



**Burnaby Electric Vehicle (EV) Charging Infrastructure Technical Bulletin**  
Requirements and Guidelines for EV Charging Bylaw



Please refer to the website for latest version of this document:

[www.burnaby.ca/ev](http://www.burnaby.ca/ev)

## 1. Introduction

Electric vehicles (EVs) are increasingly popular, and while the market for EVs is still small today, it is growing rapidly and this trend is projected to continue. The use of EVs instead of internal combustion engine vehicles helps improve air quality, fight climate change, reduce noise, and foster green economic development, among other benefits. The City's (2016) Environmental Sustainability Strategy (ESS) and Community Energy and Emissions Plan (CEEP) support policy to encourage electric vehicles.

The availability of EV charging at home is one of the most important factors in an individual's decision whether or not to purchase an EV. New homes can be equipped with EV charging with relatively modest cost. Energy management system technology, which allows multiple charging points to safely use a single circuit simultaneously, also makes it more feasible to install EV charging in multi-family residential buildings.

In June 2018 the City of Burnaby amended the Zoning Bylaw to require EV charging infrastructure in new residential development, with changes that come into effect on 2018 September 1.

The purpose of this Bulletin is to provide additional details to guide installation of the required EV charging infrastructure, in order to meet the requirements of the Zoning Bylaw. This is a "living document" that will be updated from time to time. Please refer to the website for the latest version of this document, and more information:

[www.burnaby.ca/ev](http://www.burnaby.ca/ev)

## 2. Burnaby's EV Infrastructure Requirements

All required parking spaces for new dwelling units, excluding visitor parking spaces, secondary suite parking spaces and new parking spaces servicing existing dwelling units, must include an energized outlet capable of providing **Level 2 charging** (see definition in Section 2.1) for an electric vehicle. Each energized outlet must be labelled for its intended use.

This requirement does not apply to developments that have applied for a Building Permit or Preliminary Plan Approval, or have an active rezoning application that has advanced past Second Reading prior to 2018 September 1.

Electric vehicle energy management systems (EVEMS), also known as load management or power sharing, may be used as long as the performance requirements and technical matters outlined in this document are met.

## 2.1. Terminology

Note: the terms below are provided for explanation and may differ somewhat or include additional information from the City's Zoning Bylaw. For compliance purposes, always refer to the Zoning Bylaw.

### Electric Vehicle

Means a vehicle that uses electricity for propulsion, and that can use an external source of electricity to charge the vehicle's batteries. This includes EVs that rely exclusively on a battery, and plug-in hybrid EVs. It excludes hybrid vehicles that recharge on-board and do not have the ability to plug-in to recharge.

### Energized Outlet

An "energized outlet" means a connection point in an electrical wiring installation at which current is taken and a source of voltage is connected to supply utilization equipment. An energized outlet may be either a junction box for permanent connection or a receptacle ("plug").

### Electric Vehicle Supply Equipment (EVSE)

EVSE is the piece of equipment to deliver charging, and means the complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for the purpose of power transfer and information exchange between a branch electric circuit and an electric vehicle.

### Level 2 charging

Level 2 charging is defined by SAE International's J1772 standard, as shown in the table below.

Charge Method	Nominal Supply Voltage (V)	Max Current (Amps-continuous)
AC Level 2	208V to 240V AC, 1 phase	≤80A

The amperage rating for EV circuits required by most Level 2 EVSE is **40A**, although this may differ depending on the particular system design.

### Electric Vehicle Energy Management System (EVEMS)

Also sometimes called "smart charging," "power sharing" or "load sharing", EVEMS refers to a variety of technologies and services that control the rate and timing of EV charging. An EVEMS distributes the electricity, allowing multiple charging points to safely use a single circuit simultaneously.

