

Proposed Change 2205

Code Reference(s):	NBC25 Div.B 9.36.1.1.(1) (first printing) NBC25 Div.B 9.36.1.3. (first printing) NBC25 Div.B 9.36.1.4. (first printing) NBC25 Div.B 9.36.15. (first printing) NBC25 Div.B 9.36.16. (first printing) NBC25 Div.B 9.37. (first printing)
Subject:	Greenhouse Gas Emissions
Title:	New Section 9.37.-2030 on Operational GHG Emissions
Description:	This proposed change moves the provisions in Subsections 9.36.15. and 9.36.16. to a new Section to separate requirements for operational greenhouse gas emissions from those for energy efficiency.

This change could potentially affect the following topic areas:

- | | |
|--|---|
| ☐ Division A | ☒ Division B |
| ☐ Division C | ☒ Design and Construction |
| ☐ Building operations | ☒ Housing |
| ☒ Small Buildings | ☐ Large Buildings |
| ☐ Fire Protection | ☐ Occupant safety in use |
| ☐ Accessibility | ☐ Structural Requirements |
| ☐ Building Envelope | ☒ Energy Efficiency |
| ☐ Heating, Ventilating and Air Conditioning | ☐ Plumbing |
| | ☐ Construction and Demolition Sites |

Problem

The 2025 edition of the National Building Code of Canada introduced requirements to minimize excessive emissions of operational greenhouse gases (GHGs). These requirements were included in Section 9.36., but address a different Environment Objective than energy efficiency.

Justification

Moving the operational GHG emissions requirements to their own Section would provide clarity for Code users.

PROPOSED CHANGE

[9.36.1.1.] 9.36.1.1. Scope

- [1] 1)** This Section is concerned with the energy used by *buildings*, ~~and GHG emissions resulting from the supply and consumption of that energy,~~ as a result of
- [a] a) the design and construction of the *building* envelope, and
 - [b] b) the design and construction or specification of systems and equipment for
 - [i] i) heating, ventilating or air-conditioning, and
 - [ii] ii) service water heating.
- (See Note A-9.36.1.1.(1).)

[9.36.1.3.] 9.36.1.3. Compliance

- [1] 1)** Except as provided in Article 9.36.1.4. and Sentences (3) and (4), *buildings* shall comply with
- [a] a) the prescriptive or trade-off requirements in Subsections 9.36.2. to 9.36.4.,
 - [b] b) the performance requirements in Subsection 9.36.6.,
 - [c] c) the NECB, or
 - [d] d) for compliance with Energy Performance Tiers 1 to 5,
 - [i] i) the tiered performance requirements in Subsection 9.36.7.,
 - [ii] ii) the tiered energy use intensity requirements in Subsection 9.36.8.,
 - [iii] iii) the tiered points-based prescriptive trade-off requirements in Subsection 9.36.9.,
 - [iv] iv) the tiered prescriptive path requirements in Subsections 9.36.10. to 9.36.14., or
 - [v] v) the NECB.
- ~~**[2] 2)** Except as provided in Article 9.36.1.4. and Sentences (3) to (5), *buildings* shall comply with~~
- ~~[a] a) the tiered operational GHG emissions performance requirements in Subsection 9.36.15.,~~
 - ~~[b] b) the tiered operational GHG emissions prescriptive requirements in Subsection 9.36.16., or~~
 - ~~[c] c) the NECB.~~
- [3] 3)** *Buildings* containing non-residential occupancies whose combined total floor area exceeds 300 m² or *medium-hazard industrial occupancies* shall comply with the NECB.
- [4] 4)** *Buildings* or portions of *buildings* that are not required to be conditioned spaces are exempted from the requirements of this Section. (See Note A-9.36.1.3.(4).)
- ~~**[5] 5)** Extensions added to existing buildings that have a floor area not greater~~

~~than 60% of the original gross floor area of the existing building are exempted from the requirements of Subsections 9.36.15. and 9.36.16.~~

[9.36.1.4.] 9.36.1.4. Application

(See Note A-9.36.1.4.)

- [1] 1)** Subsections 9.36.2. to 9.36.4. and 9.36.10. to 9.36.14. apply to
 - [a] a) *buildings of residential occupancy* to which Part 9 applies,
 - [b] b) *buildings containing business and personal services, mercantile or low-hazard industrial occupancies* to which Part 9 applies whose combined total *floor area* does not exceed 300 m², excluding parking garages that serve *residential occupancies*, and
 - [c] c) *buildings containing a mix of the residential and non-residential occupancies* described in Clauses (a) and (b).
- [2] 2)** Subsections 9.36.6. to 9.36.8. ~~and 9.36.15.~~ apply only to
 - [a] a) houses with or without a *secondary suite*, and
 - [b] b) *buildings containing only dwelling units* and common spaces whose total *floor area* does not exceed 20% of the total *floor area* of the *building*.

(See Note A-9.36.1.4.(2).)
- [3] 3)** Subsections ~~9.36.9. and 9.36.16.~~ apply ~~ies~~ only to *buildings of residential occupancy* to which Part 9 applies.

Note A-9.36.1.4. Compliance Options According to Building Type and Size.

Table A-9.36.1.4. describes the types and sizes of Part 9 buildings to which Section 9.36. and the NECB apply.

Table [9.36.1.4.] A-9.36.1.4.
Energy Efficiency Compliance Options for Part 9 Buildings ⁽¹⁾

Building Types and Sizes	Energy Efficiency Compliance Options							Operational GHGe Compliance Options		
	NBC 9.36.2. to 9.36.4. (Prescriptive)	NBC 9.36.6. (Performance)	NBC 9.36.7. (Tiered Performance Path)	NBC 9.36.8. (Tiered Energy Use Intensity Path)	NBC 9.36.9. (Points-based Tiered Prescriptive Trade-off Path)	NBC 9.36.10. to 9.36.14. (Tiered Prescriptive Path)	NECB	~~NBC 9.36.15. (Tiered Performance Path)~~	~~NBC 9.36.16. (Tiered Prescriptive Path)~~	NECB
- Houses with or without a secondary suite - Buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area ⁽²⁾	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Other buildings of residential occupancy to which Part 9 applies ⁽³⁾	✓	X	X	X	✓	✓	✓	✗	✗	✗

Building Types and Sizes	Energy Efficiency Compliance Options							Operational GHGe Compliance Options		
	NBC 9.36.2. to 9.36.4. (Prescriptive)	NBC 9.36.6. (Performance)	NBC 9.36.7. (Tiered Performance Path)	NBC 9.36.8. (Tiered Energy Use Intensity Path)	NBC 9.36.9. (Points-based Tiered Prescriptive Trade-off Path)	NBC 9.36.10. to 9.36.14. (Tiered Prescriptive Path)	NECB	~~NBC 9.36.15. (Tiered Performance Path)~~	~~NBC 9.36.16. (Tiered Prescriptive Path)~~	NECB
- Buildings containing Group D, E or F3 occupancies whose combined total floor area $\leq$ 300 m² (excluding parking garages that serve residential occupancies) - Buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portion's combined total floor area $\leq$ 300 m² (excluding parking	✓	X	X	X	X	✓	✓	✗	✗	✗

Building Types and Sizes	Energy Efficiency Compliance Options							Operational GHGe Compliance Options		
	NBC 9.36.2. to 9.36.4. (Prescriptive)	NBC 9.36.6. (Performance)	NBC 9.36.7. (Tiered Performance Path)	NBC 9.36.8. (Tiered Energy Use Intensity Path)	NBC 9.36.9. (Points-based Tiered Prescriptive Trade-off Path)	NBC 9.36.10. to 9.36.14. (Tiered Prescriptive Path)	NECB	NBC 9.36.15. (Tiered Performance Path)	NBC 9.36.16. (Tiered Prescriptive Path)	NECB
garages that serve residential occupancies)										
Buildings containing Group D, E or F3 occupancies whose combined total floor area > 300 m²	X	X	X	X	X	X	✓	✗	✗	✗
Buildings containing F2 occupancies of any size	X	X	X	X	X	X	✓	✗	✗	✗

Notes to Table ~~[9.36.1.4.]~~ A-9.36.1.4.:

- (1) ✓ = Requirements apply to building type
X = Requirements do not apply to building type
 - (2) The walls that enclose a common space are excluded from the calculation of floor area of that common space.
 - (3) Refers to buildings other than houses with or without a secondary suite and buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area.
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Note A-9.36.1.4.(2) ~~and 9.37.1.4.(1)~~ Houses and Common Spaces.

