ranges.

Suite of Specialty Use Vehicles in B.C.

Motorcycle

Low Speed

Medium-duty & Heavy-duty



16, 22, 45, 49 seats



E Lion
School bus



Freightliner
Odyne
(Hybrid)



Vespa Elettrica



EV STAR



19-100 seats



eCanter



COBUS



Suite of Specialty Use Vehicles in B.C.

69 MODELS



MOTORBIKES

27 MODELS



LOW SPEED VEHICLE

37 MODELS



MEDIUM & HEAVY DUTY

17 MODELS



AIRPORT & PORT

174 MODELS



FORKLIFT

- ❑ Total of 37 makes and 324 models available in B.C. covered by incentives

SUVI

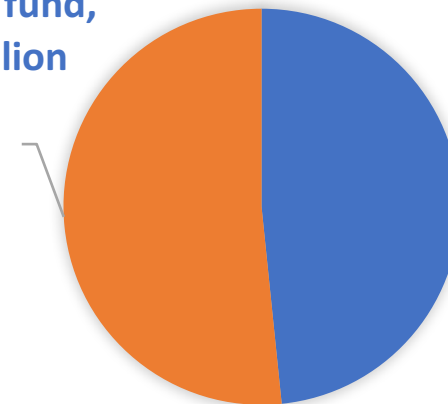
Specialty-Use Vehicle
Incentive Program



- ❑ After purchase rebates
- ❑ \$2,000 up to \$50,000
- ❑ Fleets and individuals
- ❑ 5 rebates per fleet
- ❑ 90 days after purchase

