Delivering economical solutions to drive industry's transition towards decarbonised operations

Hoa Cleantech

EV Charging Infrastructure Strategy for 132 Vehicle Fleet

Case Study January 2020

Our Client, the City of Abbotsford, asked Hoa Cleantech to develop a high-level charging infrastructure strategy, concept design and roadmap for the electrification of 132 light to heavy-duty vehicles within their fleet.

What we did:

Using our proprietary software, Hoa Decarbonisation Platform, we:

- Analysed the existing electricity loads and fleet utilisation data.
- Calculated energy loads from an equivalent electric vehicle (EV) fleet.
- Identified the supporting infrastructure to meet the utilisation requirements of the equivalent EV fleet (electrical infrastructure and charging stations).
- Developed Smart Charging strategies.
- Analysed impact of solar and battery systems.
- Developed a charging infrastructure concept design.
- Developed a 10-year roadmap for the gradual replacement of fleet vehicles to EVs and installation of supporting infrastructure.

ABBOTSFORD

The City of Abbotsford is a municipality in British Columbia (BC), Canada. They operate a fleet of vehicles and moving equipment from their main Yard to carry out services such as:

- Garbage, recycling and compost collection.
- Maintenance works.
- Snow and ice control.

NOTE: The majority of electricity generated within BC is renewable and comes from hydro-electric dams.

Key Outcomes

- The electrification of the 132-vehicle fleet would reduce greenhouse gas emissions by approximately 1,200 to 1,300 tons annually.
- Level 2 charging stations can meet the average daily utilisation requirements for 98% of the fleet between 17:00 and 08:00 the next day. However, depending on the battery pack size, vehicles may not need to be fully charged each night.
- Level 3 fast charging stations are only required to meet the peak utilisation of approximately 30% of the fleet vehicles.
- The existing 208V electric service to the Yard needs to be upgraded to a 600V service to meet future energy demands of an EV fleet.
- The Smart Charging strategy minimises the electrical infrastructure costs through a load sharing design; and reduces the energy costs of an electrified fleet by up to 60% through a dynamic charging model.
- A 360kW solar system could save around $14,000 per year in energy costs. However, without storage, it would likely not impact the peak demand as the vehicles re-charge overnight.
- A 2MWh battery could reduce the peak demand by 35% resulting in future annual savings of approximately $18,000.
- Based on the predicted energy load profiles and technology and cost trends, solar and battery systems are recommended to be installed in 5-10 years' time.

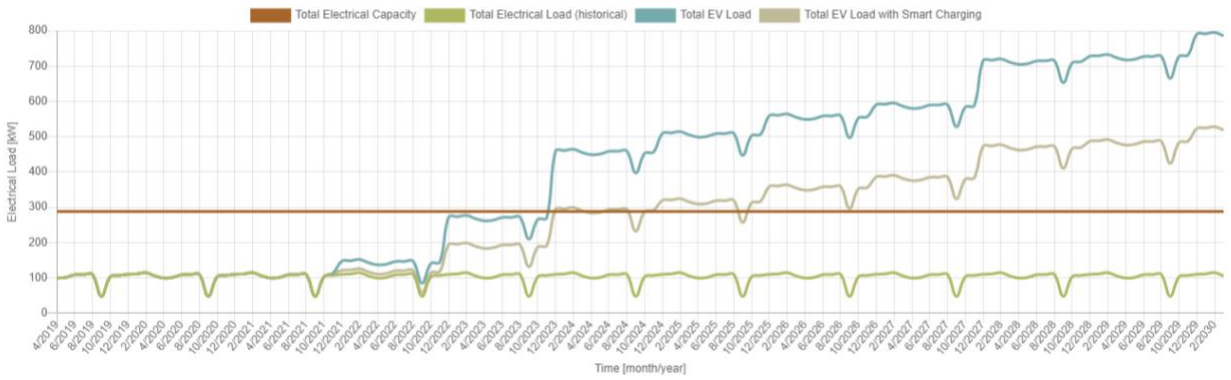

Figure 1 – Predicted peak power demands over 10-years from the integration of EVs into the fleet