~~**[9.36.15.] 9.36.15. Tiered Operational GHG Emissions Compliance: Performance Path**~~
~~**[9.36.15.1.] 9.36.15.1. Scope**~~

- ~~[1] 1)~~ This Subsection is concerned with GHG emissions, determined at the time of design, resulting from the supply and consumption of the energy used by the *building*
 - ~~[a] a) for~~
 - ~~[i] i) systems used for heating, ventilating and air conditioning, and~~
 - ~~[ii] ii) systems used to heat service water, or~~
 - ~~[b] b) as determined in accordance with Subsection 9.36.6.~~

~~**[9.36.15.2.] 9.36.15.2. Application**~~

- ~~[1] 1)~~ This Subsection applies to the *buildings* described in Article 9.36.1.4.

~~**[9.36.15.3.] 9.36.15.3. Definitions**~~

- ~~[1] 1)~~ For the purpose of this Subsection, the term "annual operational GHG emissions" shall mean the annual sum of GHG emissions produced on the *building* site in meeting the annual energy demand loads or produced off-site in generating the energy sources used to meet the annual energy demand loads.
- ~~[2] 2)~~ For the purpose of this Subsection, the term "operational GHG emissions target" shall mean the annual operational GHG emissions of a hypothetical replica of the proposed *building*, produced on the *building* site in meeting the house energy target or produced off-site in generating the energy sources used to meet the house energy target.

~~9.36.15.4.1~~ **9.36.15.4. Performance Compliance**

- ~~[1] 1)~~ Except as provided in Sentence (5), compliance with this Subsection shall be achieved by designing and constructing *buildings* in accordance with one of the GHG emissions performance levels A to F specified in Table 9.36.15.4., each of which corresponds to
- ~~[a] a) the annual operational GHG emissions of the proposed house, expressed as a percent operational GHG emissions target, or~~
 - ~~[b] b) the percentage of improvement of the annual operational GHG emissions of the proposed house relative to the operational GHG emissions target of the reference house, expressed as a percent improvement.~~

**Table ~~9.36.15.4.1~~ 9.36.15.4.
GHG Emissions Performance Levels
Forming Part of Sentences ~~9.36.15.4.1~~ 9.36.15.4.([1] 1) and ([2] 2)**

GHG Emissions Performance Level	Percent Operational GHG Emissions Target ⁽¹⁾	Percent Improvement
A	≤ 10%	≥ 90%
B	≤ 25%	≥ 75%
C	≤ 50%	≥ 50%
D	≤ 75%	≥ 25%
E	≤ 90%	≥ 10%
F	≤ 100%	≥ 0%

~~Note to Table 9.36.15.4.1~~ **9.36.15.4.1**

- (1) See Sentence (2).

- ~~[2] 2)~~ Compliance of the proposed house with one of GHG emissions performance levels A to F specified in Table 9.36.15.4. shall be determined by
- ~~[a] a) dividing the annual operational GHG emissions of the proposed house by the operational GHG emissions target of the reference house to derive the percent operational GHG emissions target, or~~
 - ~~[b] b) subtracting the annual operational GHG emissions of the proposed house from the operational GHG emissions target of the reference house and dividing the result by the operational GHG emissions~~

~~target of the reference house to derive the percent improvement.~~

- ~~[3] 3) The annual operational GHG emissions of the proposed house shall be determined in accordance with Article 9.36.15.6.~~
- ~~[4] 4) The operational GHG emissions target of the reference house shall be determined in accordance with Article 9.36.15.7.~~
- ~~[5] 5) Where the house cannot reasonably be connected to the provincial or territorial electrical power grid, compliance with this Subsection shall be achieved by reporting the annual operational GHG emissions of the proposed house calculated in accordance with Article 9.36.15.6.~~

~~[9.36.15.5.] 9.36.15.5. GHG Emissions Factors~~

~~(See Note A-9.36.15.5.)~~

- ~~[1] 1) Except as provided in Sentences (2) to (4), the GHG emissions factors used in Articles 9.36.15.6. and 9.36.15.7. shall be in conformance with the values established by the provincial or territorial government having jurisdiction.~~
- ~~[2] 2) Where permitted by the provincial or territorial government having jurisdiction, the GHG emissions factor for an energy source may be obtained from the regulated utility responsible for providing the energy source to the *building* site.~~
- ~~[3] 3) Where they have not been established in accordance with Sentences (1) and (2), the GHG emissions factors shall be in conformance with Tables 9.36.15.5.-A and 9.36.15.5.-B.~~

Table ~~[9.36.15.5.-A] 9.36.15.5.-A~~
GHG Emissions Factors for Electricity and Utility Gas by Province or Territory
Forming Part of Sentence ~~[9.36.15.5.] 9.36.15.5.([3] 3)~~

Province or Territory	GHG Emissions Factor by Energy Source, g CO ₂ e/kWh	
	Electricity ⁽¹⁾	Utility Gas ⁽²⁾
British Columbia	1.32	190
Alberta	181.86	189
Saskatchewan	146.60	185
Manitoba	0.00	185
Ontario	57.90	185
Québec	0.38	186

New Brunswick	77.88	185
Nova Scotia	161.64	190
Prince Edward Island	77.88	185
Newfoundland and Labrador	11.08	185
Yukon	25.00	190
Northwest Territories	6.82	185
Nunavut	465.16	190

Notes to Table ~~[9.36.15.5.-A]~~ 9.36.15.5.-A:

- (1) GHG emissions factors for electricity are an average of the 2031–2035 values provided by Environment and Climate Change Canada at <https://data-donnees.az.ec.gc.ca/data/substances/monitor/canada-s-greenhouse-gas-emissions-projections> and were current in June 2023.
- (2) GHG emissions factors for utility gas are based on estimates in the Environment and Climate Change Canada “National Inventory Report 1990–2020: Greenhouse Gas Sources and Sinks in Canada.”

Table ~~[9.36.15.5.-B]~~ 9.36.15.5.-B
GHG Emission Factors for Other Energy Sources
Forming Part of Sentence ~~[9.36.15.5.]~~ 9.36.15.5.([3] 3)

Energy Source	GHG Emissions Factor ⁽¹⁾	
	In-g CO ₂ e/L	In-g CO ₂ e/kWh
Diesel	2 690	250
Oil, heating or light fuel	2 755	270
Oil, heavy fuel	3 176	274
Propane	1 548	218

Note to Table ~~[9.36.15.5.-B]~~ 9.36.15.5.-B:

- (1) GHG emissions factors are values provided by Environment and Climate Change Canada at <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/emission-factors-reference-values.html> (Version 1.1).

