

ELECTRIC VEHICLE & PUBLIC CHARGING STRATEGY

PUBLIC SYNOPSIS

April 2024

Background

The City of Fredericton adopted its Climate Change Adaptation Plan in 2020 and its Community and Corporate Energy and Emissions Plans in 2021. In February 2022, the city adopted stronger GHG reductions targets: a 50% reduction by 2030 and a commitment to net-zero by 2050.

To meet these targets, the City of Fredericton wants to transition vehicles operating within the city to be zero-emission and has engaged Dunsky Energy + Climate Advisors to produce an electric vehicle (EV) strategy for light-duty vehicles. As a part of this process, the City has conducted a survey of residents, as well as a stakeholder workshop to gather feedback on EV charging needs and potential City Actions. This document outlines the Proposed City Actions based on this feedback and Dunsky's research and expertise.

Fredericton's Municipal Plan and CEEP identify strategies to reduce transportation emissions which include investment in and promotion of active transportation and public transit. The City is also pursuing an electrification plan for its own fleet in parallel to the development of this EV strategy. This strategy is intended to be understood and implemented in the context of a wider approach to transportation emissions reduction in Fredericton which includes a reduction in residents' reliance on personal vehicles, as well as converting what personal vehicles remain into lower-emission options (i.e. electric vehicles).

Definitions

EV - Electric Vehicle (for the purposes of this document, we consider light-duty vehicles only)

ZEV - a Zero-Emissions Vehicle is a vehicle that either produces no tailpipe emissions or has the potential to produce no emissions, including fully-electric (BEV) and plug-in hybrid vehicles (PHEV)

BEV - Battery Electric Vehicle, a fully electric vehicle

PHEV - Plug-in Hybrid Electric Vehicle, an electric vehicle with a fossil fuel backup engine

LDV - Light-Duty Vehicle, including cars, SUVs and light-duty pickup trucks, but excluding larger medium- and heavy-duty vehicles (e.g. buses, delivery trucks and vans, street maintenance vehicles, etc.)

EVSE - Electric Vehicle Supply Equipment, also known as a charger, charging station, or charging port.

Level 2 - an electric vehicle charging port which can deliver up to 20kW and is most common for home charging, fleet charging, and public charging where vehicles are parked for longer periods (1 hour +)

DCFC - Direct-current Fast-charging, an electric vehicle charging port which can deliver from 25 kW to 350 kW and above and is most common along highways or other locations where vehicles need to charge quickly (less than 1 hour)

EV-ready - a parking space which is EV-ready has installed all the required electrical infrastructure to support a Level 2 charger, up to and including an energized outlet, but not the charger/charging station itself.

EV energy management system (EVEMS) - a system to control EV charging electrical loads comprised of monitor(s), communications equipment, controller(s), timer(s) and other applicable devices.

Multi-residential buildings - residential buildings with more than three units, including condominiums and apartments.

GHG - Greenhouse Gas

Barriers to EV Adoption

Despite growing sales globally and across Canada, Frederictonians still face several barriers that impede wide-spread adoption of EVs, most notably:



Incremental Purchase Cost: The higher upfront cost of EVs relative to their Internal Combustion Engine Vehicle (ICEV) equivalent is a barrier to EV adoption. This was cited as the top barrier to owning an EV for respondents to our survey of Fredericton residents. Although lifetime cost savings from avoided gasoline or diesel fuel costs, combined with reduced maintenance costs, can result in a lower total cost of ownership (TCO) for EVs, many consumers do not use a TCO approach when making decisions about major purchases.



Home Charging Access: With 80-90% of EV charging expected to take place at home, lack of access to home charging for some segments of the population will limit their ability to adopt Battery Electric Vehicles (BEVs) – as opposed to Plug-In Hybrid Electric Vehicles (PHEVs). Specifically, in large urban centers, households that live in multi-unit residential buildings often face additional technical and non-technical barriers that make it challenging to install charging equipment that they can access from their usual parking location. Additionally, some households do not have access to dedicated garages or driveways.



Range anxiety and public charging access. While most EV users will charge their vehicles at home, deployment of public charging infrastructure is critical for alleviating “range anxiety” which is the fear of running out of charge away from home. Gaps in geographic coverage of public infrastructure can limit the ability to undertake long-distance travel. In contrast, insufficient capacity of charging infrastructure can lead to concerns about the availability of the infrastructure and potential lineups. Both real and perceived lack of public charging result in barriers to EV adoption. While access to public charging can enable PHEV users to cover greater distances without switching to gas power, range anxiety is only really a concern for BEV users.