TOTAL FUND ALLOCATED : \$2.2 MILLION

Remaining fund,
\$1.14 Million



Total
incentive
given,
\$1,066,691

SUVI: Specialty Use Vehicle Incentive Program

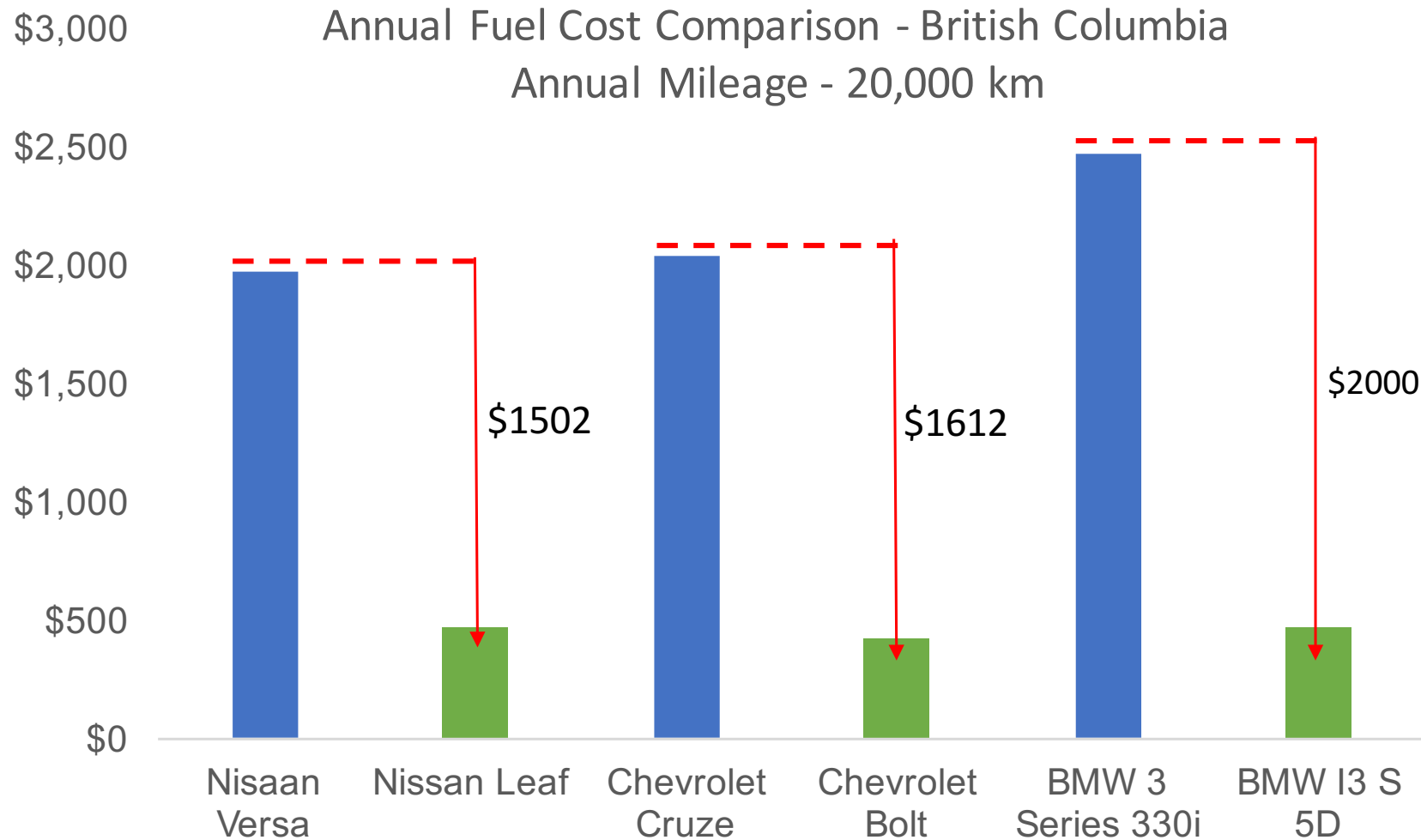


BYD C6 2016
MSRP: \$338,000
Max Incentive: \$50,000



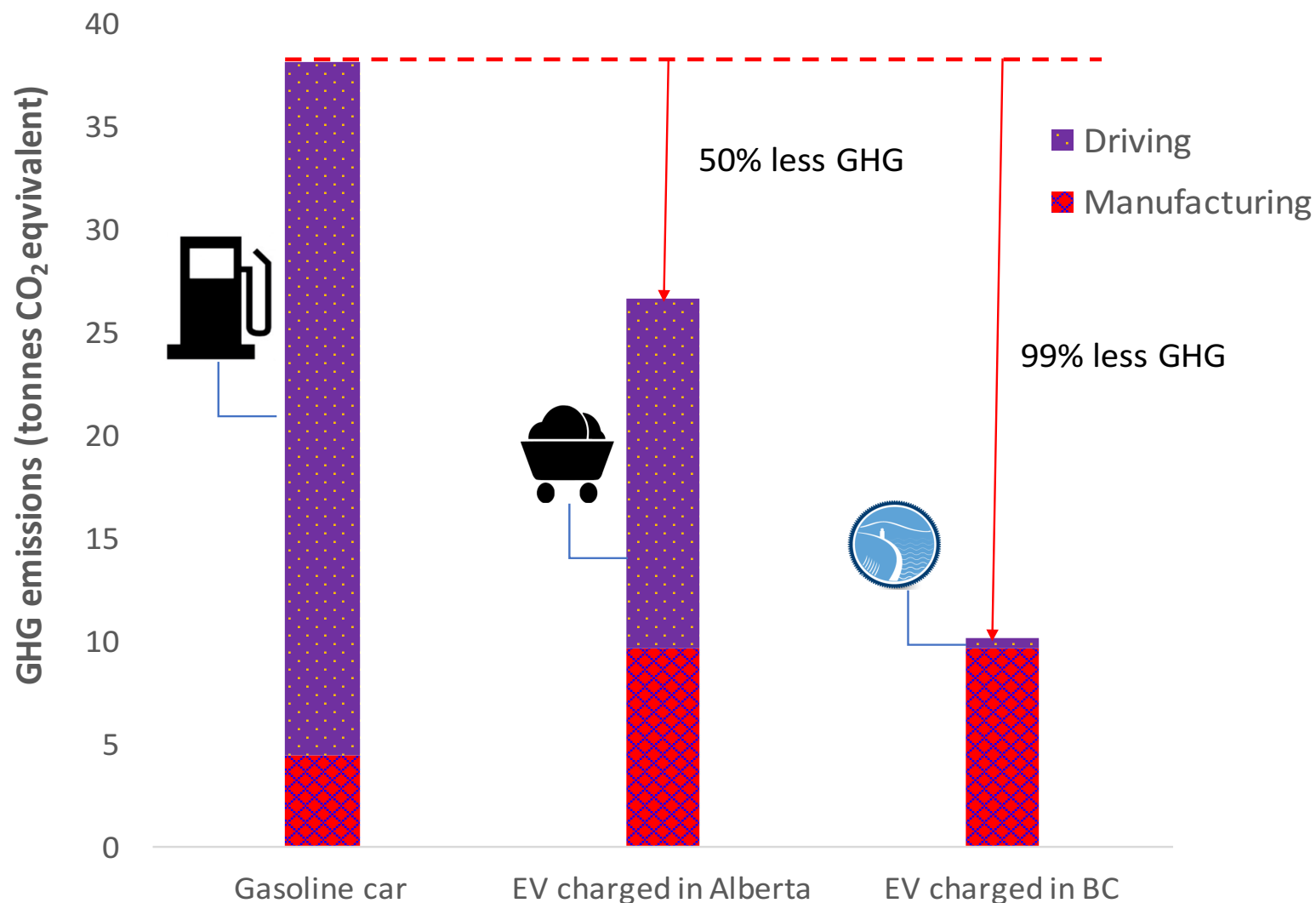
Mitsubishi Ecanter 2018
MSRP: TBD
Max Incentive: \$20,000