- ~~[4] 4)~~ For energy sources supplied by a district energy plant, the GHG emissions factors shall
- ~~[a] a)~~ be in conformance with Table 9.36.15.5.-C, or
 - ~~[b] b)~~ be determined by a qualified person representing the district energy plant operator (see Note A-9.36.15.5.(4)(b) and (5)).

~~Table [9.36.15.5.-C] 9.36.15.5.-C~~
GHG Emissions Factors for Energy Sources Supplied by a District Energy Plant
Forming Part of Clause 9.36.15.5.(4)(a)

Energy Source	GHG Emissions Factor, ⁽¹⁾ g CO₂e/kWh
Chilled water	128
Hot water	362
Steam	383

~~Note to Table [9.36.15.5.-C] 9.36.15.5.-C:~~

- (1) GHG emissions factors are values sourced from ANSI/ASHRAE 228, "Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance".

- ~~[5] 5)~~ Where they have not otherwise been established in accordance with this Article, the GHG emissions factors shall be determined by a qualified person. (See Note A-9.36.15.5.(4)(b) and (5).)

~~[9.36.15.6.] 9.36.15.6. Annual Operational GHG Emissions of the Proposed House~~

- ~~[1] 1)~~ The annual operational GHG emissions of the proposed house, CO₂e_{proposed}, in kg CO₂e, shall be determined using the following equation:

$$\text{CO}_2\text{e}_{\text{proposed}} = \sum_{\text{ES}} (E_{\text{reg,ES}} \times \text{GEF}_{\text{ES}}) / 1\,000$$

where

$E_{reg,ES}$	= annual energy consumption of the equipment and systems regulated by the NBC, as listed in Clauses 9.36.6.4.(1)(a) to (d), for each energy source (ES), in kWh, determined by modeling the proposed house in accordance with Article 9.36.6.9., and
GEF_{ES}	= GHG emissions factor for the corresponding energy source, in g CO ₂ e/kWh, as specified in Article 9.36.15.5.

9.36.15.7.1 9.36.15.7. Operational GHG Emissions Target of the Reference House

- 1 1)** The operational GHG emissions target of the reference house, CO₂e_{target}, in kg CO₂e, shall be determined using the following equation:

$$CO_2e_{target} = CO_2e_{NHreg} + CO_2e_{SH} + CO_2e_{SWH}$$

where

CO_2e_{NHreg}	= annual operational GHG emissions of all non-heating equipment and systems regulated by the NBC, in kg CO ₂ e, determined in accordance with Sentence (2),
CO_2e_{SH}	= annual operational GHG emissions from space heating, in kg CO ₂ e, determined in accordance with Sentence (3), and
CO_2e_{SWH}	= annual operational GHG emissions from service water heating, in kg CO ₂ e, determined in accordance with Sentence (4).

- 2 2)** The annual operational GHG emissions of all non-heating equipment and systems regulated by the NBC, CO₂e_{NHreg}, in kg CO₂e, shall be determined using the following equation:

$$CO_2e_{NHreg} = E_{NHreg} \times GEF_{elec} / 1\,000$$

where

E_{NHreg}	= annual energy consumption of all non-heating systems and equipment regulated by the NBC, as listed in Clauses 9.36.6.4.(1)(b) and (d), in the reference house, in kWh, determined by modeling the reference house in accordance with Article 9.36.6.13., and
GEF_{elec}	= GHG emissions factor for electricity, in g CO ₂ e/kWh, as specified in Article 9.36.15.5.

- ~~[3] 3)~~ The annual operational GHG emissions from space heating, $\text{CO}_2\text{e}_{\text{SH}}$, in kg CO_2e , shall be determined using the following equation:

$$\text{CO}_2\text{e}_{\text{SH}} = \text{TED}_{\text{SH}} \times 235 / 1\,000$$

where

-

TED_{SH} = annual thermal energy demand of the space heating system, including baseboard heating, in the reference house, in kWh, determined by modeling the reference house in accordance with Subsection 9.36.6., and
 235 = reference GHG emissions factor for space heating, in g $\text{CO}_2\text{e}/\text{kWh}$.

(See Note A-9.36.15.7.(3) and (4).)

- ~~[4] 4)~~ The annual operational GHG emissions from service water heating, $\text{CO}_2\text{e}_{\text{SWH}}$, in kg CO_2e , shall be determined using the following equation:

$$\text{CO}_2\text{e}_{\text{SWH}} = \text{TED}_{\text{SWH}} \times 260 / 1\,000$$

where

-

TED_{SWH} = annual thermal energy demand of the service water heating system in the reference house, in kWh, determined by modeling the reference house in accordance with Subsection 9.36.6., and
 260 = reference GHG emissions factor for service water heating, in g $\text{CO}_2\text{e}/\text{kWh}$.

(See Note A-9.36.15.7.(3) and (4).)

~~Note A-9.36.15.5. Unit Conversions.~~

A volumetric quantity of a fuel can be converted to an equivalent amount of energy, in kWh, using the conversion factors provided in Table A-9.36.15.5.

**Table ~~[9.36.15.5.1] A-9.36.15.5.~~
Unit Conversions for Energy Sources**

Energy Source	Unit	Energy per Unit, ⁽¹⁾ kWh
Diesel	L	10.74
Natural gas	m ³	10.36

Energy Source	Unit	Energy per Unit, ⁽¹⁾ kWh
Oil, heating or light fuel	L	10.20
Oil, heavy fuel	L	11.59
Propane	L	7.09

Note to Table ~~[9.36.15.5.1] A-9.36.15.5.:~~

- (1) The energy per unit is the approximate energy content, in GJ, of the fuel from <https://apps.cer-rec.gc.ca/Conversion/conversion-tables.aspx> converted to kWh (1 GJ = 277.7778 kWh).

Note ~~A-9.36.15.5.(4)(b) and (5) -Qualified Person.~~

A qualified person is a person with training and expertise in building energy analysis and includes

- a. a GHG verifier certified in accordance with ISO/IEC 17024, "Conformity assessment — General requirements for bodies operating certification of persons", who
 - i. demonstrates competence with the use of ISO 14064-1, "Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals", or
 - ii. is accredited in accordance with ISO 14065, "General principles and requirements for bodies validating and verifying environmental information", and ISO 14066, "Environmental information — Competence requirements for teams validating and verifying environmental information", and
- b. a person qualified by the authority having jurisdiction.

Note ~~A-9.36.15.7.(3) and (4) -Thermal Energy Demand.~~

Thermal energy demand is the amount of heating energy that is output from all types of heating equipment.

For space heating, heating equipment includes electric, gas, hot water, and any other equipment used for the purpose of space heating and ventilation. The heating output of any equipment whose source of energy is not directly provided by a utility (electricity, gas or district) must still be counted towards TED_{SH} .

For service water heating, heating equipment includes electric resistance elements or gas heaters/burners of hot water storage tanks or instantaneous water heaters, heat pump water heaters, and any other equipment used for the purpose of service water heating. The heating output of any equipment whose source of energy is not directly provided by a utility (electricity, gas or district) must still be counted towards TED_{SWH} .

