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Zero Carbon Step Code British Columbia Building Code 2018 Revision 5

The purpose of this bulletin is to provide information about Revision 5 changes to the British Columbia Building Code 2018 (BCBC) regarding the new requirements relating to greenhouse gas emissions (GHG) and the Zero Carbon Step Code (ZCSC). Changes are effective May 1, 2023 and apply to projects for which a permit is applied for on or after this date.

Background

This bulletin will further highlight and clarify the new requirements that make up Sections 9.37. and 10.3. of Division B of the BCBC. Topics include:

- an introduction of additional fuel types that can be used in the calculation of operational GHG emissions,
- how to address buildings connected to District Energy Systems (DES),
- clarifications pertaining to principal systems, supplementary equipment and back-up/redundant equipment,
- a brief overview of the compliance requirements and calculation methodology, and
- future work and the evolution of the ZCSC.

Further information on the Zero Carbon Step Code can be found in the 20% Better Energy Efficiency & Zero Carbon Step Code bulletin (see bulletin B23-01).

Additional Fuel Types

A list of additional fuel types that are currently not listed in the BC Buildings Code is provided as a reference that can be used for compliance with the Zero Carbon Step Code, at the discretion of the Authority Having Jurisdiction (AHJ). These emissions factors were derived from the National Inventory Report 1990-2020: Greenhouse Gas Sources and Sinks in Canada – Part 2. [En81-4-2020-2-eng.pdf \(publications.gc.ca\)](https://publications.gc.ca/En81-4-2020-2-eng.pdf)

- **Propane** - 0.2155 kgCO₂e/kwh
- **Light Fuel Oil (Standard)** - 0.2579 kgCO₂e/kwh
- **Heavy Fuel Oil** - 0.2689 kgCO₂e/kwh
- **Diesel Fuel (Standard)** - 0.2581 kgCO₂e/kwh
- **Wood Fuel** - 0.0786 kgCO₂e/kwh

The contents of this Bulletin are not intended to be provided as legal advice and should not be relied upon as legal advice. For further information, contact the Building and Safety Standards Branch.

District Energy Systems (DES)

The emissions factor associated with district energy systems are to be established by the AHJ in discussion with the utility. District energy systems are an unrestricted matter under section 2(f) of the Building Act General Regulation, and it is recommended that local governments discuss with their solicitors to better determine what local building requirements may be acceptable.

When demonstrating compliance with the ZCSC, similar to any energy source used by the building's systems, the emission factor associated with the DES is to be applied to the systems or equipment that use the energy supplied by the DES.

Terminology for Systems and Equipment

The clarifications below are to be considered when demonstrating compliance with the ZCSC as per Division B, Article 9.37.1.3.

Principal Heating Systems

A principal heating system refers to the heating system that has been designed to accommodate the heating load of the building and may include supplementary heating equipment.

Supplementary Heating Equipment

Supplementary heating equipment refers to heating equipment that is used to supplement the principal heating system when the capacity of the principal equipment has been exceeded. The supplementary equipment is to be included when demonstrating compliance with Article 9.37.1.3. of Division B. Examples of this can include central ducted air source heat pump (ASHP) with supplementary gas furnace, air to water heat pump with supplementary gas boiler and packaged dual fuel system (electric heat pump with supplementary gas heater).

Redundant or Backup Equipment

Redundant or backup equipment refers to equipment that is installed in addition to a principal heating system, is independent of the principal heating system and is not designed to meet the space conditioning load of the house. Examples of this can include wood burning stoves, gas fireplaces, and emergency back-up equipment.

Equipment and Appliances

This refers to devices that convert fuel into energy and includes heating and cooling equipment, domestic hot water equipment, ventilation equipment as well as cooktops and laundry drying equipment.

When following the compliance calculations as required in Article 9.37.1.4. of Division B, the terms used within this bulletin for supplementary heating systems as well as redundant or back-up equipment may not align with the terminology used within the EnerGuide Rating System (ERS). They also may not align with terms commonly used in industry. Take care to ensure that the appropriate modelling ruleset is being followed in the context of the terminology provided in this bulletin and compliance with the ZCSC.

Compliance Requirements and Calculations

For Part 9 buildings, compliance can be achieved by following either the performance or prescriptive paths. The calculation methodology for the performance path is based on the Mechanical Energy Use Intensity (MEUI) metric, which accounts for the emissions associated with the space heating and cooling equipment, domestic hot water equipment and ventilation equipment. For both paths, redundant/back-up systems are permitted to be excluded provided that they have been equipped with controls and have not been designed to meet the space conditioning load of the house. The note for Table 9.37.1.3. has been shown to apply to the prescriptive path, but also applies to the performance path by proxy via modelling requirements as per Division B, Subsection 9.36.5. For the prescriptive pathway, EL-2 to EL-4 require that energy sources supplying heating systems have an emissions factor of less than or equal to 0.011 kgCO_{2e}/kWh, which includes both the principal and supplementary heating systems.

For Part 10 compliance, the City of Vancouver Energy Modelling Guidelines (CoV EMGs) are referenced, which accounts for end uses such as gas fireplaces and gas cooktops. Furthermore, the National Energy Code of Canada for Buildings (NECB) uses the same language as Division B, Subsection 9.36.5 regarding redundant/back-up systems when demonstrating compliance.

The Evolution of the ZCSC

For Part 9 application of the ZCSC, when following the performance pathway, the GHG and GHGI metrics are to be met by focusing on the building systems and equipment as defined by MEUI. This does not account for the GHG emissions associated with other ancillary end-uses such as decorative gas fireplaces, gas cooktops and gas laundry drying equipment. Further, the terms provided in this bulletin pertaining to principal, supplementary, backup and redundant equipment can be open to interpretation as to how these terms are to be applied consistently especially when a building may incorporate a number of different types of equipment or systems. As a result, this could create ambiguities when discerning which equipment could be considered principal and what could be considered supplementary or backup/redundant. Please consult with the local authority having jurisdiction before finalizing any building plans dependent on interpretation of how heating and hot water systems are being used.

Through the evolution of the ZCSC, these gaps will continue to be addressed to refine calculation methodologies ensuring that all systems, equipment and appliances are being accounted for in a

consistent manner. BSSB will continue to engage stakeholders to better define solutions with future iterations of this regulation.

More Information

BC Codes are Now Available Free Online

Free online access to the [BC Building Code](#) and the [BC Fire Code](#) is available on the BC publications [website](#).

Other Links

- Ministry website: <https://www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards>
- Free online access to the [BC Building Code](#) and the [BC Fire Code](#) is available on the BC publications [website](#).

Contact the Building and Safety Standards Branch

- **General** inquiries can be sent to building.safety@gov.bc.ca

Contact the Local Authority

- Local authority contact information is available online at <http://www.civicinfo.bc.ca/directories>.

The Building and Safety Standards Branch does not enforce compliance with the BC Code. Local authorities are authorized to enforce the BC Code through the Local Government Act and the Community Charter.