

Electric Vehicle Energy Management Systems

Presented by:

Robert Preston Education Business Partner Client Education



DISCLAIMER

This presentation is being provided for information purposes only.

In the event of conflict, the requirements stated in the:

- *Safety Standards Act*;
- Safety Standards General Regulations;
- Electrical Safety Regulations
- Laws in your jurisdiction

...shall take precedence



DEFINITIONS

EVEMS–Electric Vehicle Energy Management System

Defined as a means used to control electric vehicle supply equipment loads through the process of connecting, disconnecting, increasing, or reducing electric power to the load and consisting of any of the following:

- A monitor
- Communications equipment
- Controller(s)
- Timer(s)
- Other applicable device(s)



DEFINITIONS

EVSE—Electric Vehicle Supply Equipment

A complete assembly consisting of cables, connectors, devices, apparatus, and fittings installed for the purpose of power transfer and information exchange between the branch circuit and the electric vehicle.



DEFINITIONS

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Safety Standards Act:

Variance—means a document without precedential value issued, for an individual circumstance on a single occasion, by a safety officer or safety manager allowing

- (a) a deviation from the application of a regulation under this Act, or
- (b) a use, other than the standard use, of a regulated product if the proposed use is not specifically prohibited under this act.

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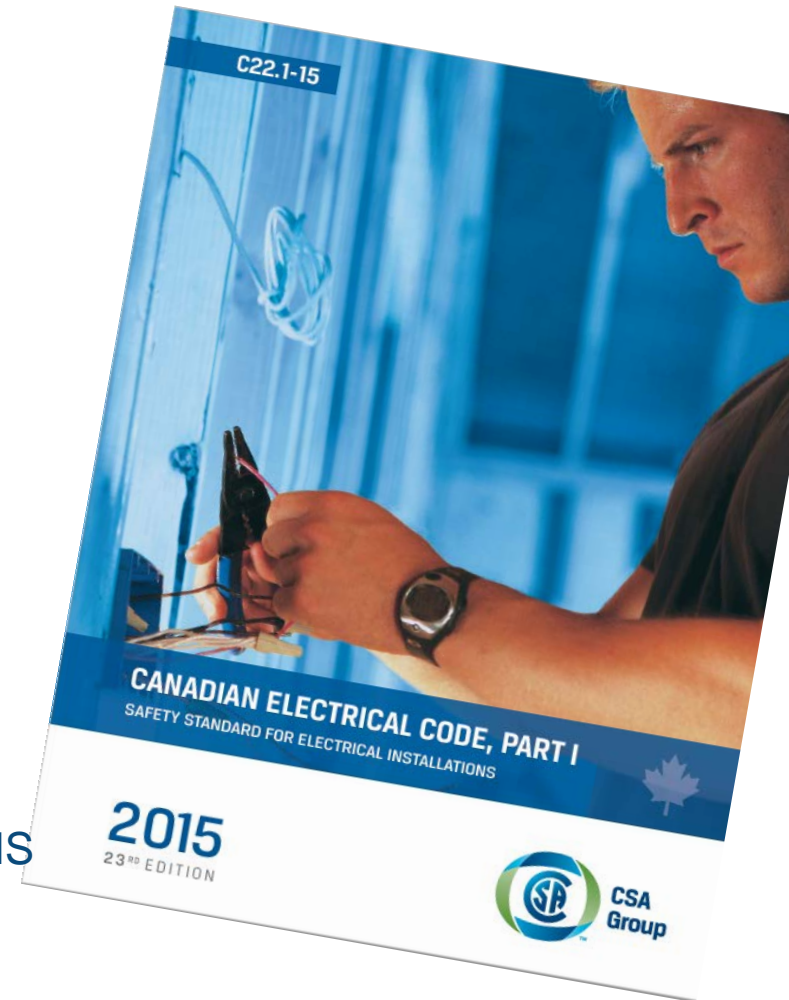
BRIDGING THE GAP

Section 86 of the 2015 BC Electrical Code

- Only recognizes load management on a branch circuit level
- Does **not** include:
 - Services
 - Feeder conductors
 - Distribution equipment

Section 8 of the BC Electrical Code 2015

- Does **not** permit the installation of an EVEMS



BRIDGING THE GAP

24th edition of the 2018 CEC recognizes EVEMS:

“The control of electric vehicle supply equipment loads is the process of connecting, disconnecting, increasing, or reducing electric power to electric vehicle supply equipment and connected electric vehicle.”



BRIDGING THE GAP

Technical Safety BC will consider applications for a **Variance of Section 8 and 86 of the BCEC 2015** for installation of an **EVEMS** to bridge the gap until **CEC 2018** adoption.

It is presently under regulatory review for adoption, until adoption the **variance** process is needed to recognize any new changes from the **2015 BC Electrical Code**.

Local government authorities having jurisdiction should be consulted for installations within their jurisdiction.