~~[9.36.16.] 9.36.16. Tiered Operational GHG Emissions Compliance: Prescriptive Path~~

~~[9.36.16.1.] 9.36.16.1. Scope~~

- ~~[1] 1)~~ This Subsection is concerned with GHG emissions, determined at the time of design, resulting from the supply and consumption of energy used by the *building* for
- ~~[a] a) systems used for heating, ventilating and air-conditioning, and~~
 - ~~[b] b) systems used to heat service water.~~

~~[9.36.16.2.] 9.36.16.2. Application~~

- ~~[1] 1)~~ This Subsection applies to the *buildings* described in Article 9.36.1.4.

~~[9.36.16.3.] 9.36.16.3. Compliance~~

- ~~[1] 1)~~ The GHG emissions factor (GEF) for an energy source shall be determined in accordance with Article 9.36.15.5.
- ~~[2] 2)~~ The total number of energy conservation points achieved by the *building* shall be determined in accordance with
- ~~[a] a) the tiered points-based prescriptive trade-off requirements in Subsection 9.36.9., or~~
 - ~~[b] b) the tiered prescriptive requirements in
 - ~~[i] i) Subsection 9.36.10., where Tier 1 is assigned 0 energy conservation points,~~
 - ~~[ii] ii) Reserved,~~
 - ~~[iii] iii) Reserved,~~
 - ~~[iv] iv) Reserved, or~~
 - ~~[v] v) Subsection 9.36.14., where Tier 5 is assigned 75 energy conservation points.~~~~
- ~~[3] 3)~~ Compliance with this Subsection shall be achieved by designing and constructing *buildings* in accordance with one of the GHG emissions performance levels A to F specified in Article 9.36.16.4.

~~[9.36.16.4.] 9.36.16.4. GHG Emissions Performance Levels~~

- ~~[1] 1)~~ Except as provided in Sentence (2), to comply with one of the GHG emissions performance levels A to F, the *building* shall be designed and constructed so that its total number of energy conservation points, as determined in accordance with Sentence 9.36.16.3.(2), meets or exceeds the minimum number of energy conservation points required for that GHG emissions performance level, as specified in Tables 9.36.16.4.-A to 9.36.16.4.-F for the energy sources or types of equipment used for space and service water heating and the applicable GHG emissions factor for electricity.

Table ~~9.36.16.4-A~~ 9.36.16.4-A
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level A
Forming Part of Sentence ~~9.36.16.4.~~ 9.36.16.4.([1] 1)

Energy Source or Type of Equipment		Electricity GEF, ⁽¹⁾ g CO₂e/kWh	Minimum Number of Energy Conservation Points ⁽²⁾
Space Heating	Service Water Heating		
Electricity	Heat pump water heater	GEF ≤ 25	10
		25 < GEF ≤ 100	70
	Electric tankless or storage-type service water heater	GEF ≤ 25	15
Heat pump ⁽³⁾ with electric supplemental system ⁽⁴⁾	Electric tankless or storage-type service water heater or heat pump water heater	GEF ≤ 25	0
		25 < GEF ≤ 100	65
Other energy source ⁽⁵⁾	Other energy source ⁽⁵⁾	GEF < 200	10

Notes to Table ~~9.36.16.4-A~~ 9.36.16.4-A:

- (1) GEF = GHG emissions factor
- (2) See Sentence 9.36.16.3.(2).
- (3) Electrically operated.
- (4) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.

- (5) Other energy source with $GEF \leq 25 \text{ g CO}_2\text{e/kWh}$.

Table ~~[9.36.16.4.-B]~~ 9.36.16.4.-B
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level B
Forming Part of Sentence ~~[9.36.16.4.]~~ 9.36.16.4.([1]-1)

Energy Source or Type of Equipment		Electricity GEF, (1) g CO ₂ e/kWh	Minimum Number of Energy Conservation Points (2)
Space Heating	Service Water Heating		
Electricity	Heat pump water heater	$GEF \leq 25$	10
		$25 < GEF \leq 100$	35
	Electric tankless or storage-type service water heater	$GEF \leq 25$	15
		$25 < GEF \leq 100$	35
Heat pump (3) with electric supplemental system (4)	Heat pump water heater	$GEF \leq 25$	0
		$25 < GEF \leq 100$	10
		$100 < GEF < 200$	65
	Electric tankless or storage-type service water heater	$GEF \leq 25$	0
		$25 < GEF \leq 100$	20
		$100 < GEF < 200$	65
Other energy source (5)	Other energy source (5)	$GEF < 200$	10

Notes to Table ~~[9.36.16.4.-B]~~ 9.36.16.4.-B:

- (1) $GEF =$ GHG emissions factor
- (2) See Sentence 9.36.16.3.(2).

- (3) ~~Electrically operated.~~
- (4) ~~The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.~~
- (5) ~~Other energy source with $GEF \leq 25$ g CO₂e/kWh.~~

Table ~~[9.36.16.4. C]~~ 9.36.16.4. C
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level C
Forming Part of Sentence ~~[9.36.16.4.]~~ 9.36.16.4.([1] 1)

Energy Source or Type of Equipment		Electricity GEF, (1) g CO₂e/kWh	Minimum Number of Energy Conservation Points (2)
Space Heating	Service Water Heating		
Electricity	Heat pump water heater	~~GEF $\leq$ 25~~	~~10~~
		~~25 $<$ GEF $<$ 200~~	~~35~~
	Electric tankless or storage-type service water heater	~~GEF $\leq$ 25~~	~~15~~
		~~25 $<$ GEF $\leq$ 100~~	~~35~~
		~~100 $<$ GEF $<$ 200~~	~~40~~
Heat pump (3) with electric supplemental system (4)	Heat pump water heater	~~GEF $\leq$ 25~~	~~0~~
		~~25 $<$ GEF $\leq$ 100~~	~~10~~
		~~100 $<$ GEF $<$ 200~~	~~15~~
	Electric tankless or storage-type service water heater	~~GEF $\leq$ 25~~	~~0~~
		~~25 $<$ GEF $<$ 200~~	~~15~~

~~Energy Source or Type of Equipment~~		~~Electricity GEF, (1) g CO₂e/kWh~~	~~Minimum Number of Energy Conservation Points (2)~~	
~~Space Heating~~	~~Service Water Heating~~			
~~Heat pump (3) with utility gas or propane supplemental system (4)~~	~~Electric, utility gas, or propane tankless or storage-type service water heater or heat pump water heater~~	~~GEF < 200~~	~~35 (5)~~	
~~Other energy source (6)~~	~~Other energy source (6)~~	~~GEF < 200~~	~~10~~	

~~Notes to Table 9.36.16.4.-C 9.36.16.4.-C:~~

- (1) ~~GEF = GHG emissions factor~~
- (2) ~~See Sentence 9.36.16.3.(2).~~
- (3) ~~Electrically operated.~~
- (4) ~~The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.~~
- (5) ~~Based on the use of the GEFs for utility gas and propane listed in Tables 9.36.15.5.-A and 9.36.15.5.-B, respectively.~~
- (6) ~~Other energy source with GEF ≤ 25 g CO₂e/kWh.~~
-

Table ~~9.36.16.4.-D1~~ 9.36.16.4.-D
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level D
Forming Part of Sentence ~~9.36.16.4.~~ 9.36.16.4.([1] 1)

