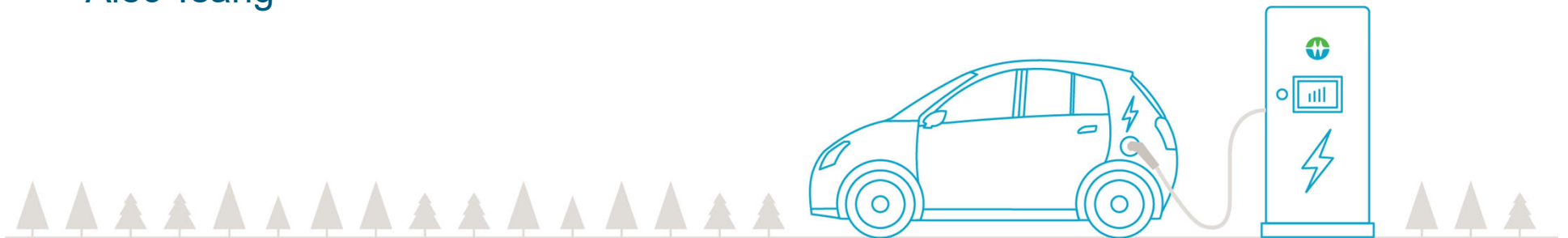


EV Charging in BC – BOMA Event

12 June 2019

Alec Tsang



 **BC Hydro**
Power smart

Outline

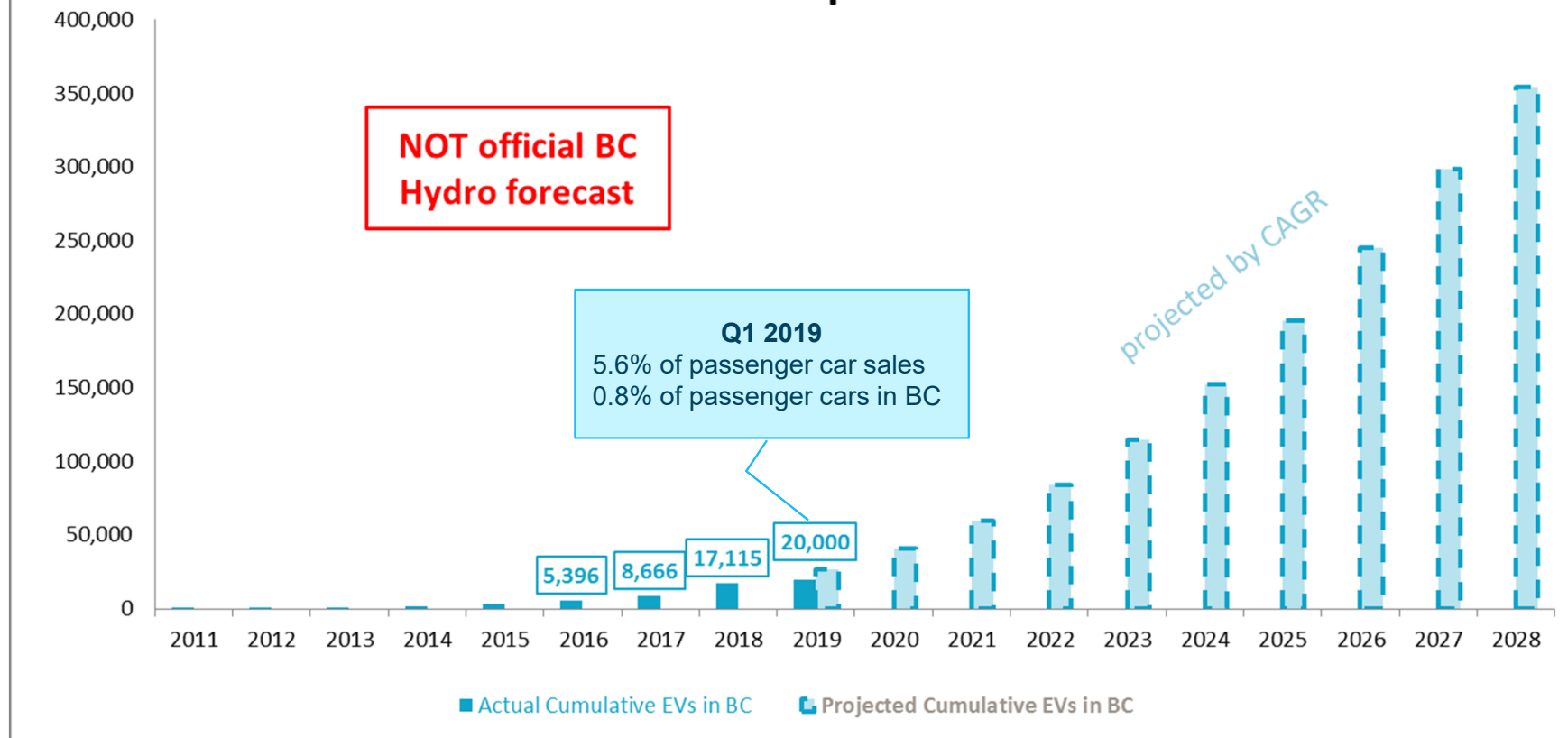
- EV Trends
- Government Policy & Regulations
- Grid Impacts & Integration
- Charging at Multi-Unit Residential Buildings (MURB)
- Fast Charging