### DC Fast Charging

Direct Current Fast Charging (DCFC) refers to systems that deliver direct current (DC) directly to the batteries of the vehicle. Three standards are in use for DCFC stations and connectors: the SAE CCS (Combined Charging System), the Japanese CHAdeMO (supports charging up to 60kW), and a proprietary Tesla SuperCharger (supports charging up to 135kW). Multi-standard DCFC stations are available that provide both CHAdeMO and CCS connectors. The most common power rating for DCFC stations is 50kW, although higher and lower rated units are available.

## 2.2. Individual Parking (single-family, two-family, and some townhouse)

Residences such as detached homes, semi-detached (duplex) homes, and some townhouse units have parking spaces in private garages, carports or surface parking areas that are individually serviced with electrical infrastructure directly from the adjacent private residence.

To meet the City's requirements, each required parking space for a new dwelling unit, excluding those for secondary suites and visitor parking, must feature an energized outlet of 208-240V AC and minimum 40A circuit breaker. Any of the three following strategies may be used to meet the requirement:

1. Provide a dedicated circuit and energized outlet to each required parking stall.
2. Utilize load switching (a load miser or "watt miser") on a 208-240V 40A circuit. In cases where an additional circuit for the EVSE would exceed the panel's calculated load, the electrical code allows EVSE to be supplied from a branch circuit supplying another load(s), such as a dryer or stove. Control equipment such as a load miser must be used to prevent simultaneous operation of the EVSE with other circuit loads so the calculated demand of the circuit is not exceeded (see CSA CEC 22.1-15 Rule 86-300).
3. Utilize load sharing (EVEMS) with a minimum 208-240V 40A circuit breaker to achieve the minimum performance requirements, or greater (see EVEMS requirements in Section 3).

EV charging beyond the minimum requirements of the Bylaw may be provided, including:

- **Additional parking space(s):** As long as all relevant electrical code requirements are addressed, and one energized outlet capable of providing Level 2 charging is installed, additional outlets for EV charging may be provided, or an EVEMS may be installed, in order to service more than one parking space.
- **Secondary suites:** Although not required by the Bylaw, EV charging may be provided to a secondary suite utilizing one of the options above. If a dedicated or load switched circuit is used, it should be supplied from the suite's electrical panel.
- **EVSE:** The Bylaw does not require installation of EVSE (only an energized outlet), however installation of EVSE at energized parking spaces is encouraged.

Refer to the Building Department Brochure for permit application requirements.

## 2.3. Shared Parking (apartments and some townhouse)

Parking spaces for apartments and some townhouses are provided in underground garages that are serviced by shared infrastructure.

To meet the City's requirements, each residential parking stall, excluding those for visitor parking, must feature an energized outlet of 208-240V AC and minimum 40A circuit breaker. Either of the following two strategies may be used to meet the requirement:

1. Provide a dedicated circuit and energized outlet to each required parking stall.
2. Utilize an EV Energy Management System (EVEMS) that meets the minimum performance standard set by the Planning and Building Director and defined in this Bulletin. The EVEMS

must be installed (online and/or as hardware) as part of the EV electrical infrastructure.

EV charging beyond the minimum requirements of the Bylaw may be provided, including:

- **Visitor parking spaces:** Although not required by the Zoning Bylaw, EV charging may be provided to visitor parking stalls, either with dedicated circuits or with EVEMS.
- **DC Fast Charging (DCFC):** Although not required by the Zoning Bylaw, one or more DCFC may be installed. If so, the DCFC should include multi-standard connectors meeting both CHAdeMO and CCS standards, and be rated for at least 50 kW, in order to provide effective charging for the majority of EVs currently on the market.
- **EVSE:** The Bylaw does not require installation of EVSE (only an energized outlet), however installation of EVSE at energized parking spaces is encouraged.

Refer to the Building Department Brochure for permit application requirements.

### 3. Development Approval Requirements

#### 3.1. Rezoning, Subdivision and Preliminary Plan Approval

EV charging requirements meeting the Zoning Bylaw, and any additional infrastructure as agreed to through the development review process, will be indicated in the Public Hearing report to Council.

