FORESIGHT

BC NET ZERO INNOVATION NETWORK

Efficient Charging

March 2026

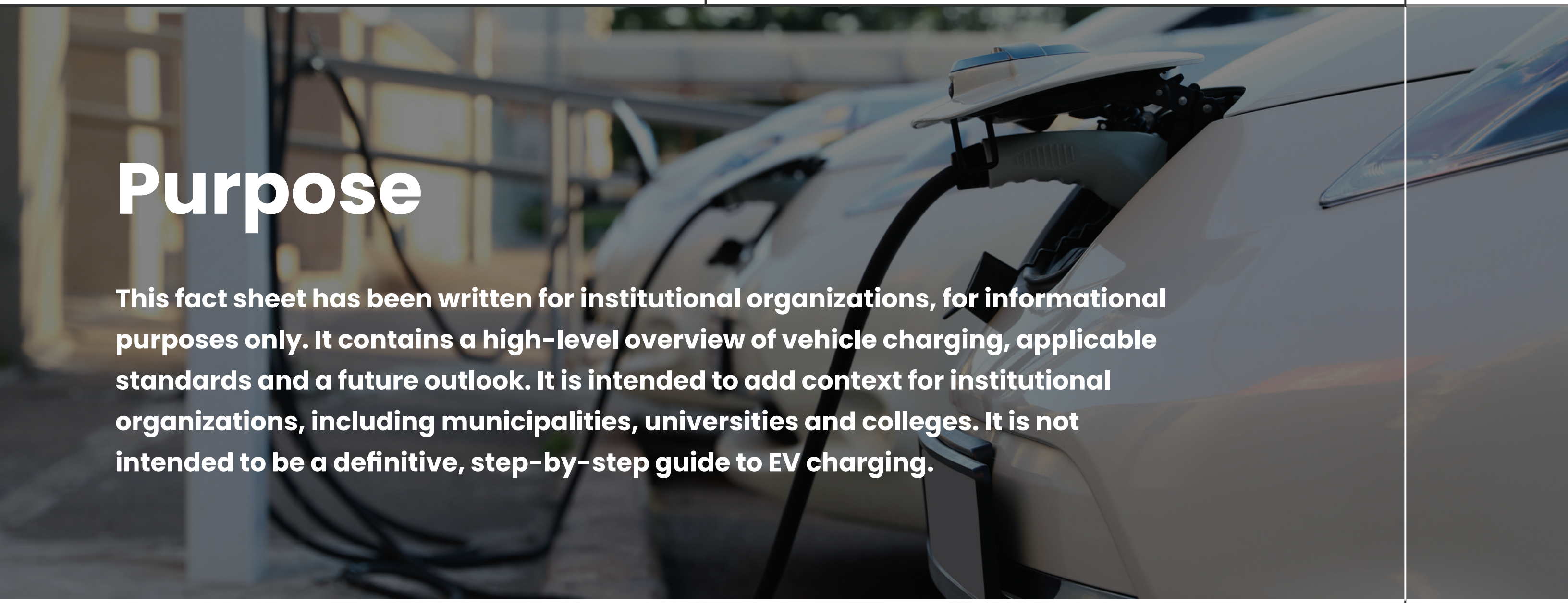
About Foresight

Foresight Canada helps the world do more with less, sustainably. As Canada's largest cleantech innovation and adoption accelerator, we de-risk and simplify public and private sector adoption of the world's best clean technologies to improve productivity, profitability, and economic competitiveness, all while addressing urgent climate challenges.

Foresight's Net Zero Innovation Network in British Columbia mitigates risk through strengthening capacity across sectors, advancing decarbonization and sustainability. Through our extensive network and active working groups, we partner with industry and collaborate with innovators, academia, government, communities, and First Nations to develop and deploy impactful projects.

Leveraging BC's powerful natural resources, BCNZIN fosters collaboration and connection across four sectors:

Mining	**Transportation**
Forest Bioeconomy	**Water**



Purpose

This fact sheet has been written for institutional organizations, for informational purposes only. It contains a high-level overview of vehicle charging, applicable standards and a future outlook. It is intended to add context for institutional organizations, including municipalities, universities and colleges. It is not intended to be a definitive, step-by-step guide to EV charging.