Economic Benefits from Fleet Electrification



Source: CAA 2018

Environmental Benefits from Fleet Electrification



P. Thimmaiah, C. Argue and R. Davis (2018) "Electric vehicles as part of Canada's climate change solution" **Policy Options**

Medium and Heavy Duty Tool for B.C. Fleets



Jointly developing a Medium and Heavy Duty Toolkit, under **Fleet Champions Program**

- ☐ Helps fleets in decision making,
- ☐ Faster transition to clean energy vehicles,
- ☐ Total Cost of Ownership,
- ☐ Helps choosing a suitable vehicle option for a specific application.

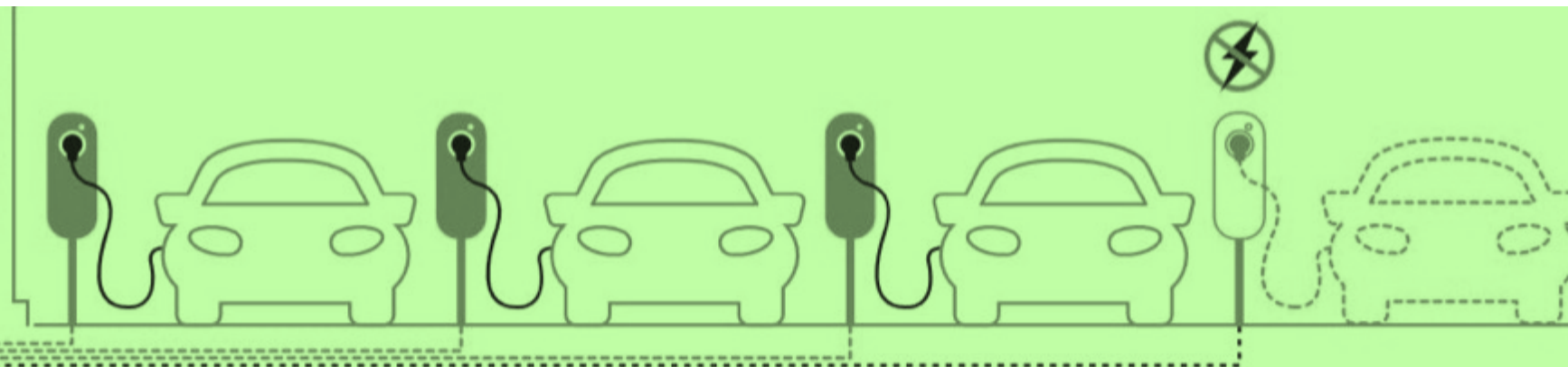
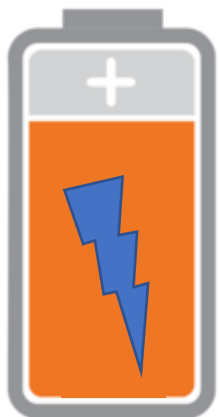
Timeline: June
2019