Vehicle Availability: The limited availability of existing EV models at local dealerships, as well as the lack of variety in available EV models, is a significant barrier to EV adoption. This is predominantly the case for larger vehicle segments (e.g. SUVs, pick-up trucks, minivans), for which EV models are currently limited or unavailable and in smaller markets like New Brunswick.



Lack of Awareness: Limited information - or misinformation - about EVs, their availability, their environmental impact compared to ICEVs, charging options, and TCO can lead consumers to focus more on the initial cost of EVs and ignore the long-term benefits.

Cities have a critical role to play during a time of rapid transition for vehicle electrification, alongside federal and provincial governments and private actors. Many cities across Canada are showing leadership in reducing barriers to EV adoption for their residents. Fredericton can look to these other cities and federal and provincial policy to guide what it chooses to implement in an EV strategy.

Charging Technologies

For light-duty vehicles (LDVs) (cars, vans, SUVs and light trucks) there are three main charging levels: Level 1, Level 2, and direct current fast charging (DCFC), sometimes referred to as Level 3 or, simply, fast charging.

Charging Type	Charging Power	Approx. charging time for 300 km of range ¹		Charging Location				
		Typical car	Typical SUV/ light truck	Ground-oriented home	Multi-residential building	Public	Depot	Shared commercial
Level 1	1.3-2.4 kW	46-25 h	69-37.5 h					
Level 2	3 kW	20 h	30 h					
	7 kW	8.5 h	13 h					
	9.6 kW	6 h	9.5 h					
	19.2 kW	3.25 h	4.75 h					
DCFC	25 kW	2.5 h	3.5 h					
	50 kW ¹¹	1.25 h	1.75 h					
	100 kW	36 min	54 min					
	150 kW	24 min	36 min					
	350 kW	10 min	15 min					

¹ Many vehicles do not require a full 300 km charge on a typical day.

Proposed City Actions

Strategy 1: Expand the public Level 2 and DCFC charging network

Continue to deploy City-owned EV charging ports

If the Government of New Brunswick and Government of Canada’s ZEV targets are met (6% of all vehicle sales by 2025 and 50% by 2030; and 100% of all vehicle sales by 2035, respectively), EVs in Fredericton are forecasted to exceed 20,000 vehicles by 2035. The City of Fredericton has already begun to deploy EV charging ports but will need to install more to meet the resulting demand for charging.

The City of Fredericton should work with partners and other landowners and aim to increase the number of Level 2 and DCFC charging ports between 2024 and 2035, in areas of the city that would best serve residents including private and City-owned property. It can use direct capital investment or low/no-cost procurement methods to do so, as described in the previous section. The forecasted charging needs in the Charging Infrastructure Deployment Plan below can serve as a guide for the total number of chargers needed to support EV adoption.

The City of Fredericton should aim to increase the number of Level 2 and DCFC charging ports between 2024 and 2035, for which the forecasted charging needs in the table below can serve as a guide:

	2024	2025	2030	2035
Forecasted number electric vehicles				
Total EVs	400	700	7,100	27,900
Total public charging ports needed				
Public DCFC	8	11	46	138
Public Level 2	60	90	670	1,933

Results from the survey of Fredericton residents for this strategy show that top suggested location types for chargers include malls, shopping centres and other retail locations in the downtown, parks and recreation or event facilities. Given that the City only has direct control

over land and facilities that it owns and does not have authority to install charging infrastructure on privately owned land, it should explore coordinating with the private sector to form partnerships or ensure businesses are aware in locations that residents have noted as priority for future charging.

On-street vs. off-street

Due to the prevalence of off-street parking in Fredericton and the increased cost and complexity associated with on-street charging, we recommend that Fredericton focus its public charging deployments off-street locations. However, where it is feasible and provides value to residents, on-street charging availability certainly has a place in municipal plans as EV adoption grows.

Site selection and prioritization

Criteria that are recommended be used when selecting areas of the city for installing City-owned charging ports include:

- Property that is owned by the City. The City may consider owning chargers which are located on private land that it obtains access to, but this may come with additional challenges.
- Increasing access to public charging in areas of the city which do not already have available charging ports.
- Tourism locations where visitors often park their vehicles including parks, arenas, and community centres as well as attractions for outside tourism.
- Locations where barriers to home charging for residents are higher, such as:
 - Areas with a higher proportion of multi-residential buildings
 - Areas with a higher proportion of renters
 - Areas with a higher proportion of lower income residents
- Common pick-up and drop-off locations for taxis to support electrification of the taxi fleet.