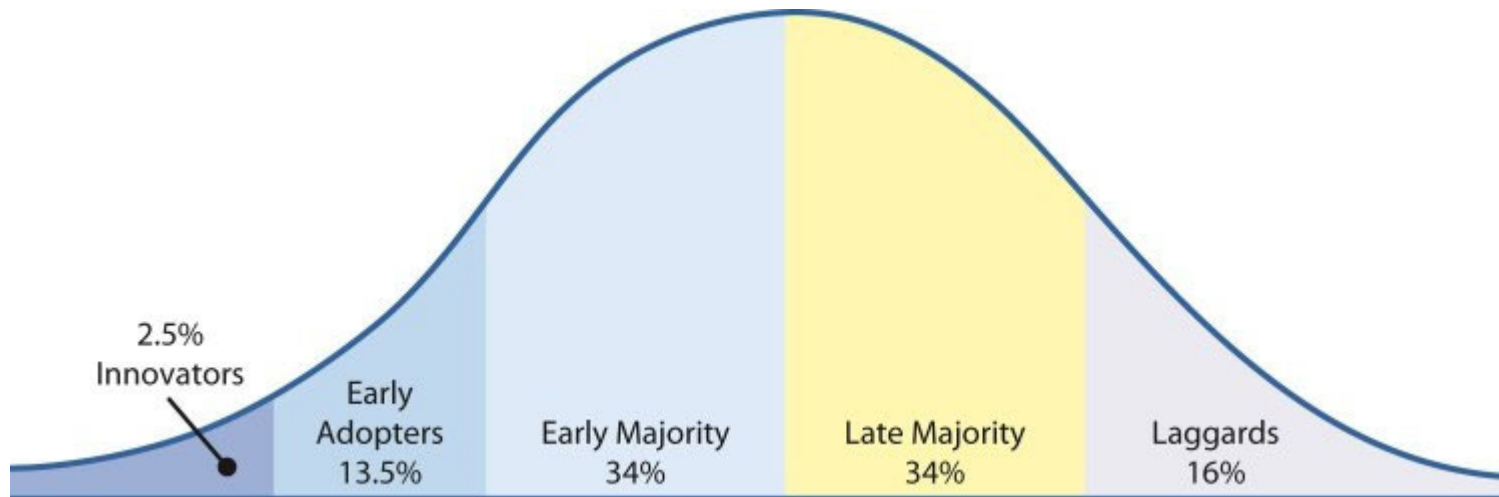
EV Trends

- EV Sales growth
- Emerging EV Market Segments
- Driven by battery technology advancements

