

# Get a Charge out of It!

## EV Charging for Multi-Unit Buildings

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Adrian is a Capital Planning Specialist at Entuitive with a focus on all aspects of Condominium.

With 13 years of experience as a Condominium Manager, Adrian has an intimate knowledge of all aspects related to residential and commercial condominiums including building systems, governance, operating and reserve fund budgeting, and insurance to name a few. Adrian is also a Board Member with CCI-South Alberta, CCI-North Saskatchewan, and a member of ACMA.

His operational experience covers project delivery from start to finish including initial Building Condition Assessments and performance failure investigations; Capital Replacement Studies; Reserve Fund Studies; Building Exterior Visual Assessments (BEVA); Technical Audits; recommendations for restoration and renewal of building envelope systems; and facilitate project administration tasks.

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# A little bit of background

- Greenhouse gas (GHG) emissions in Canada grew 19% overall between 1990 and 2017, with a significant proportion of this growth driven by increases from the oil and gas and transportation sectors. Transportation related GHG emissions increased 43% over the same time period.
- The market for EVs in Canada continues to expand rapidly. However, in order for the technology to become an integral part of a successful sustainable transportation system and contribute to the decarbonization of the transportation sector, the social, environmental and financial needs of all users must be met.
- Some of the most critical outstanding barriers to charging at home are those specific to the increasing number of Canadians choosing to live in multi unit condominiums, stratas, and apartments. Approximately 1/3 of all Canadians now live in these types of homes.



# A little bit of background

- No two buildings are alike and may vary dramatically in terms of size, age, layout, and the make-up of the Condominium Board. The EV charging solution determined most appropriate for one building will vary dramatically from that of the next. Solutions must consider a wide range of considerations including the building's unique parking, electrical system configurations, electrical capacity, budget, and the Condominium Board's level of involvement in managing the charging infrastructure over time.



# Current State of EV Adoption in Canada & Saskatchewan

- There are more than 250,000 electric vehicles (EVs) in Canada, with about 2,000\* in Saskatchewan. As interest in EVs grows globally, so does local demand.  
\*This is based on the number of EVs in Saskatchewan at the end of 2022.
- Canada also has a sizeable HEV (Hybrid EV) market.
- The city of Saskatoon has 82 public charging station ports (Level 2 and Level 3) within 15km. 82% of the ports are level 2 charging ports and 33% of the ports offer free charges for your electric car.
- The city of Regina has 84 public charging station ports (Level 2 and Level 3) within 15km. 55% of the ports are level 2 charging ports and 27% of the ports offer free charges for your electric car.
- Currently there are no government incentives, either federal or provincial in place for the installation of EV charging stations.
- As the number of EV vehicles increases the need for charging stations, both public and in all types of multi unit residential sites will increase as well.



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# Overview of EV Charging Station Types

## Level 1 Charging

This type of charging involves a standard electrical outlet, a 120 volt (V) alternating current (AC) and a standard three-prong household plug.<sup>5</sup> Level 1 is the slowest charging type and adds approximately 8 km of range per hour. Almost all EV makes and models come with a Level 1 cord set charger as standard equipment. It generally takes between 8 and 30 hours to fully recharge an EV battery, making it most suitable for locations where a vehicle will be parked for long periods of time.

## Level 2 Charging

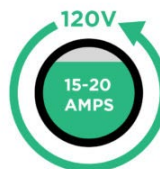
Level 2 charging requires the use of a 240V, AC plug. Depending on the vehicle's battery size, it can take between 4 and 10 hours to fully recharge, adding between 30 km and 50 km of range per hour.<sup>8</sup> Level 2 charging stations are practical for charging at home, the workplace and in public locations, such as restaurants, parks or parking lots and can also be programmed to charge during off-peak periods. Level 2 offers both networked and non-networked charging options.

# Overview of EV Charging Station Types

## Direct Current Fast Charging (DCFC)

This type of charging is also known as a quick charge and power is supplied through a 480V direct current (DC) plug. DCFC stations can charge a BEV to 80% in approximately 25 to 30 minutes, adding more than 100 km of range per hour. The use of a DCFC station is best suited to driving applications where it is necessary to recharge in a short period of time, such as along major highways. For a number of reasons (e.g., cost to install, amount of civil work required on site), DCFC are not typically an appropriate option for a MURB.

### Level 1

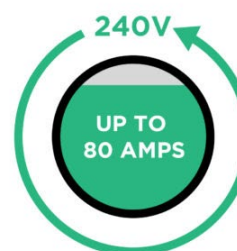


Level 1 chargers use standard 120V electrical outlets. 120V circuits are also used by most home electronics.