The City should also be continually engaging with local community members and organisations to update and confirm priority areas for additional public chargers as the city grows and changes over time.

Site-specific criteria should be considered when designing locations for charging stations, including access to amenities (washrooms, shopping, entertainment, etc.), appropriate lighting, signage indicating that charging station spaces may only be used for EVs while charging, and accessibility (including spacing, accessible paths, height of screens and ports, etc.).

Fast charging vs. Level 2 charging

When determining whether to install DCFC or Level 2 charging stations at a given location, the City should consider the electrical capacity of the site, as well as the typical time spent parked. DCFC stations will require more available electrical capacity than Level 2 stations, and the site may require an electrical upgrade to support them. Level 2 stations charge more slowly, but are cheaper to install and operate, and put less pressure on the grid, so they should be prioritized for sites where typical time spent parked is longer than one to two hours.

Sharing depot charging with the public

Opening fleet depot charging for public use is not recommended, based on experiences in other cities, except under very narrow circumstances where fleet depots are conveniently located and do not pose a safety or security risk. Particularly, enabling fleets to use public stations can be a great way to reduce range anxiety for fleet drivers, especially as they are getting used to driving EVs.

Work with NB Power to expand deployment of DCFC charging along highway corridors

The City of Fredericton is recommended also to continue to work with NB Power to increase the number of DCFC ports along highway corridors near Fredericton. The city can advocate for additional ports, and provide information about potential locations that would most benefit residents and visitors to the City.

Incentivize private investment in public charging ports

The business case for investment in public charging is expected to improve as EV adoption increases. In the early stages of EV adoption, it will therefore be more important for the City to invest in public charging both directly by owning and operating charging ports, and by incentivising private investment.

To encourage and incentivize private investment in public charging ports, the City of Fredericton should explore:

- Directly reaching out to local businesses with parking in high-priority locations (as outlined above, including residents' suggestions) to engage them on installing chargers on their property.
- Applying to be a third party delivery agent in Natural Resources Canada's ZEVIP program, so that it can administer grants to local organizations to install public charging ports.
- Reviewing and, where necessary, updating regulations, permitting and licensing requirements to remove barriers to third party EV charging deployment, for example:

- Ensure zoning and parking requirements do not create unnecessary barriers.
- Ensuring that EV charging parking spaces count toward parking minimums.
- Clarifying that EV charging in visitor parking may be accessed by residents of a property.
- Not requiring building permits or separate business licences to EV charging infrastructure deployments.
- Ensuring processes are in place to provide timely project approvals to EV charging projects.

It is also recommended that the City of Fredericton require that a proportion of parking in new non-residential developments be EV-Ready:

- Workplace charging - Approximately 10-40% of parking intended for employee parking is recommended to be EV-Ready.
- Visitor/Customer charging - Approximately 15-20% of parking intended for non-residential visitor (e.g. retail customers, etc.) is recommended to be EV-Ready.

We recognize that the City of Fredericton will review this recommendation and adjust its implementation to reflect the level of at-home charging uptake and forthcoming Federal and Provincial actions and policies, integrate with existing zoning and by-laws, and incorporate feedback from the private sector and development community.

Strategy 2:

Support access to home charging in multi-residential buildings

Fredericton is a growing city that plans to build many new multi-residential homes over the coming years. As a result, ensuring the availability of home charging will be critical to enabling EV adoption in Fredericton. The most effective policies for enabling home charging are to require that new developments have the necessary electrical capacity and wiring so that residents can easily install a charger, as well as programs to retrofit existing buildings.

Require that all residential parking spaces in new developments be EV-ready

It is recommended that the City of Fredericton require that all residential parking in new developments be EV-ready - with reasonable provisions for grandfathering any developments which have already submitted permits - to ensure that all residents have access to home charging. EV-ready means a parking space which has installed all the required electrical infrastructure to support a Level 2 charger, up to and including an energized outlet, but not the charger/charging station itself with the understanding that a charger will be installed at a later date when it is needed.

Survey results showed that many respondents indicated their interest in having EV charging available in multi-residential buildings, with most of those directly indicating support for EV-ready retrofits and/or EV-ready requirements for new developments.