Overview

In the transition to electric fleets, efficiency is no longer just a technical metric—it is a financial and operational imperative. Traditional charging infrastructure can lead to inefficient power spikes, underutilized electrical service, and expensive utility demand charges. By prioritizing smart infrastructure management, organizations can maximize their current electrical capacity, ensuring that every kilowatt is deployed strategically based on vehicle duty cycles. This efficiency-first approach avoids a costly cycle of necessary infrastructure upgrades, allowing facilities to scale their EV adoption without outgrowing their existing footprint.

Beyond simple efficiency, these optimizations lay the groundwork for a more dynamic relationship with the electrical grid and renewable energy solutions. As infrastructure becomes more sophisticated, vehicles transition from being simple energy consumers to active grid participants through Vehicle-to-Grid (V2G) technology. By utilizing bidirectional hardware, fleets can leverage their idle battery capacity to discharge energy back into the grid during peak times. This transforms a parked bus or truck from a dormant asset into a dispatchable energy resource, creating new opportunities for revenue generation and long-term grid stability. Furthermore, by combining solar generation with battery storage and intelligent software, operators can decouple from volatile grid pricing and maximize profitability through peak shaving and energy arbitrage. Integrating these technologies transforms the charging station from a passive consumer into an active energy hub.

Realizing this potential requires confronting a critical infrastructure reality: most existing buildings lack the electrical infrastructure capacity to support the significant demand of EV charging and upgrading this infrastructure is prohibitively expensive. Furthermore, the majority of public chargers are unidirectional, designed to only send electricity in one direction, to the vehicle.

To bridge the gap between current infrastructure and future V2G aspirations, institutions need to consider complementary approaches: electric vehicle energy management systems (EVEMS) to optimize existing capacity, and bidirectional-ready hardware to enable vehicles to eventually serve as energy sources.

As the demand for EV charging infrastructure expands, strategic procurement choices can help to reduce costs, minimize costly local electrical grid upgrades, and support organizational sustainability goals. This fact sheet outlines key considerations to ensure that investments are future-proof and reliable choices.

Key Considerations

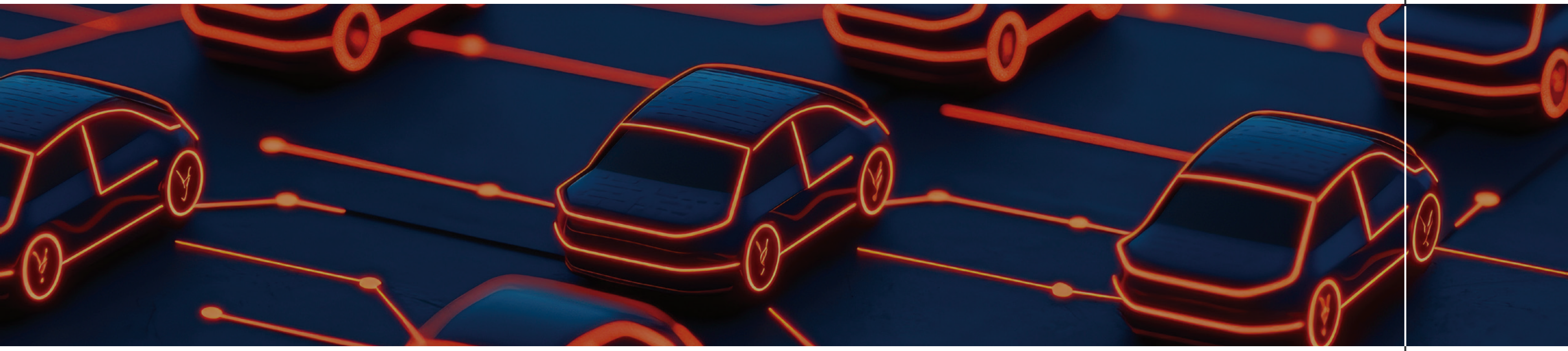
Before procuring any equipment, institutions must also ensure compliance with Canadian safety regulations. The Canadian Electrical Code (CEC), particularly section 86, governs the installation of Electric Vehicle Supply Equipment. Section 86 addresses wiring methods, equipment construction, overcurrent protection, and disconnecting means specific EV charging. All charging equipment sold and installed in Canada must be certified to applicable standards by CSA Group or Underwriters Laboratories of Canada (ULC).