Visit website TechnicalSafetybc.ca for local jurisdictions.

DO YOU NEED A VARIANCE?

Is a variance required if only an electric car charger (EVSE) is installed?

No. A variance is only required if an energy management system (EVEMS) is installed at the service or feeder portion of the distribution.

INFORMATION BULLETIN



INFORMATION BULLETIN

ELECTRIC VEHICLE ENERGY MANAGEMENT SYSTEMS

This bulletin provides guidance on electric vehicle charging systems utilizing electric vehicle energy management systems with respect to the 2015 BC Electrical Code. The requirements of local municipal authorities having jurisdiction may vary. Owners, designers, and installers should consult with local authorities having jurisdiction prior to undertaking work to determine their requirements.

Date of Issue: October 31, 2018

No: IB-EL 2018-01

Topic: Electric vehicle charging systems utilizing energy management systems.

Definitions:

Electric vehicle energy management system (EVEMS) — a means used to control electric vehicle supply equipment loads through the process of connecting, disconnecting, increasing, or reducing electric power to the loads and consisting of any of the following: a monitor(s), communications equipment, a controller(s), a timer(s), and other applicable device(s).

Electric vehicle supply equipment (EVSE) — a complete assembly consisting of cables, connectors, devices, apparatus, and fittings installed for the purpose of power transfer and information exchange between the branch circuit and the electric vehicle.

Introduction: EVEMS are rapidly becoming available for use in British Columbia and are available for all types of occupancies and locations for both new and existing installations. BC Electrical Code 2015 Section 86 *Electrical Vehicle Charging Systems*, recognizes load management systems at a branch circuit level. Section 86 does not extend the load management systems to include distribution equipment, feeders, or services.

A variance may be considered to allow for the use of an EVEMS to limit the demand on distribution equipment, feeders, or services. All plans, specifications, load calculations, and variance applications shall be submitted to the appropriate authority having jurisdiction (AHJ). See Information Bulletin, 2016-05. https://www.technicalsafetync.ca/sites/default/files/section_2_-_general_rules_ib-el_2016-05.pdf

Details: BC Electrical Code 2015, Sections 8 and Section 86 do not permit the installation of any electrical equipment or systems such as EVEMS if the calculated load or demonstrated load exceeds the rating of the distribution equipment, feeders, or services. Electric vehicle supply equipment must be calculated at 100% load based on the nameplate rating of the equipment. Provisions for switching of loads have been identified in rule 8-106.

The power requirements for residential installations are diverse and cyclical in nature. EVEMS demands power for longer periods of time. EVSE can overload the conductors or distribution equipment if the charging loads are not controlled.

The 2018 edition of the Canadian Electrical Code (2018 CEC) recognizes technology advancements for EVEMS but the 2018 CEC has not yet been adopted into regulation. In the interim, Technical Safety BC will consider applications for variance of Sections 8 and 86 for installation of EVEMS to limit the demand on distribution equipment, feeders, and services. Local government authorities having jurisdiction should be consulted for installations within their jurisdiction.

Some EVEMS allow an administrator to manage, monitor, and control loads. These systems will require the administrator to play an important role in the safe management of the loads on the distribution equipment, feeders, and services. When the need for an administrator is identified in the manufacturer's instructions or plans and specifications the following are required:

1. An operating permit, regardless of occupancy type; and
2. A management plan, which must document how the EVEMS will control the connected loads and how the addition, alteration, or removal of loads will be managed.

VARIANCE APPLICATION PROCESS



VARIANCE APPLICATION PROCESS

General Requirements:

- Identify the rules to be varied under the **BC Electrical Code 2015**
- Provide a rationale to support the variance request
- Include a clear description of design and operation
- Demonstrate the **EVEMS** will not cause the loading of distribution equipment, feeders, or services to exceed the requirements of rules **BC Electrical Code Rules 8-104(3,5,6)**

VARIANCE APPLICATION PROCESS

General Requirements cont.

- If an administrator is required, include how:
 - loads will be managed; and
 - changes to the connected load (such as additions, alterations, or removal) are documented
- Clearly indicate when an administrator is required to operate the EVEMS
- Indicate the administrator plan as part of the terms and conditions

VARIANCE APPLICATION PROCESS

If the EVEMS system **requires** an **administrator** to manage, monitor, and control loads:

1. An operating permit regardless of occupancy type is required.
2. A management plan documenting how the EVEMS will be controlling the connected loads; including how the addition, or removal of loads will be managed.

VARIANCE APPLICATION PROCESS

At no time should the load, imposed by the electrical equipment, exceed feeder or service ratings as determined by applicable BC Electrical Code rules.

THE LOCAL UTILITY IS NOT REGULATED BY THE BC ELECTRICAL CODE

“Conditions for a variance require that the utility be consulted and notified of all EVEMS installations where the service may be overloaded upon the failure or removal of the EVEMS.”