To support this requirement, the City of Fredericton should also:

- Create guidelines for developers to make the implementation process easier and educate them on best practices.
- Specify minimum performance requirements and management guidelines for designs using an EV Energy Management System to reduce costs.
- Explore offering incentives such as reductions in parking minimums to ease the cost burden of compliance with the 100% EV-ready requirement.

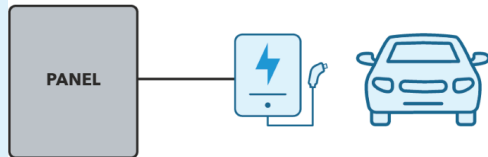
It is recognized that the City of Fredericton will review this recommendation in conjunction with forthcoming Federal and Provincial actions and policies, challenges with existing zoning and by-laws, the readiness of the development community and impact on existing affordable housing initiatives. Based on these factors and other variables, the City may refine the approach, timeline and application.

EV Ready Parking

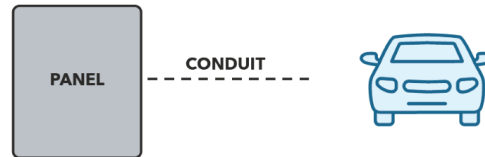
EV-ready parking is a parking space that features an adjacent electrical outlet (a junction box or a receptacle) capable of providing at least Level 2 EV charging (as defined by the SAE standard J1772).

Fully EV-ready residential buildings are the most cost-effective, practical, and fair way to ensure charging access in existing multi-residential buildings.

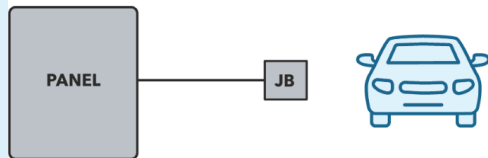
1. EVSE installed



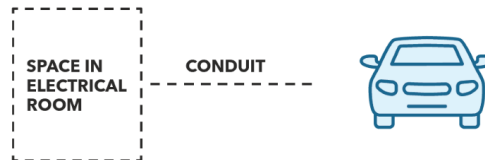
3. EV Capable



2. EV Ready



4. Conduit and Space



Support EV-ready retrofits of multi-residential buildings

Existing multi-residential residential building stock in Fredericton will require retrofits to become EV-ready. These projects are more costly than adding the required infrastructure during construction, so municipal support for retrofits will be critical to ensure as many residents have access to home charging as possible.

To support EV-ready retrofits of existing multi-residential buildings, the City of Fredericton should explore:

- Offering financial incentives or financing programs to implement comprehensive (e.g., 100%) EV-Ready retrofits
- Offering (individually or in-partnership) educational resources for multi-family condominiums and rental apartments navigating EV-ready retrofits
- Developing requirements for comprehensive EV-Ready retrofits for multi-family buildings

Strategy 3:

Support the electrification of Fredericton's taxi fleet

Fredericton should pursue taxi electrification, despite its relatively small taxi fleet, since this has been an effective way for municipalities to kick-start their public EV charging network, creating demand from high-mileage vehicles that will increase the utilization rate of public chargers.

Create a ZEV target for taxi fleets in Fredericton

Electrification of the local taxi fleet is important for reducing emissions due to the high utilization of these vehicles. The City of Fredericton should therefore explore the creation of 100% EV target for taxis operating within the City.

To support taxi companies in meeting this requirement, the City can:

- Increase the maximum vehicle age requirement
- Include common pick-up and drop-off locations in DCFC site selection for Strategy 1
- Target installation of Level 2 for Strategy 1 near buildings where taxi drivers live
- Provide education for drivers on EV technology and benefits

Other strategies

Bringing it all together

Calling for solutions needed from other orders of government

In addition to City actions, Fredericton can also advocate to other orders of government to create the conditions for faster EV adoption and charging deployment. Important examples include:

- Calling on the provincial government, regulator and utility to offer **favourable electricity rates** for EV charging.
- Calling on the provincial government to adopt a provincial **ZEV sales mandate** to bolster local availability and create market certainty.
- Calling on the federal and provincial governments to **provide funding for EV ready retrofits** of existing multifamily buildings.

Public education on EVs and charging

Education is an important factor in driving EV adoption and helping residents become aware of charging existing and future resources and charging infrastructure. In building out its public education tactics, Fredericton can build on excellent local resources, such as initiatives by the Clean Foundation and Drive Electric Atlantic.