

Proposed Change: Introduction to Greenhouse Gas Emissions

CHANGE NUMBER: BCBC2018-R503-GHG

CODE REFERENCE: British Columbia Building Code 2018 - Division A and Part 9 and 10 of Division B

BACKGROUND

Description

This change introduces a new objective and functional statement, as well as provisions relating to operational greenhouse gas (GHG) emissions for Part 9 and Part 3 buildings. It is important to note that the use of the GHG provisions for Part 9 buildings require that buildings be of residential occupancy and that it must also conform to the new prescriptive compliance pathway in Tables 9.36.2.6.-C, 9.36.2.7.-D, and 9.36.2.8.-C or Steps 3 or higher in Tables 9.36.6.3.-A to 9.36.6.3.-H (see also proposed change BCBC2018-R501-EE and BCBC2018-R502-ESC). For Part 3 buildings, buildings are required to meet the description set forth in Article 10.3.1.1.

(Note: only code references that have been revised are included in the proposed code change)

Problem

There are currently no objectives and functional statements, or provisions in the National Codes, of which the BC Codes are substantially based on, that addresses greenhouse gas emissions (GHGs). New provisions for the reduction of GHG emissions must be attributed to an objective and a functional statement.

Justification

The introduction of a new GHG objective was triggered by a provincial commitment to have new buildings be zero-carbon by 2030. The existing objectives and functional statements do not clearly address GHGs and may cause confusion for designers and local building officials. The new GHG objectives will help to inform the intent of future code development.

New Sections 9.37. and 10.3. contain GHG performance requirements for Part 9 and Part 3 buildings, respectively. Table 9.37.1.3. outlines the various ways a building can meet GHG requirements depending on the desired GHG emission level target ranging from medium, low, or zero-carbon ready. A 'measure only' compliance path has also been provided. There are several compliance options within the table that may accommodate buildings of a certain size. For example, the far left column may cater towards smaller buildings, whereas the two middle columns may be more suitable for medium to large buildings. The far right column of Table 9.37.1.3. provides a more prescriptive approach in that it allows designers to decarbonize an energy source for specific building systems such as the heating system or the service water heating system.

Part 3 buildings looking to meet GHG requirements will be required to use Table 10.3.1.3. This table is separated by occupancy types and is based on a performance approach. The unit of measurement used is based on the GHGi metric.

PROPOSED CHANGE

Section 2.2. Objectives

2.2.1. Objectives

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- 1) The objectives of this Code are as follows (see Note A-2.2.1.1.(1)):

OE2 Greenhouse Gases

An objective of this Code is to limit the probability of, as a result of design and construction of the *building's* systems, and the energy consumed in the operation of those systems, the production of greenhouse gases will be excessive. The risks of excessive greenhouse gas emissions addressed in this Code are those caused by-

OE2.1 – excessive emissions as a result of the design and construction of the *building* systems and the energy consumed in the operation of those systems

Section 3.2. Functional Statements

3.2.1. Functional Statements

3.2.1.1. Functional Statements

- 1) The objectives of this Code are achieved by measures, such as those described in the acceptable solutions in Division B, that are intended to allow the building or its elements to perform the following functions (see Note A-3.2.1.1.(1)):

F101 To limit excessive emission of greenhouse gases into the environment.

Section 9.37. Greenhouse Gas Emissions

9.37.1. General

9.37.1.1. Application

- 1) Notwithstanding Sentence (3), the requirements of this Section apply only to *buildings* that

- a) are a house or contain houses, with or without a *secondary suite*,
- b) does not contain spaces common to more than one house, and
- c) are designed to one of the following
 - i) Step 3, 4 or 5 in Tables 9.36.6.3.-A to 9.36.6.3.-H, or
 - ii) Tables 9.36.2.6.-C, 9.36.2.7.-D, and 9.36.2.8.-C.

2) Modelling of greenhouse gas emissions and the emissions factors associated with the use of energy utilities consumed by the *building's* systems shall conform to the City of Vancouver Energy Modelling Guidelines.

3) Where a *building* contains more than one house, with or without a *secondary suite*, the requirements of this Subsection shall apply to the greenhouse gas emissions of the *building* and not to the individual house. (See Note A-9.36.6.2.(2)).

9.37.1.2. Definitions and Abbreviations

1) Notwithstanding 9.37.1.1.(3), for the purposes of this Section, the term “house” shall mean all houses, with or without a *secondary suite*, that

- a) have HVAC systems that serve only a house, only a *secondary suite*, or both a house and its

secondary suite including their common spaces,

b) have service water heating systems that serve only a house, only a *secondary suite*, or both a house and its *secondary suite* including their common spaces, and

c) except for common spaces in a house with its *secondary suite*, do not share common spaces with other *dwelling units* or houses.

(See Note A-9.36.6.2.(2)).

2) For the purposes of this Section, the term “greenhouse gas” shall have the same meaning as defined in the Climate Change Accountability Act, and is expressed with the abbreviation “GHG.”

3) For the purposes of this Section, the term “greenhouse gas intensity” shall mean the total greenhouse gas emissions, expressed as kgCO_{2e} per m² per year, associated with the energy used by the building’s systems, and is expressed with the abbreviation “GHGi.”