Energy Source or Type of Equipment		Electricity GEF, ⁽¹⁾ g-CO₂e/kWh	Minimum Number of Energy Conservation Points ⁽²⁾
Space Heating	Service Water Heating		
Utility gas or propane	Utility gas or propane	GEF < 200 ⁽³⁾	35 ⁽⁴⁾
	Electricity	GEF ≤ 100	10 ⁽⁴⁾
Electricity	Electricity	GEF < 200	10
Heat pump ⁽⁵⁾ with electric supplemental system ⁽⁶⁾	Electric tankless or storage-type service water heater or heat pump water heater	GEF < 200	0
Heat pump ⁽⁵⁾ with utility gas or propane supplemental system ⁽⁶⁾	Electric, utility gas, or propane tankless or storage-type service water heater or heat pump water heater	GEF < 200	10 ⁽⁴⁾
Other energy source ⁽⁷⁾	Other energy source ⁽⁷⁾	GEF < 200	10

Notes to Table ~~9.36.16.4.-D1~~ 9.36.16.4.-D:

- (1) GEF = ~~GHG emissions factor~~
- (2) See ~~Sentence 9.36.16.3.(2).~~
- (3) ~~Accounts for GHG emissions from electricity used for non-heating systems and equipment that are regulated by this Code.~~

- (4) ~~Based on the use of the GEFs for utility gas and propane listed in Tables 9.36.15.5.-A and 9.36.15.5.-B, respectively.~~
- (5) ~~Electrically operated.~~
- (6) ~~The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.~~
- (7) ~~Other energy source with $GEF \leq 25 \text{ g CO}_2\text{e/kWh}$.~~

Table ~~[9.36.16.4.-E] 9.36.16.4.-E~~
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level E
Forming Part of Sentence ~~[9.36.16.4.] 9.36.16.4.([1] 1)~~

Energy Source or Type of Equipment		Electricity GEF, ⁽¹⁾ g CO₂e/kWh	Minimum Number of Energy Conservation Points ⁽²⁾
Space Heating	Service Water Heating		
Utility gas or propane	Utility gas or propane	$GEF < 200$ ⁽³⁾	15 ⁽⁴⁾
	Electricity or other energy source ⁽⁵⁾	$GEF < 200$	0
Electricity, heat pump ⁽⁶⁾ with electric, utility gas, or propane supplemental system, ⁽⁷⁾ or other energy source ⁽⁵⁾	Utility gas, electricity, propane, or other energy source ⁽⁵⁾	$GEF < 200$	0

Notes to Table ~~[9.36.16.4.-E] 9.36.16.4.-E:~~

- (1) ~~GEF = GHG emissions factor~~
 - (2) ~~See Sentence 9.36.16.3.(2).~~
 - (3) ~~Accounts for GHG emissions from electricity used for non-heating systems and equipment that are regulated by this Code.~~
 - (4) ~~Based on the use of the GEFs for utility gas and propane listed in Tables 9.36.15.5.A and 9.36.15.5.B, respectively.~~
 - (5) ~~Other energy source with $GEF \leq 25 \text{ g CO}_2\text{e/kWh}$.~~
 - (6) ~~Electrically operated.~~
 - (7) ~~The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.~~
-

Table ~~[9.36.16.4.-F]~~ 9.36.16.4.-F
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level F
Forming Part of Sentence [9.36.16.4.] 9.36.16.4.([1]-1)

Energy Source or Type of Equipment		Electricity GEF, ⁽¹⁾ g CO ₂ e/kWh	Minimum Number of Energy Conservation Points ⁽²⁾
Space Heating	Service Water Heating		
Utility gas	Utility gas, electricity, propane, or other energy source ⁽³⁾	GEF < 200	0
Propane	Propane	GEF < 200 ⁽⁴⁾	±0 ⁽⁵⁾
	Electricity or other energy source ⁽³⁾	GEF < 200	0
Electricity, heat pump ⁽⁶⁾ -with electric, utility gas, or propane supplemental system, ⁽⁷⁾ -or other energy source ⁽³⁾	Utility gas, electricity, propane, or other energy source ⁽³⁾	GEF < 200	0

Notes to Table ~~[9.36.16.4.-F]~~ 9.36.16.4.-F:

- (1) GEF = GHG emissions factor
- (2) See Sentence 9.36.16.3.(2).
- (3) Other energy source with GEF ≤ 25 g CO₂e/kWh.
- (4) Accounts for GHG emissions from electricity used for non-heating systems and equipment that are regulated by this Code.

- (5) ~~Based on the use of the GEFs for propane in Table 9.36.15.5.-B.~~
- (6) ~~Electrically operated.~~
- (7) ~~The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.~~

~~[2] 2) Where the *building* cannot reasonably be connected to the provincial or territorial electrical power grid, the *building* shall be exempted from compliance with the requirements of this Subsection.~~

[9.37.] -- Operational GHG Emissions

[9.37.1.] -- General

[9.37.1.1.] --- Scope

- [1] --)** Except as provided in Articles 9.37.3.1. and 9.37.4.1., this Section is concerned with the GHG emissions, resulting from the supply and consumption of energy used by the *building*, as a result of
- [a] --) the design and construction of the *building* envelope, and
 - [b] --) the design and construction or specification of systems and equipment for
 - [i] --) heating, ventilating or air-conditioning, and
 - [ii] --) service water heating.

[9.37.1.2.] --- Definitions

- [1] --)** For the purpose of this Section, the term "annual operational GHG emissions" shall mean the annual sum of GHG emissions produced on the *building* site in meeting the annual energy demand loads or produced off-site in generating the energy sources used to meet the annual energy demand loads.
- [2] --)** For the purpose of this Section, the term "operational GHG emissions target" shall mean the annual operational GHG emissions of a hypothetical replica of the proposed *building*, produced on the *building* site in meeting the house energy target or produced off-site in generating the energy sources used to meet the house energy target.
- [3] --)** For the purpose of this Section, the term "common space" shall have the meaning stated in Sentence 9.36.1.4.(2).

[4] --) For the purpose of this Section, the term "house energy target" shall have the meaning stated in Sentence 9.36.1.2.(6).

[5] --) For the purposes of this Section, the term "house" shall have the meaning stated in Sentence 9.36.1.2.(9).

[9.37.1.3.] --- Compliance

[1] --) Except as provided in ~~Article 9.36.1.4.~~Article 9.37.1.4. and Sentences (2) to (4), *buildings* shall comply with

[a] --) the tiered operational GHG emissions performance requirements in Subsection 9.37.3.,

[b] --) the tiered operational GHG emissions prescriptive requirements in Subsection 9.37.4., or

[c] --) the NECB.

[2] --) *Buildings* containing *non-residential occupancies* whose combined total floor area exceeds 300 m² or *medium-hazard industrial occupancies* shall comply with the NECB.

[3] --) *Buildings* or portions of *buildings* that are not required to be *conditioned spaces* are exempted from the requirements of this Section.

[4] --) Extensions added to *existing buildings* that have a floor area not greater than 60% of the original gross floor area of the *existing building* are exempted from the requirements of ~~Subsections 9.36.15. and 9.36.16.~~Subsections 9.37.3. and 9.37.4.

[9.37.1.4.] --- Application

[1] --) Subsection 9.37.3. applies only to

[a] --) houses with or without a *secondary suite*, and

[b] --) *buildings* containing only *dwelling units* and common spaces whose total floor area does not exceed 20% of the total floor area of the *building*.

(See Note A-9.36.1.4.(2) and 9.37.1.4.(1).)

[2] --) Subsection 9.37.4. applies only to *buildings of residential occupancy* to which Part 9 applies.

[9.37.2.] -- GHG Emissions Factors

[9.37.2.1.] --- GHG Emissions Factors

(See Note A-9.37.2.1.)