Cumulative EV Population in BC



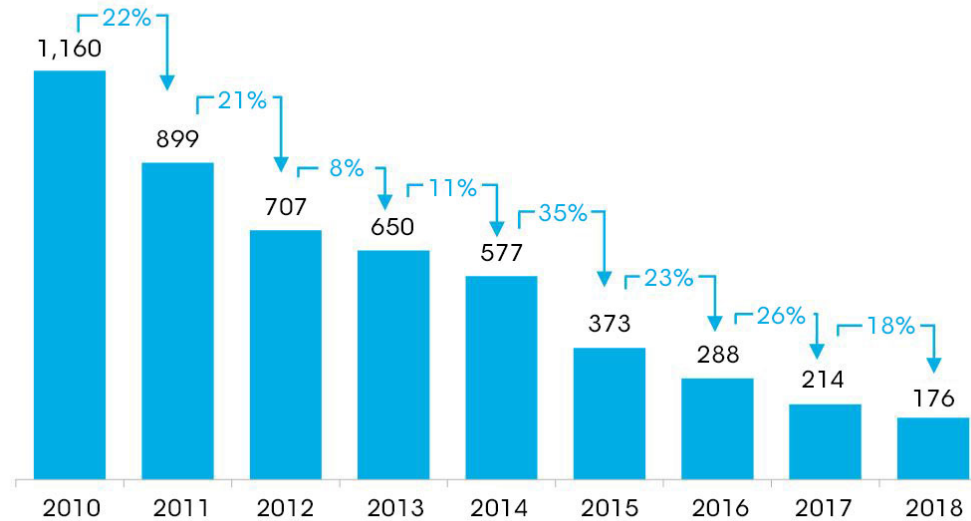
Technology Adoption Curve



Battery Advancements – Cost Drop

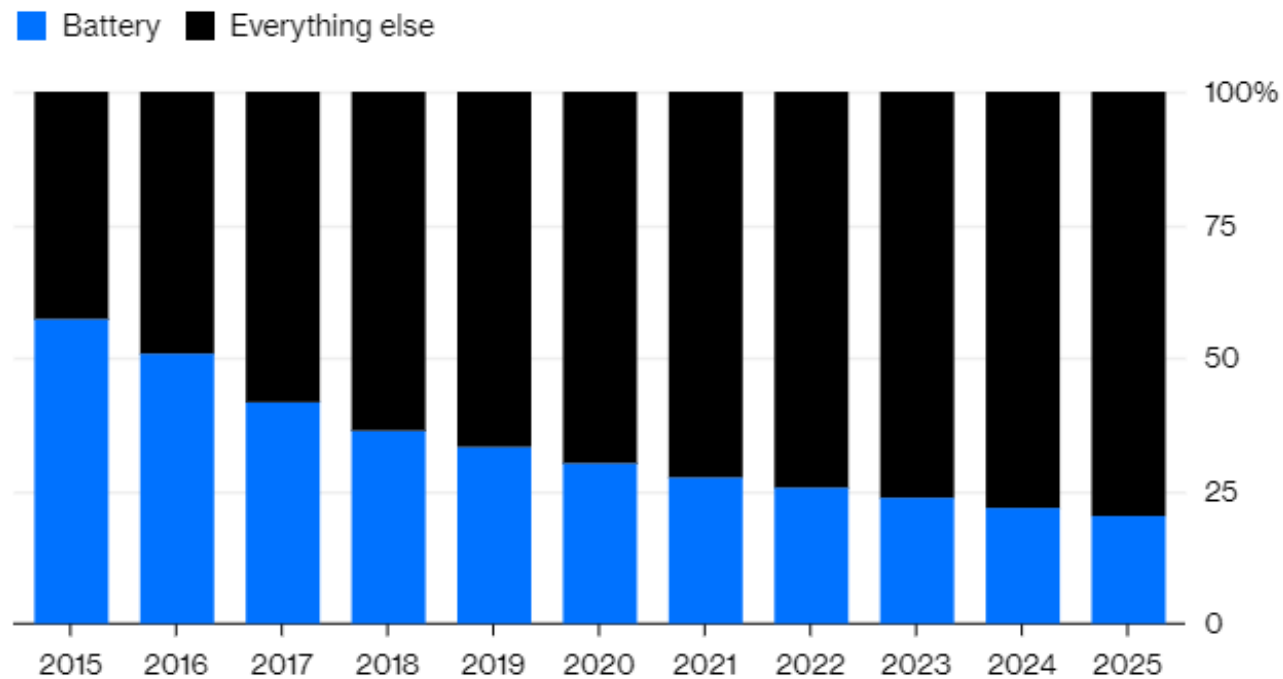
Lithium-ion battery price survey results: volume-weighted average

Battery pack price (real 2018 \$/kWh)