--IB-EL 2018-01



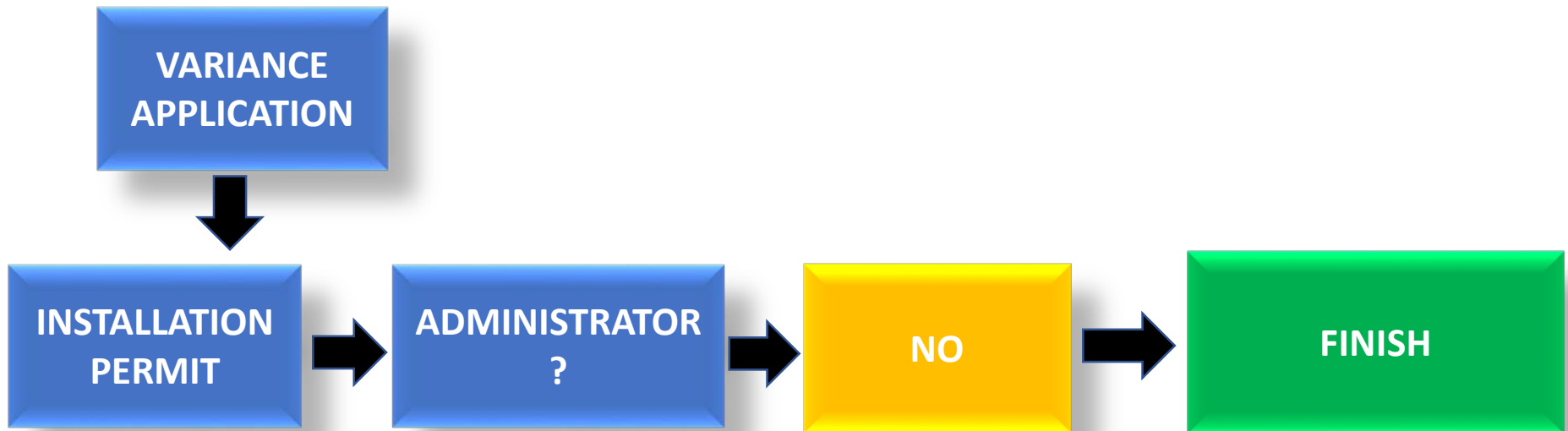
HOW MANY PERMITS?

Some common situations



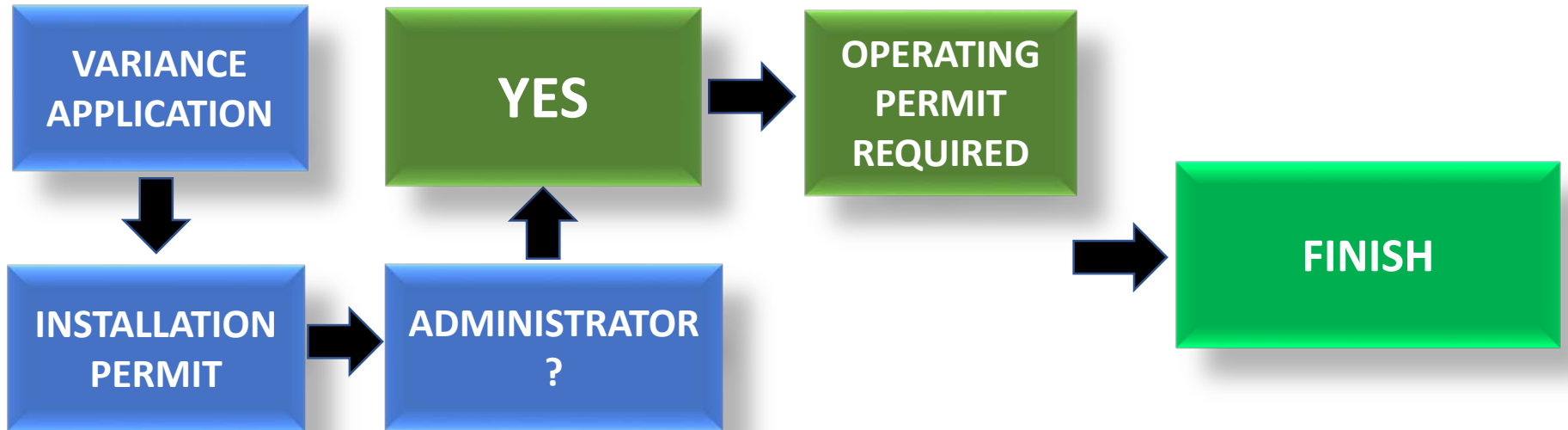
COMMON EXAMPLES

New or existing building, including single detached homes with EVEMS installation plan



COMMON EXAMPLES

New or existing building, including single detached homes with EVEMS installation plan



COMMON EXAMPLES

Existing building with valid operating permit in place



QUESTIONS?

THANK YOU