[1] --) Except as provided in ~~this~~ Sentences (2) to (4)~~ction~~, the GHG emissions factors used in ~~Articles 9.36.15.6. and 9.36.15.7.~~this Section shall be in conformance with the values established by the provincial or territorial government having jurisdiction.

[2] --) Where permitted by the provincial or territorial government having jurisdiction, the GHG emissions factor for an energy source may be

obtained from the regulated utility responsible for providing the energy source to the *building* site.

[3] --) Where they have not been established in accordance with Sentences (1) and (2), the GHG emissions factors shall be in conformance with ~~and 9.36.15.5.-B~~ Tables 9.37.2.1.-A and -B.

Table [9.37.2.1.-A]
GHG Emissions Factors for Electricity and Utility Gas by Province or Territory
Forming Part of Sentence 9.37.2.1.(3)

<u>Province or Territory</u>	<u>GHG Emissions Factor by Energy Source, g CO₂e/kWh</u>	
	<u>Electricity ⁽¹⁾</u>	<u>Utility Gas ⁽²⁾</u>
<u>British Columbia</u>	<u>1.32</u>	<u>190</u>
<u>Alberta</u>	<u>181.86</u>	<u>189</u>
<u>Saskatchewan</u>	<u>146.60</u>	<u>185</u>
<u>Manitoba</u>	<u>0.00</u>	<u>185</u>
<u>Ontario</u>	<u>57.90</u>	<u>185</u>
<u>Québec</u>	<u>0.38</u>	<u>186</u>
<u>New Brunswick</u>	<u>77.88</u>	<u>185</u>
<u>Nova Scotia</u>	<u>161.64</u>	<u>190</u>
<u>Prince Edward Island</u>	<u>77.88</u>	<u>185</u>
<u>Newfoundland and Labrador</u>	<u>11.08</u>	<u>185</u>
<u>Yukon</u>	<u>25.00</u>	<u>190</u>
<u>Northwest Territories</u>	<u>6.82</u>	<u>185</u>
<u>Nunavut</u>	<u>465.16</u>	<u>190</u>

Notes to Table [9.37.2.1.-A] :

- (1) GHG emissions factors for electricity are an average of the 2031–2035 values provided by Environment and Climate Change Canada at <https://data-donnees.az.ec.gc.ca/data/substances/monitor/canada-s-greenhouse-gas-emissions-projections> and were current in June 2023.
- (2) GHG emissions factors for utility gas are based on estimates in the Environment and Climate Change Canada “National Inventory Report 1990–2020: Greenhouse Gas Sources and Sinks in Canada.”

Table [9.37.2.1.-B]
GHG Emission Factors for Other Energy Sources
Forming Part of Sentence 9.37.2.1.(3)

<u>Energy Source</u>	<u>GHG Emissions Factor ⁽¹⁾</u>	
	<u>In g CO₂e/L</u>	<u>In g CO₂e/kWh</u>
<u>Diesel</u>	<u>2 690</u>	<u>250</u>
<u>Oil, heating or light fuel</u>	<u>2 755</u>	<u>270</u>
<u>Oil, heavy fuel</u>	<u>3 176</u>	<u>274</u>
<u>Propane</u>	<u>1 548</u>	<u>218</u>

Note to Table [9.37.2.1.-B] :

- (1) GHG emissions factors are values provided by Environment and Climate Change Canada at <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/emission-factors-reference-values.html> (Version 1.1).

- [4] --)** For energy sources supplied by a district energy plant, the GHG emissions factors shall
- [a] --) be in conformance with ~~Table 9.36.15.5.-C~~ Table 9.37.2.1.-C, or
- [b] --) be determined by a qualified person representing the district energy plant operator (see ~~Note A-9.36.15.5.(4)(b) and (5)~~ Note A-9.37.2.1.(4)(b) and (5)).

Table [9.37.2.1.-C]
GHG Emissions Factors for Energy Sources Supplied by a District Energy Plant
Forming Part of Clause 9.37.2.1.(4)(a)

<u>Energy Source</u>	<u>GHG Emissions Factor, ⁽¹⁾ g CO₂e/kWh</u>
<u>Chilled water</u>	<u>128</u>
<u>Hot water</u>	<u>362</u>
<u>Steam</u>	<u>383</u>

Note to Table [9.37.2.1.-C] :

- (1) GHG emissions factors are values sourced from ANSI/ASHRAE 228, "Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance".

[5] --) Where they have not otherwise been established in accordance with this Article, the GHG emissions factors shall be determined by a qualified person. (See Note 9.37.2.1.(4)(b) and (5) ~~Note A-9.36.15.5.(4)(b) and (5).~~)

[9.37.3.] -- Tiered Operational GHG Emissions Compliance: Performance Path

[9.37.3.1.] --- Scope

- [1] --)** This Subsection is concerned with GHG emissions, determined at the time of design, resulting from the supply and consumption of the energy used by the *building*
- [a] --) for
- [i] --) systems used for heating, ventilating and air-conditioning, and
- [ii] --) systems used to heat service water, or
- [b] --) as determined in accordance with Subsection 9.36.6.

[9.37.3.2.] --- Application

- [1] --)** This Subsection applies to the *buildings* described in ~~Article 9.36.1.4.~~ Article 9.37.1.4.

[9.37.3.3.] --- Performance Compliance

- [1] --)** Except as provided in Sentence (5), compliance with this Subsection shall be achieved by designing and constructing *buildings* in accordance with

one of the GHG emissions performance levels A to F specified in Table 9.37.3.3.~~Table 9.36.15.4.~~, each of which corresponds to

- [a] --) the annual operational GHG emissions of the proposed house, expressed as a percent operational GHG emissions target, or
- [b] --) the percentage of improvement of the annual operational GHG emissions of the proposed house relative to the operational GHG emissions target of the reference house, expressed as a percent improvement.

Table [9.37.3.3.]
GHG Emissions Performance Levels
Forming Part of Sentences 9.37.3.3.(1) and (2)

<u>GHG Emissions Performance Level</u>	<u>Percent Operational GHG Emissions Target ⁽¹⁾</u>	<u>Percent Improvement</u>
A	<u>≤ 10%</u>	<u>≥ 90%</u>
B	<u>≤ 25%</u>	<u>≥ 75%</u>
C	<u>≤ 50%</u>	<u>≥ 50%</u>
D	<u>≤ 75%</u>	<u>≥ 25%</u>
E	<u>≤ 90%</u>	<u>≥ 10%</u>
F	<u>≤ 100%</u>	<u>≥ 0%</u>

Note to Table [9.37.3.3.] :

- (1) See Sentence (2).

[2] --) Compliance of the proposed house with one of GHG emissions performance levels A to F specified in ~~Table 9.36.15.4.~~ Table 9.37.3.3. shall be determined by

- [a] --) dividing the annual operational GHG emissions of the proposed house by the operational GHG emissions target of the reference house to derive the percent operational GHG emissions target, or
- [b] --) subtracting the annual operational GHG emissions of the proposed house from the operational GHG emissions target of the reference house and dividing the result by the operational GHG emissions target of the reference house to derive the percent improvement.

[3] --) The annual operational GHG emissions of the proposed house shall be determined in accordance with ~~Article 9.36.15.6.~~Article 9.37.3.4.

[4] --) The operational GHG emissions target of the reference house shall be determined in accordance with ~~Article 9.36.15.7.~~Article 9.37.3.5.

[5] --) Where the house cannot reasonably be connected to the provincial or territorial electrical power grid, compliance with this Subsection shall be achieved by reporting the annual operational GHG emissions of the proposed house calculated in accordance with ~~Article 9.36.15.6.~~Article 9.37.3.4.