Source: BloombergNEF

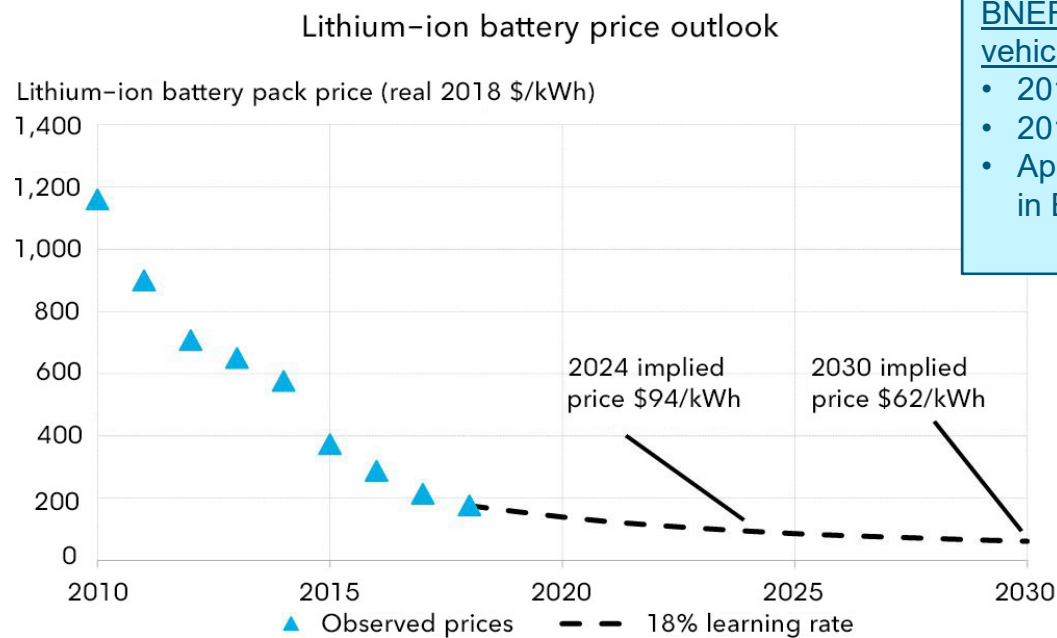
Battery Advancements – Percentage of Vehicle Cost



Source: BloombergNEF

Note: Includes profit margins and costs other than direct manufacturing costs.

Battery Advancements – Forecast

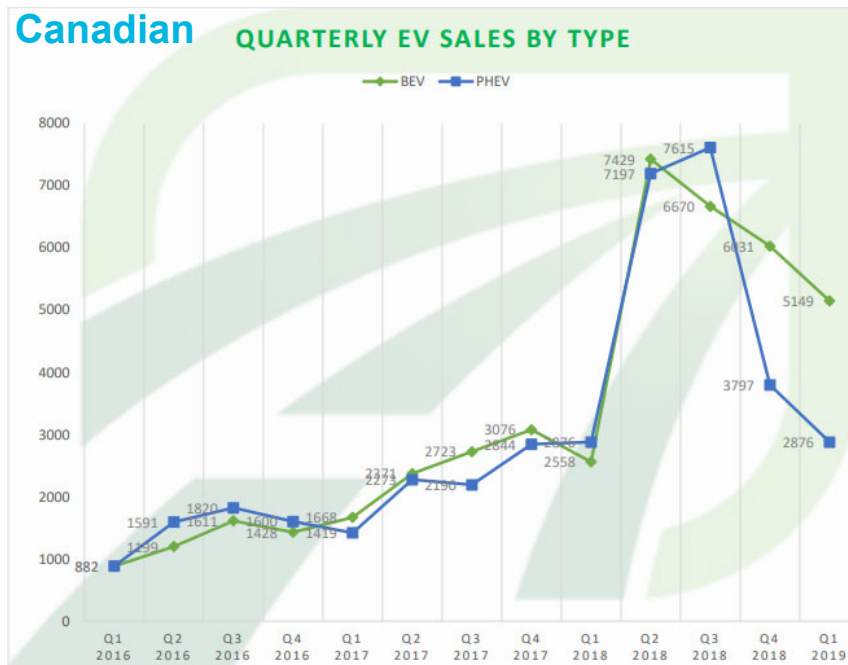


BNEF – forecast of EV cost parity with combustion vehicles

- 2017 – cost parity by 2026
- 2018 – cost parity by 2024
- Apr 2019 – cost parity by 2022 for large vehicles in EU

Source: BloombergNEF

EV Models & Trends



- 40+ models to choose from
- 14 more models in 2020
- Growing in popularity and size