1. **Prioritize efficient hardware referencing appropriate standards.** Energy efficiency should be a core requirement, particularly for standby power consumption. Procurement specifications should differ by charger type:
    a. DCFC (Direct Current Fast Chargers): Specify compliance with CSA 810:23, Energy efficiency and test methodology for EVSE DCFCs. This standard addresses efficiency across a range of load conditions, including energy consumption in the "no vehicle" mode. This standard is harmonized with ENERGY STAR but is more applicable to the Canadian context.
    b. Level 2 AC Chargers: Specify ENERGY STAR certification. ENERGY STAR-certified chargers use approximately 40% less energy than standard models when in standby mode. A new CSA standard for Level 2 charger efficiency is under development and has been published for comment. Once finalized, this will become the applicable Canadian standard.
2. **Maximize existing infrastructure.**
    a. Ensure that EVEMS equipment meets applicable standards:
        i. CSA/ANSI C22.2 No. 343, Electric vehicle energy management systems covers the design, manufacture and testing of EVEMS that provide control to safely manage electrical loads.
        ii. Other acceptable certifications include cUL, ULC, cETL, CSA, or cQPS.
    b. Review existing reports for more information and outlook on expected future conditions.

3. **Consider operational efficiencies: time-of use and smart charging.**
   a. Smart chargers can respond to grid signals and electricity price offers allowing flexibility to meet business needs while taking advantage of cost savings.
   b. At a minimum, chargers should be programmable to take advantage of off-peak charging hours.
   c. Networked (interconnected) chargers permit remote management, load balancing/peak shaving and data collection on usage patterns.
4. **Ensure equipment is future ready.**
   a. Vehicle to everything (V2X): Bi-directional charging represents a major future opportunity. When procuring fleet or vehicle chargers, consider specifying bidirectional capable hardware. This will ensure assets are ready to participate in future V2G programs.
   b. Integration with renewable energy sources: Additionally, pairing EV charging with on-site renewables like building integrated photovoltaic or solar parking lot canopies, can offset charging loads and support institutional carbon reduction goals.

Applicable Standards and References

- **CSA Group Research**, Electric Vehicle Energy Management Systems, May 2019
- **CSA TS-802:24 | Electric vehicle infrastructure deployment guidance.** The goal of the guidance document is to promote safe and consistent charging infrastructure across Canada. This guidance document provides recommendations (rather than mandatory requirements) across five key areas:
  - Distribution
  - Site layout and accessibility
  - Installation guidance
  - Interoperability
  - Reliability and performance
- **CSA C810:23 | Energy efficiency and test methodology for EVSE DCFCs.** This standard specifies a standard method for calculating the energy efficiency of electric vehicle supply equipment (EVSE) for direct current fast charging (DCFC) across a range of load conditions and defines minimum requirements for these operating modes. Previous standards ignored parasitic losses (e.g. standby power and heating, particularly in cold weather). This standard seeks to quantify the "non dispensable" energy these chargers consume when no vehicle is present.
- **Natural Resources Canada | Electric Vehicle Chargers.** Energy Star certified vehicle chargers on average use 40% less energy than standard models in standby mode. Some chargers are "smart grid" ready.
- **Pembina Institute,** Planning to Charge: Electric truck charging infrastructure and electricity demand in the GTHA, January 2026
- **Technical Safety BC,** Information Bulletin: Electric Vehicle Supply Equipment (EVSE) and Electric Vehicle Energy Management Systems (EVEMS) | TSBC



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