[9.37.3.4.] --- Annual Operational GHG Emissions of the Proposed House

[1] --) The annual operational GHG emissions of the proposed house, $CO_2e_{proposed}$, in kg CO_2e , shall be determined using the following equation:

$$CO_2e_{proposed} = \sum_{ES} (E_{reg,ES} \times GEF_{ES}) / 1\,000$$

where

$E_{reg,ES}$ = annual energy consumption of the equipment and systems regulated by the NBC, as listed in Clauses 9.36.6.4.(1)(a) to (d), for each energy source (ES), in kWh, determined by modeling the proposed house in accordance with Article 9.36.6.9., and

GEF_{ES} = GHG emissions factor for the corresponding energy source, in g CO_2e /kWh, as specified in Article 9.37.2.1.~~Article 9.36.15.5.~~

[9.37.3.5.] --- Operational GHG Emissions Target of the Reference House

[1] --) The operational GHG emissions target of the reference house, CO_2e_{target} , in kg CO_2e , shall be determined using the following equation:

$$CO_2e_{target} = CO_2e_{NHreg} + CO_2e_{SH} + CO_2e_{SWH}$$

where

CO_2e_{NHreg} = annual operational GHG emissions of all non-heating equipment and systems regulated by the NBC, in kg CO_2e , determined in accordance with Sentence (2),

CO_2e_{SH} = annual operational GHG emissions from space heating, in kg CO_2e , determined in accordance with Sentence (3), and

CO_2e_{SWH} = annual operational GHG emissions from service water heating, in kg CO_2e , determined in accordance with Sentence (4).

[2] --) The annual operational GHG emissions of all non-heating equipment and systems regulated by the NBC, CO_2e_{NHreg} , in kg CO_2e , shall be

determined using the following equation:

$$\text{CO}_2\text{e}_{\text{NHreg}} = E_{\text{NHreg}} \times \text{GEF}_{\text{elec}} / 1\,000$$

where

E_{NHreg} = annual energy consumption of all non-heating systems and equipment regulated by the NBC, as listed in Clauses 9.36.6.4.(1)(b) and (d), in the reference house, in kWh, determined by modeling the reference house in accordance with Article 9.36.6.13., and

GEF_{elec} = GHG emissions factor for electricity, in g CO₂e/kWh, as specified in Article 9.37.2.1. ~~Article 9.36.15.5.~~

[3] --) The annual operational GHG emissions from space heating, CO₂e_{SH}, in kg CO₂e, shall be determined using the following equation:

$$\text{CO}_2\text{e}_{\text{SH}} = \text{TED}_{\text{SH}} \times 235 / 1\,000$$

where

TED_{SH} = annual thermal energy demand of the space-heating system, including baseboard heating, in the reference house, in kWh, determined by modeling the reference house in accordance with Subsection 9.36.6., and

235 = reference GHG emissions factor for space heating, in g CO₂e/kWh.

(See ~~Note A-9.36.15.7.(3) and (4)~~ Note A-9.37.3.5.(3) and (4).)

[4] --) The annual operational GHG emissions from service water heating, CO₂e_{SWH}, in kg CO₂e, shall be determined using the following equation:

$$\text{CO}_2\text{e}_{\text{SWH}} = \text{TED}_{\text{SWH}} \times 260 / 1\,000$$

where

TED_{SWH} = annual thermal energy demand of the service water heating system in the reference house, in kWh, determined by modeling the reference house in accordance with Subsection 9.36.6., and

260 = reference GHG emissions factor for service water heating, in g CO₂e/kWh.

(See ~~Note A-9.36.15.7.(3) and (4)~~ Note A-9.37.3.5.(3) and (4).)

[9.37.4.] -- Tiered Operational GHG Emissions Compliance: Prescriptive Path

[9.37.4.1.] --- Scope

- [1] --)** This Subsection is concerned with GHG emissions, determined at the time of design, resulting from the supply and consumption of energy used by the *building* for
- [a] --) systems used for heating, ventilating and air-conditioning, and
 - [b] --) systems used to heat service water.

[9.37.4.2.] --- Application

- [1] --)** This Subsection applies to the *buildings* described in Article 9.37.1.4.

[9.37.4.3.] --- Compliance

- [1] --)** The GHG emissions factor (GEF) for an energy source shall be determined in accordance with ~~Article 9.36.15.5.~~Article 9.37.2.1.
- [2] --)** The total number of energy conservation points achieved by the *building* shall be determined in accordance with
- [a] --) the tiered points-based prescriptive trade-off requirements in Subsection 9.36.9., or
 - [b] --) the tiered prescriptive requirements in
 - [i] --) Subsection 9.36.10., where Tier 1 is assigned 0 energy conservation points.
 - [ii] --) Reserved.
 - [iii] --) Reserved.
 - [iv] --) Reserved, or
 - [v] --) Subsection 9.36.14., where Tier 5 is assigned 75 energy conservation points.
- [3] --)** Compliance with this Subsection shall be achieved by designing and constructing *buildings* in accordance with one of the GHG emissions performance levels A to F specified in ~~Article 9.36.16.4.~~Article 9.37.4.4.

[9.37.4.4.] --- GHG Emissions Performance Levels

- [1] --)** Except as provided in Sentence (2), to comply with one of the GHG emissions performance levels A to F, the *building* shall be designed and constructed so that its total number of energy conservation points, as determined in accordance with ~~Sentence 9.36.16.3.(2)~~Sentence 9.37.4.3.(2)., meets or exceeds the minimum number of energy conservation points required for that GHG emissions performance level, as specified in ~~Tables 9.36.16.4.-A to 9.36.16.4.-F~~Tables 9.37.4.4.-A to -F for the energy sources or types of equipment used for space- and service water heating systems and the applicable GHG emissions factor for electricity.

Table [9.37.4.4.-A]
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level A
Forming Part of Sentence 9.37.4.4.(1)

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, ⁽¹⁾ g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points ⁽²⁾</u>
<u>Space Heating</u>	<u>Service Water Heating</u>		
<u>Electricity</u>	<u>Heat pump water heater</u>	<u>GEF ≤ 25</u>	<u>10</u>
		<u>25 < GEF ≤ 100</u>	<u>70</u>
	<u>Electric tankless or storage-type service water heater</u>	<u>GEF ≤ 25</u>	<u>15</u>
<u>Heat pump ⁽³⁾ with electric supplemental system ⁽⁴⁾</u>	<u>Electric tankless or storage-type service water heater or heat pump water heater</u>	<u>GEF ≤ 25</u>	<u>0</u>
		<u>25 < GEF ≤ 100</u>	<u>65</u>
<u>Other energy source ⁽⁵⁾</u>	<u>Other energy source ⁽⁵⁾</u>	<u>GEF < 200</u>	<u>10</u>

Notes to Table [9.37.4.4.-A] :

- (1) GEF = GHG emissions factor
- (2) See ~~Sentence 9.36.16.3.(2)~~ Sentence 9.37.4.3.(2).
- (3) Electrically operated.
- (4) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.

- (5) Other energy source with $GEF \leq 25$ g CO₂e/kWh.