4) For the purposes of this Section, the symbol “CO_{2e}” shall mean carbon dioxide or carbon dioxide equivalent, with carbon dioxide equivalent meaning one or more greenhouse gases with a global warming potential equivalent to carbon dioxide.

5) For the purposes of this Section, the term “decarbonize” shall mean the energy source supplying the *building’s* systems achieves an emissions factor equal to or less than that of electricity, calculated in accordance with the City of Vancouver Energy Modelling Guidelines.

6) For the purposes of this Section, the term “Level” shall mean a Level referred to in Table 9.37.1.3.

7) For the purposes of this Section, the term “total greenhouse gases” shall mean the total greenhouse gas emissions, expressed as kgCO_{2e} per year, associated with the energy used by the *building’s* systems.

8) For the purposes of this Section, the terms “measure” and “measure only” shall mean that the GHGi and the total greenhouse gases are to be calculated and these values are to be reported as per Subsection 2.2.8. of Division C.

9.37.1.3. Compliance Requirements

1) *Buildings* conforming to the requirements of any of GHG emission levels medium, low and zero carbon ready shall be designed and constructed to conform to one of the GHG emission compliance options in Table 9.37.1.3.

Table 9.37.1.3.
Greenhouse Gas Emissions
Forming part of Sentence 9.37.1.3.(1)

GHG Emission Level	GHG Emission Compliance Options				
	Maximum GHG Emissions by House, Expressed in kg CO _{2e} per House	or	Maximum GHG Emissions by House ¹		Reduction of GHG Emissions by Energy Source of Building Systems
			Maximum GHGi of the House, Expressed in kgCO _{2e} /m ² /year	Maximum GHG Emissions by House, Expressed in kgCO _{2e} per House	
Measure	Measure Only	or	Measure Only		N/A
medium	1050		6.0	2400	Decarbonize heating system energy source
low	440		2.5	800	Decarbonize heating and service water heating system energy source
zero carbon ready	265		1.5	500	Decarbonize all <i>building</i> systems energy sources

Notes to Table 9.37.1.3.:

(1) Compliance for this option is demonstrated by meeting both the GHGi and the GHG emission requirements for each house.

Section 10.3. Greenhouse Gas Emissions

10.3.1. General

10.3.1.1. Application

- 1) Except for *buildings* described in Article 1.3.1.1. of Division A and Sentence 9.37.1.1.(1) of Division B, the requirements of this Section apply only to *buildings* that
 - a) contain any of the following *major occupancies* as described in Table 10.3.1.3.:
 - i) *residential*,
 - ii) *business and personal service*, or
 - iii) *mercantile*, and
 - b) are designed to Step 2, 3 or 4 in Tables 10.2.3.3.-G to 10.2.3.3.-J. (See also Sentence 10.2.3.2.(3)).
- 2) Modelling of greenhouse gas emissions and the emissions factors associated with the use of energy utilities consumed by the *building's* systems shall conform to the City of Vancouver Energy Modelling Guidelines.

10.3.1.2. Definitions and Attributions

- 1) For the purposes of this Section, the term “greenhouse gas” shall have the same meaning as defined in the Climate Change Accountability Act, and is expressed with the abbreviation “GHG.”
- 2) For the purposes of this Section, the term “greenhouse gas intensity” shall mean the total greenhouse gas emissions, expressed as kgCO_{2e} per m² per year, associated with the energy used by the building's systems, and is expressed with the abbreviation “GHGi.”
- 3) For the purposes of this Section, the symbol “CO_{2e}” shall mean carbon dioxide or carbon dioxide equivalent, with carbon dioxide equivalent meaning one or more greenhouse gases with a global warming potential equivalent to carbon dioxide.
- 4) For the purposes of this Section, the term “Level” shall mean a Level referred to in Table 10.3.1.3.
- 5) For the purposes of this Section, the term “total greenhouse gases” shall mean the total greenhouse gas emissions, expressed as kgCO_{2e} per year, associated with the energy used by the *building's* systems.
- 6) For the purposes of this Section, the terms “measure” and “measure only” shall mean that the GHGi and the total greenhouse gases are to be calculated and these values are to be reported as per Subsection 2.2.8. of Division C.

10.3.1.3. Compliance Requirements

1) *Buildings* conforming to the requirements of any of GHG emission levels measure, medium, low and zero carbon ready shall be designed and constructed to conform to Table 10.3.1.3. based on *occupancy*.

Table 10.3.1.3.
Greenhouse Gas Emissions
Forming Part of Sentence 10.3.1.3.(1)

GHG Emission Level	Maximum GHGi of the <i>Building</i> , Expressed in kgCO _{2e} /m ² /year			
	<i>Residential Major Occupancy</i>		<i>Business and Personal Service and Mercantile Major Occupancies</i>	
	Hotels and Motels	Other <i>Residential Occupancies</i>	Offices	Other <i>Business and Personal Service and Mercantile Occupancies</i>
Measure	Measure Only			
medium	9.0	7.0	5.0	6.0
low	4.0	3.0	3.0	3.0
zero carbon ready	2.0	1.8	1.5	2.0