**7-8 miles of i3 range per hour charging**

1.4 kW power delivery

### Level 2

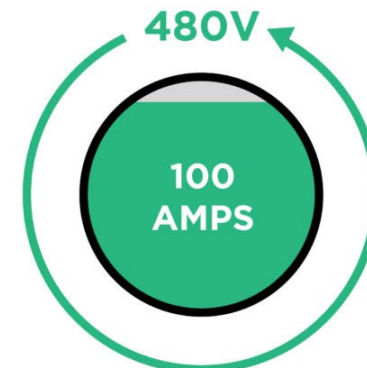


Level 2 chargers use 240V electrical circuits. 240V circuits are also used by electric dryers & electric stovetops.

**10 - 26 miles of i3 range per hour charging**

3.7 - 7.7 kW power delivery

### Level 3



Level 3 direct current fast chargers use ultra high-power 480V circuits at public charging stations.

**Up to 80% of i3 range in just 30 mins charging**

Up to 50 kW power delivery



# Key Components



## Infrastructure Requirements

Often built before EVs were readily available, their electrical systems and the layout of their parkades and parking areas were not designed with EV charging in mind. However, a number of solutions in the market today can help to facilitate home charging, even for residents of older buildings.

There is a need to ensure that EV charging in MURBs is approached in a manner that accounts for the interests of all building residents and which anticipates future needs. Each building is unique and will require a tailored EV charging solution.

It is recommended that a qualified professional (architect/consultant) is involved in the design and installation of any EV charging infrastructure.

# Key Components

## Smart Charging

Traditional ('dumb') charging looks like: EV drivers plug their vehicles into a charge point. Maximum charging power is provided until the EV battery reaches 100% SoC, at which time it stops charging automatically.

In smart EV charging, an electric vehicle and a charger share a data connection, and the charger shares a data connection with a charging operator and an energy utility. In other words, the charger automatically transmits important data to the charging operator and energy utility whenever an EV is plugged in, so they can optimize the charging.

Unlike traditional charging, smart charging allows the charging operator to manage how much energy is delivered to each plugged-in electric vehicle. A central system coordinates and manages the charging process. Rather than charging all vehicles at the maximum capacity of the charge point, the central system takes over and makes intelligent decisions. Depending on the number of people using electricity at that time, the amount used can vary, putting less pressure on the grid.

With smart charging, electric cars can interact with the power grid in a symbiotic way - they support one another. Smart charging makes this connection possible and prevents EVs from adding unnecessary strain to the grid.



# Key Components

## Smart Charging

When an EV is charging, information is transmitted between the vehicle and charger and often a centralized cloud-based charging management platform. For example, the local grid's capacity and the way energy is currently used at the charging site can be tracked.

The platform analyses and visualizes this data in real-time. This way, it can be used to make automated decisions about the charging of EVs.

This allows charging operators to control and regulate energy usage easily and remotely from one platform, website or mobile app. In addition, EV owners can monitor and pay for their charging sessions through a mobile app from anywhere, at any time. Both charging and billing are handled in one digital solution.





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# Who are the Stakeholders?

Here are some of the stakeholders involved with the installation along with roles and responsibilities.

## Electrical Contractors

- Initial consultation
- Information gathering and assessment including review of architectural and electrical drawings, and electrical assessment
- Conduct electrical audit and work with the utility if required, to determine a building's existing capacity. This may include submitting a request to the utility to acquire load data or for any service upgrades
- Develop options and perform initial design including safety and accessibility considerations
- Provide cost estimates and quote
- Apply for relevant permits (e.g., electrical and operating)
- Perform installation including any electrical requirements and ensure installation meets all relevant codes, standards and bylaws
- Prepare any necessary drawings or operations manuals
- Managing the necessary connection of EV charging stations to a third party for billing and power sharing
- Assisting in the development of an EV policy or updating appropriate standard operating procedures



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# Who are the Stakeholders?

## Engineering or Consulting Firms or Electric Vehicle/ EMS Charging Solution Providers

- Initial consultation
- Information gathering and assessment including review of architectural and electrical drawings, and electrical assessment
- Develop options and perform initial design including safety and accessibility considerations
- Provide cost estimates and quote
- Apply for relevant permits (e.g., electrical and operating)
- Ensure installation meets all relevant codes, standards and bylaws
- Prepare any necessary drawings or operations manuals
- Managing the necessary connection of EV charging stations to a third party for billing and power sharing
- Apply for any necessary variances (e.g., related to the use of Electric Vehicle Energy Management Systems)
- Assist in obtaining any potential third-party funding or grants



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# Who are the Stakeholders?

## Utilities/Municipalities

- Assessing capacity of local distribution system
- Providing information to account holders regarding current electricity usage
- Conducting service upgrades in existing buildings
- Provision of educational resources
- Installation of metering solutions
- Offer pilot and/or incentive programs to test EV-related business models and new integrated technologies





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# Who are the Stakeholders?