Available EV Models & Trends



Emerging EV Segments



CleanBC & Federal EV Funding for Cleaner Transportation

- ZEV Mandate
 - 100% EV (light duty cars and trucks) sales by 2040
 - Targets: 10% ZEV sales by 2025 & 30% ZEV sales by 2030
- 2019 Budget
 - \$42M for point of sales incentives
 - \$20 million for new public fast-charging stations and H₂ fueling stations
 - \$5M for home and workplace charging
 - \$5M for charging stations at highway rest areas and government buildings
- Federal EV incentive - \$5,000
- Federal Infrastructure - \$96.4M for EV & Alternative Fuel Infrastructure (electric, natural gas & H₂)

EV Rates & Regulatory

BC Utilities Commission (BCUC) – EV Inquiry

- Phase 1 outcome report delivered Nov 2018 – EV charging is exempt; sales of EV charging like gas stations
- Phase 2 is ongoing – the role of the utility?
- BC Hydro's current position – do not compete with private sector

Grid Impacts & Integration

Setting the context



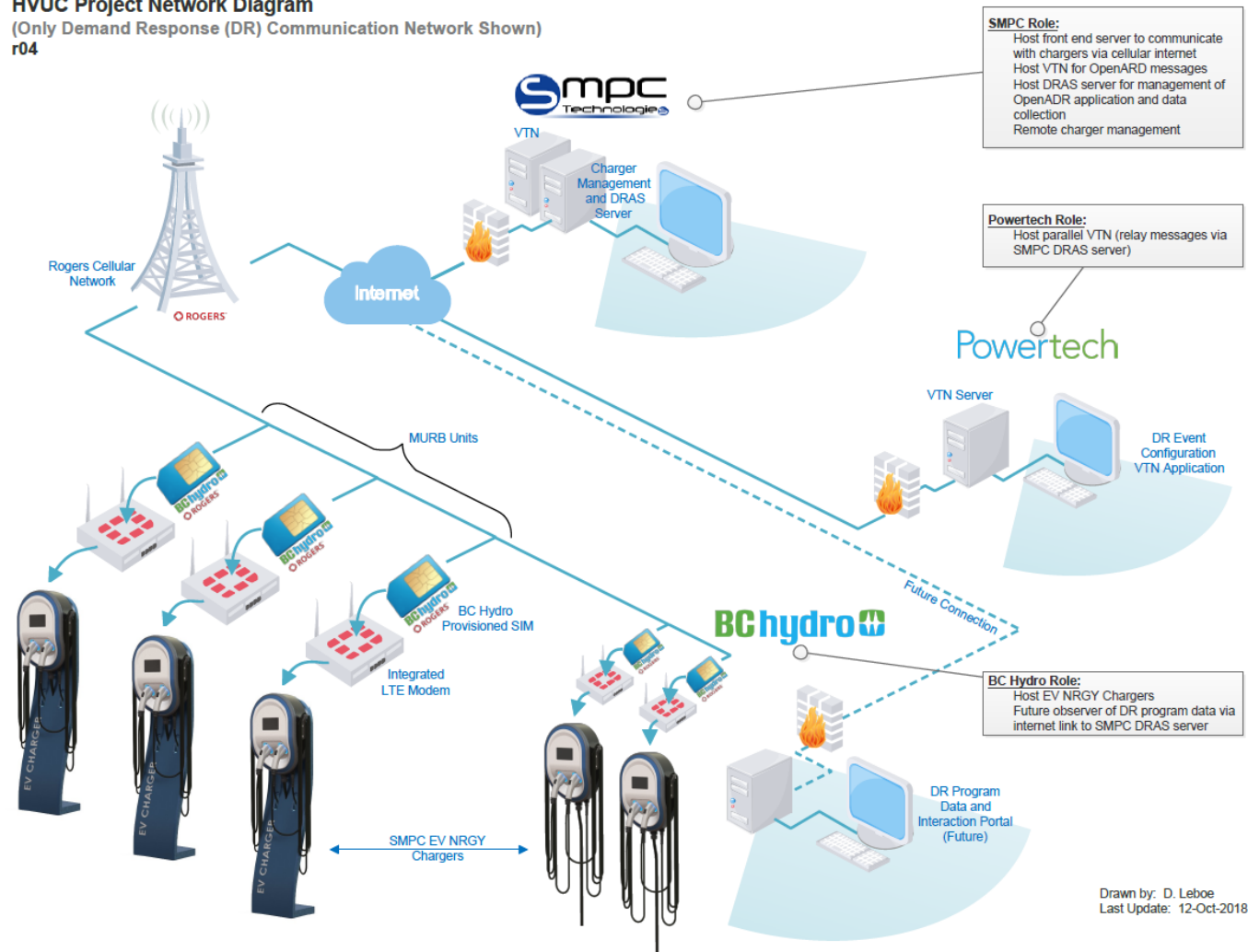
- EV charging predominantly takes place at home and in the fleet yard
- EVs are discretionary loads
- Fast charging stations are becoming large spot loads