To ensure the EV charging infrastructure is effectively maintained and operational, and that strata members have access to its use, a covenant under Section 219 of the *Land Title Act* will be registered on the property.

The EV charging system will be required to be indicated on all applicable plans and drawings submitted for development application review.

#### 3.2. Building Permit Requirements

For Building Permit Requirements, please refer to the Building Department Brochure.

### 4. Performance Standard and Other Technical Matters

#### 4.1. Electric Vehicle Energy Management Systems (EVEMS)

Also referred to as load sharing or power sharing, EVEMS refers to a variety of systems that distribute and manage the electrical load from EV charging across multiple EVSE. EVEMS reduce the amount of electrical infrastructure required and associated costs, when compared to dedicated circuits. Because in an EVEMS the electrical supply is shared, it can take longer to charge the vehicles using EVEMS compared to dedicated circuits. A performance standard ensures that an adequate charge is still delivered over this time.

When multiple EVSE are supplied from a single branch circuit or panel, demand is controlled to ensure circuit rating is not exceeded. An EVEMS may utilize circuit sharing, panel sharing, dwelling demand management and/or building demand management. Specific EVSE equipment must be specified for a

particular EVEMS, and amperage must match the particular energy management system employed.

Currently the 2015 Canadian Electrical Code (CEC) is the version adopted by the Electrical Safety Regulation and is used in BC. The current code considers EVSE installed in homes and apartments at a demand of 100% and it does not recognize the EVEMS. The 2018 CEC includes new rules that recognize EVEMS; however, it has not yet been adopted by BC. In order to use the EVEMS prior to the adoption of the 2018 CEC, a request for an “alternative solution” submitted by a professional engineer to the Building Department is required. Please refer to the Alternative Solution brochure or contact the Building Department for submission details.

#### **4.2. Minimum performance standard for EVEMS**

The intention of the performance standard is to ensure that sufficient electricity is available to EVSE users to ensure a reasonable rate of overnight charging, based on daily driving distances applicable for Metro Vancouver. It is intended to ensure that vehicles plugged in to the EVEMS will have an overnight charge equivalent to approximately 65 km of driving distance, however specific performance can vary depending on factors such as vehicle type, local weather, topography, and driving habits.

The performance standard is:

*The system must be capable of supplying a minimum performance level of 12 kWh average per EVSE, over an 8 hour period, assuming that all parking spaces are in use by a charging EV.*

A variety of EVEMS and electrical infrastructure configurations are capable of meeting this standard. For example, a 40A 208V single phase circuit sharing up to four EVSE or an 80A 208V single phase circuit sharing up to eight EVSE would be sufficient to provide the minimum charging requirement. The above statements should not be interpreted to preclude the use of alternate configurations to achieve the minimum performance standard.

#### **4.3. Additional Requirements**

##### **Communications Technology**

Projects implementing EVEMS must provide for communications technology necessary for the function of the chosen EVEMS (e.g. cellular repeaters, wireless access points, or cabled infrastructure).

##### **EVSE Certification**

Electrical configurations must be designed for use by EVSE certified to *C22.2 NO. 280-16 - Electric vehicle supply equipment (Tri-national standard, with UL 2594 and NMX-J-677-ANCE-2016)* by certification agencies such as CSA, Intertek (cETL), or UL (cUL). Products solely certified to *UL 2594* can typically also be certified to CSA due to harmonized CSA and UL standards.

##### **Metering**

In buildings with shared parking areas, EV electrical infrastructure should be separately metered from the common areas so that stratas, building owners and BC Hydro can distinguish between common area electrical usage and EV charging electrical usage.

## 5. More Information

- City EV Policy, background & resources: [www.burnaby.ca/ev](http://www.burnaby.ca/ev)
- Inquiries: [ecoplanning@burnaby.ca](mailto:ecoplanning@burnaby.ca)
- General information about EVs including technology, vehicles and incentives: <https://pluginbc.ca/>
- Managing EV charging infrastructure in residential strata buildings: [www.evcondo.ca](http://www.evcondo.ca)