Charging Infrastructure Considerations

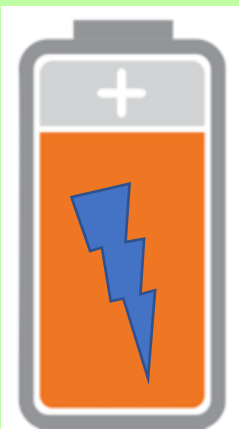


- ☐ Vehicle expansion plan (1yr, 5yrs, 10yrs)
- ☐ Utilization: km per day per vehicle?
- ☐ Return to base?
- ☐ Power capacity (at facility)?
- ☐ What charging type is needed? (level 1, level 2 and DCFC)?
- ☐ Non-networked or networked chargers? (Do I need power management, data tracking?)

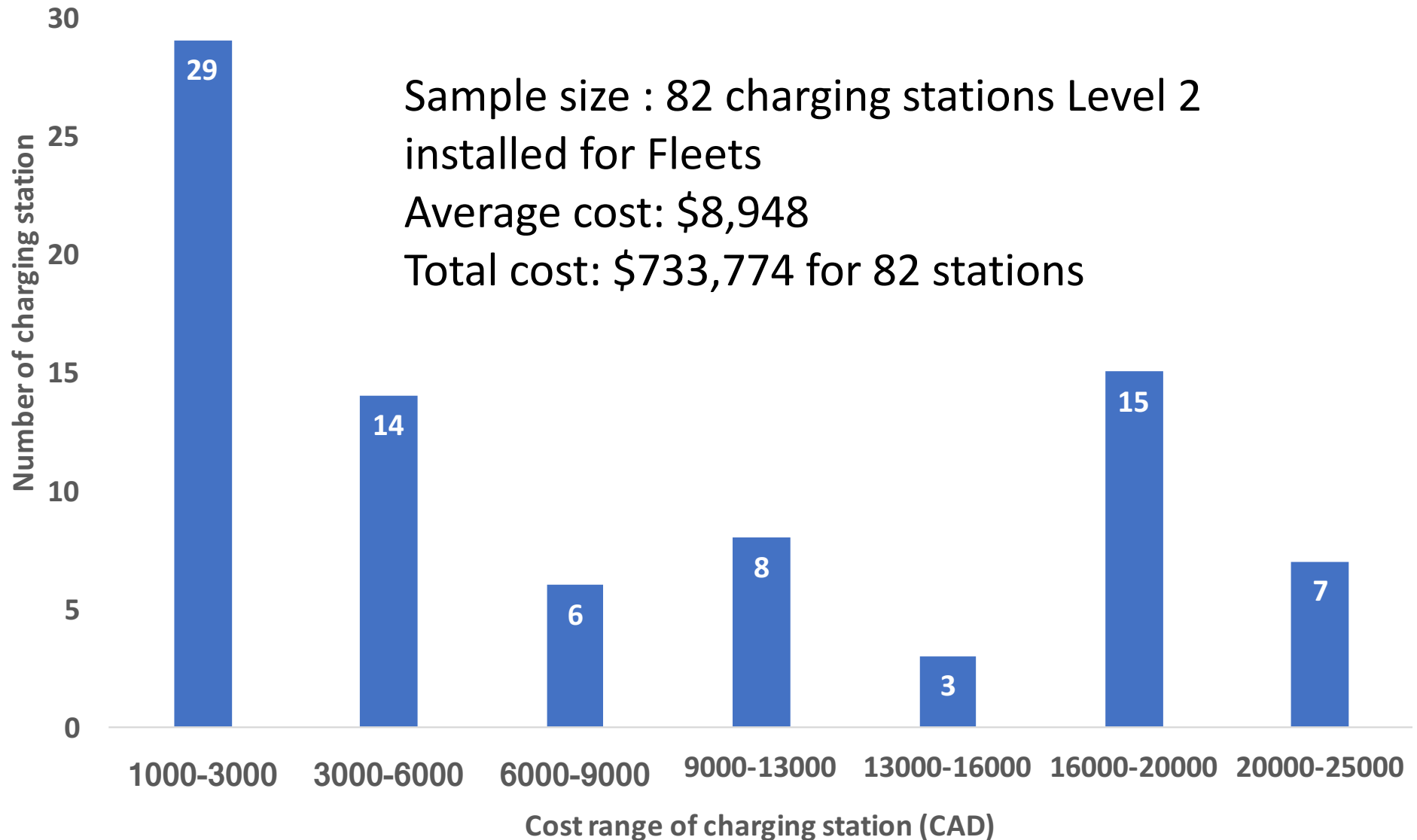
Power Management System



Allows multiple vehicles to charge on same circuit.



How Much Does it Cost to Install Charging Stations



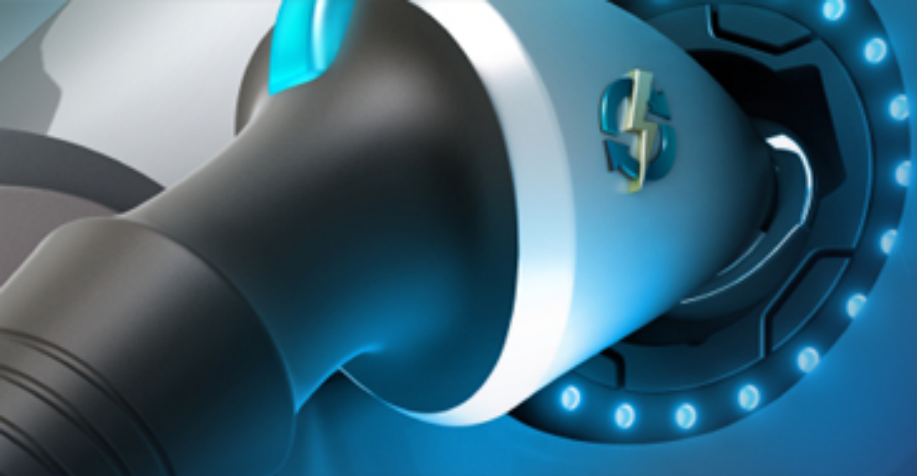


Join WCEF!



Medium and Heavy Duty Vehicle Toolkit





Further info

Pete Thimmaiah, PhD

Transportation Analyst, Plug In BC


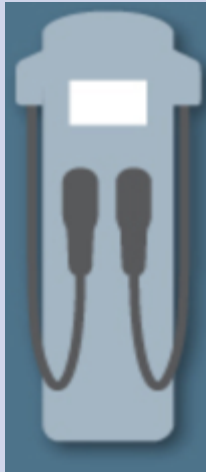

Fraser Basin Council

P: 604-488-5365





E: pthimmaiah@pluginbc.ca

www.pluginbc.ca

Charging Infrastructure Types

Charge Level	Level 1	Level 2	Level 3
			
kW	1.4	3.5-19	25-250+
100 miles of range	20 hours	2-10 hours	30 minutes
AC/DC	AC 110 V 20 Amp	AC 208-240V 40-80 Amp	DC 200-600V 400 Amp 1 or 3 phase

Connector Types

Standard	A/C J1772	DC CHAdeMO	SAE Combo CCS	Tesla
	 SAE J1772	 CHAdeMO	 SAE Combo	
Vehicle Types	Most vehicles have a J1772 port	Japanese Vehicles	Non-Japanese, Non- Tesla vehicles	Tesla
Key Facts	Universal, but 20 kW max	Nissan, Honda	Will this standard overtake CHAdeMO?	Tesla can convert to J1772