MURBs

- Municipal EV requirements new developments & retrofits
- Impacts on service size
- Load management – Local vs Grid
- **BC Hydro Project:**
 - EV Metering
 - 347/600V Level 2 station



HVUC Project Network Diagram
 (Only Demand Response (DR) Communication Network Shown)
 r04



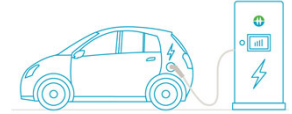
Drawn by: D. Leboe
 Last Update: 12-Oct-2018

Fast Charging

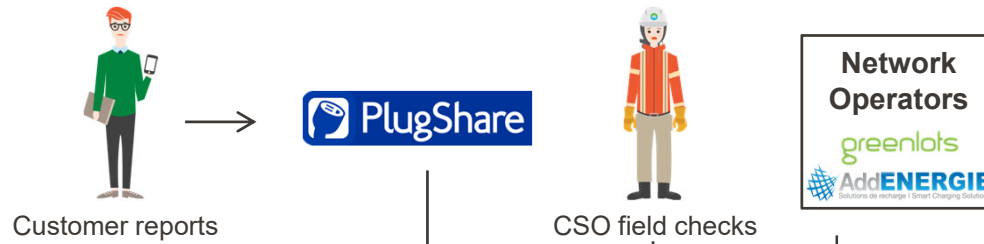
- Deployments plans 2019, 2020
- Operations
- Deployment strategy
- Next generation fast chargers

The map displays the proposed rail network for the 2019-2020 period in British Columbia. The legend indicates that red dots represent installed stations, blue dots represent planned stations for 2019, and a green line represents planned stations for 2020. The map shows a network of rail lines connecting various locations across the province, including Vancouver, Prince George, and Kamloops. A scale bar indicates 25 miles or 40 kilometers. An inset map shows the location of the study area within British Columbia.

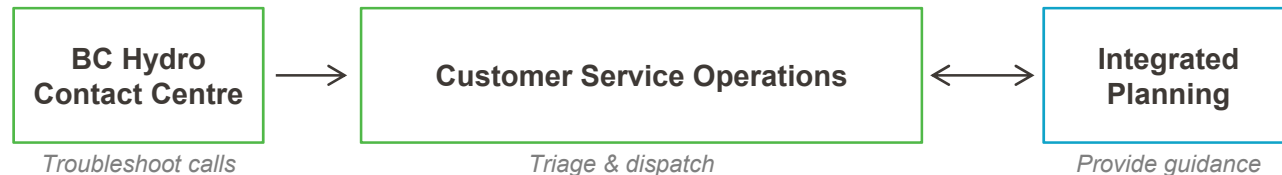
Fast charging station restoration



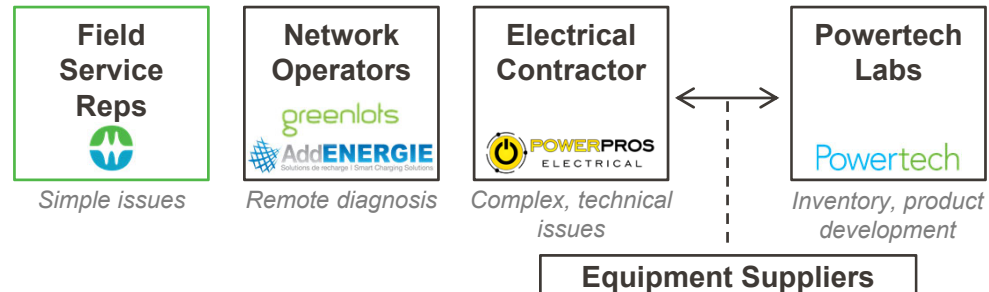
1 Identify issue



2 Manage issue



3 Resolve issue



Tesla Supercharger

12 charge ports x 120kW



Electrify America

charge ports @ 150kW & 350kW