## Condominium Corporation/Board of Directors/Property Managers

- Consider request to install EVSE in the building
- Provision of electrical or architectural drawings
- Gathering information to support the decision on how to proceed with EVSE installation
- Obtaining the services of an electrical contractor, EVSE provider, engineering firm, EV/ EMS charging solutions provider or EV advisor to manage the installation (this may also be undertaken by the EV owner depending on the agreement with the Condo board)
- Working together with the property manager (if applicable) to determine roles and responsibilities
- Consideration for number of EVSE to install, location of installation, ownership, cost allocation, maintenance of EVSE Ensure installation meets all relevant codes, standards, and bylaws
- Obtaining a Special Resolution or entering into agreement with EV owner(s)
- Developing an EV policy or updating appropriate standard operating procedures
- Apply for any necessary variances (e.g., related to the use of Electric Vehicle Energy Management Systems)
- Assist in obtaining any potential third-party funding or grants

# Who are the Stakeholders?

## EV Owners (Personal Station)

- Information gathering
- Formal application for EV charging in the building
- Depending on the circumstances, entering into agreement with EVSE provider or electrical contractor
- Cover the cost to purchase and install a private EV charging station or contribute to the cost of common infrastructure upgrades. Working together with the Corporation or property manager (if applicable) to determine roles and responsibilities
- Cover the cost of personal energy consumption from the EV charging stations





# Planning and Implementation

Condominium legislation can create complicated and lengthy processes for any activities that require a modification to the common property on behalf of residents. These common elements are often affected by the installation of EV charging infrastructure. There is a requirement to consult with the Act/Regulations and the Corporation's bylaws to gain approval from the owners through a Special Resolution prior to proceeding. Installation of an EV charging station will still require approval from the Board.

Prior to proceeding with the installation of EV charging stations the Board should consider input from the owners as to the desirability for the installation of charging stations. Owners should be advised of project cost, any implications to changes in parking, future (potential) maintenance costs, how charging would be billed, and potential benefits to the Corporation.

At completion, the Corporation will need to at minimum establish an EV policy and potentially an amendment to the Corporation's bylaws.



## Benefits Of Electric Vehicle Charging in Multi-Unit Residential Buildings

An increasing number of condominium corporations and property managers have begun to see the benefits of installing EV charging stations in their buildings. The following are some of the potential benefits offered:

**Resident Retention or Attraction:** The availability of charging infrastructure enables alternative commuting options within cities, thereby attracting and retaining tenants or residents who drive EVs. Condominium Corporations and property managers can leverage their environmental choices to positively influence brand perception and appeal and differentiate themselves in what is an increasingly competitive market. In some jurisdictions, EV charging stations are considered the new luxury amenity.



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**Alternate revenue streams:** Condominium Corporations and property managers can tap into alternative revenue streams from the advertisement of products and services on charging stations. Revenue may also be generated through pay-for-parking services that include charging. There may also be opportunities to explore innovative business models and partnerships that can address some of the upfront capital installation costs. Integrated EV charging solutions (e.g., EVSE with demand response capabilities) can help mitigate increases in operating costs or demand charges that would otherwise be incurred by increased EV loads. The revenues may offset utility or capital costs in turn potentially reducing condominium contributions.

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**Convenience:** The ability to charge at home is important to EV owners and they may be willing to pay more to live in a building that provides this convenience.

**Credits or points towards building certification programs:** Installation of charging stations would qualify new and existing buildings for additional credits or points from building environmental performance assessment or certification programs, such as LEED or BOMA BEST. Obtaining such certifications have been shown to help boost the desirability of a building or property.



## Benefits Of Electric Vehicle Charging in Multi-Unit Residential Buildings

An increasing number of condominium corporations and property managers have begun to see the benefits of installing EV charging stations in their buildings. The following are some of the potential benefits offered:

**Energy Management:** Some energy management solutions can help increase visibility of the building's overall energy usage, providing additional information for the condo board related to where to electricity costs can be reduced. These solutions can also integrate alternative energy sources (e.g., batteries, solar, etc.,) so that power can be managed more effectively.



While it is important to consider the benefits of installing EV infrastructure in Multi-Unit Residential Buildings, it should also be noted that as the EV market continues to grow, access to charging in these buildings is likely to become more of a necessity than an amenity.



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# Resources

- Natural Resources Canada Guide to Electric Vehicle Charging in Multi-Unit Residential Buildings.
- BOMA Canada. Electric Vehicle Charging Stations: For Multi-Unit Residential and Mix-Use Commercial/Residential Buildings.
- Pollution Probe and The Delphi Group (2019). Zero Emission Vehicle Charging in Multi-Unit Residential Buildings and for Garage Orphans.
- Condominium Authority of Ontario. Electric Vehicle Charging Systems
- SaskPower. Electrical Vehicle Resources, Charging
- ChargeHub. Saskatchewan EV Charging Directory



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# Questions?