Table [9.37.4.4.-B]
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level B
Forming Part of Sentence 9.37.4.4.(1)

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, (1) g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points (2)</u>
<u>Space Heating</u>	<u>Service Water Heating</u>		
<u>Electricity</u>	<u>Heat pump water heater</u>	<u>$GEF \leq 25$</u>	<u>10</u>
		<u>$25 < GEF \leq 100$</u>	<u>35</u>
	<u>Electric tankless or storage-type service water heater</u>	<u>$GEF \leq 25$</u>	<u>15</u>
		<u>$25 < GEF \leq 100$</u>	<u>35</u>
<u>Heat pump (3) with electric supplemental system (4)</u>	<u>Heat pump water heater</u>	<u>$GEF \leq 25$</u>	<u>0</u>
		<u>$25 < GEF \leq 100$</u>	<u>10</u>
		<u>$100 < GEF < 200$</u>	<u>65</u>
	<u>Electric tankless or storage-type service water heater</u>	<u>$GEF \leq 25$</u>	<u>0</u>
		<u>$25 < GEF \leq 100$</u>	<u>20</u>
		<u>$100 < GEF < 200$</u>	<u>65</u>
<u>Other energy source (5)</u>	<u>Other energy source (5)</u>	<u>$GEF < 200$</u>	<u>10</u>

Notes to Table [9.37.4.4.-B] :

- (1) GEF = GHG emissions factor
- (2) See ~~Sentence 9.36.16.3.(2)~~ Sentence 9.37.4.3.(2).

- (3) Electrically operated.
- (4) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.
- (5) Other energy source with $GEF \leq 25$ g CO₂e/kWh.

Table [9.37.4.4.-C]
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level C
Forming Part of Sentence 9.37.4.4.(1)

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, (1) g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points (2)</u>
<u>Space Heating</u>	<u>Service Water Heating</u>		
<u>Electricity</u>	<u>Heat pump water heater</u>	<u>GEF ≤ 25</u>	<u>10</u>
		<u>25 < GEF < 200</u>	<u>35</u>
	<u>Electric tankless or storage-type service water heater</u>	<u>GEF ≤ 25</u>	<u>15</u>
		<u>25 < GEF ≤ 100</u>	<u>35</u>
		<u>100 < GEF < 200</u>	<u>40</u>
	<u>Heat pump (3) with electric supplemental system (4)</u>	<u>Heat pump water heater</u>	<u>GEF ≤ 25</u>
<u>25 < GEF ≤ 100</u>			<u>10</u>
<u>100 < GEF < 200</u>			<u>15</u>
<u>Electric tankless or storage-type service water heater</u>		<u>GEF ≤ 25</u>	<u>0</u>
		<u>25 < GEF < 200</u>	<u>15</u>

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, (1) g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points (2)</u>	
<u>Space Heating</u>	<u>Service Water Heating</u>			
<u>Heat pump (3) with utility gas or propane supplemental system (4)</u>	<u>Electric, utility gas, or propane tankless or storage-type service water heater or heat pump water heater</u>	<u>GEF < 200</u>	<u>35 (5)</u>	
<u>Other energy source (6)</u>	<u>Other energy source (6)</u>	<u>GEF < 200</u>	<u>10</u>	

Notes to Table [9.37.4.4.-C] :

- (1) GEF = GHG emissions factor
- (2) See ~~Sentence 9.36.16.3.(2)~~ Sentence 9.37.4.3.(2).
- (3) Electrically operated.
- (4) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.
- (5) Based on the use of the GEFs for utility gas and propane listed in ~~Tables 9.36.15.5.-A and 9.36.15.5.-B~~ Tables 9.37.2.1.-A and -B, respectively.
- (6) Other energy source with GEF ≤ 25 g CO₂e/kWh.
-

Table [9.37.4.4.-D]
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level D
Forming Part of Sentence 9.37.4.4.(1)

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, ⁽¹⁾ g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points ⁽²⁾</u>
<u>Space Heating</u>	<u>Service Water Heating</u>		
<u>Utility gas or propane</u>	<u>Utility gas or propane</u>	<u>GEF < 200 ⁽³⁾</u>	<u>35 ⁽⁴⁾</u>
	<u>Electricity</u>	<u>GEF ≤ 100</u>	<u>10 ⁽⁴⁾</u>
<u>Electricity</u>	<u>Electricity</u>	<u>GEF < 200</u>	<u>10</u>
<u>Heat pump ⁽⁵⁾ with electric supplemental system ⁽⁶⁾</u>	<u>Electric tankless or <i>storage-type service water heater</i> or heat pump water heater</u>	<u>GEF < 200</u>	<u>0</u>
<u>Heat pump ⁽⁵⁾ with utility gas or propane supplemental system ⁽⁶⁾</u>	<u>Electric, utility gas, or propane tankless or <i>storage-type service water heater</i> or heat pump water heater</u>	<u>GEF < 200</u>	<u>10 ⁽⁴⁾</u>
<u>Other energy source ⁽⁷⁾</u>	<u>Other energy source ⁽⁷⁾</u>	<u>GEF < 200</u>	<u>10</u>

Notes to Table [9.37.4.4.-D] :

- (1) GEF = GHG emissions factor
- (2) See ~~Sentence 9.36.16.3.(2)~~ Sentence 9.37.4.3.(2).
- (3) Accounts for GHG emissions from electricity used for non-heating systems and equipment that are regulated by this Code.

- (4) Based on the use of the GEFs for utility gas and propane listed in ~~Tables 9.36.15.5.-A and 9.36.15.5.-B~~ Tables 9.37.2.1.-A and -B, respectively.
- (5) Electrically operated.
- (6) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.
- (7) Other energy source with $GEF \leq 25 \text{ g CO}_2\text{e/kWh}$.

Table [9.37.4.4.-E]
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level E
Forming Part of Sentence 9.37.4.4.(1)

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, ⁽¹⁾ g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points ⁽²⁾</u>
<u>Space Heating</u>	<u>Service Water Heating</u>		
<u>Utility gas or propane</u>	<u>Utility gas or propane</u>	<u>$GEF < 200$ ⁽³⁾</u>	<u>15 ⁽⁴⁾</u>
	<u>Electricity or other energy source ⁽⁵⁾</u>	<u>$GEF < 200$</u>	<u>0</u>
<u>Electricity, heat pump ⁽⁶⁾ with electric, utility gas, or propane supplemental system, ⁽⁷⁾ or other energy source ⁽⁵⁾</u>		<u>$GEF < 200$</u>	<u>0</u>

Notes to Table [9.37.4.4.-E] :

- (1) GEF = GHG emissions factor
 - (2) See ~~Sentence 9.36.16.3.(2)~~ Sentence 9.37.4.3.(2).
 - (3) Accounts for GHG emissions from electricity used for non-heating systems and equipment that are regulated by this Code.
 - (4) Based on the use of the GEFs for utility gas and propane listed in ~~Tables 9.36.15.5.-A and 9.36.15.5.-B~~ Tables 9.37.2.1.-A and -B, respectively.
 - (5) Other energy source with $GEF \leq 25 \text{ g CO}_2\text{e/kWh}$.
 - (6) Electrically operated.
 - (7) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.
-

Table [9.37.4.4.-F]
Minimum Number of Energy Conservation Points for GHG Emissions
Performance Level F
Forming Part of Sentence 9.37.4.4.(1)

<u>Energy Source or Type of Equipment</u>		<u>Electricity GEF, ⁽¹⁾ g CO₂e/kWh</u>	<u>Minimum Number of Energy Conservation Points ⁽²⁾</u>
<u>Space Heating</u>	<u>Service Water Heating</u>		
<u>Utility gas</u>	<u>Utility gas, electricity, propane, or other energy source ⁽³⁾</u>	<u>GEF < 200</u>	<u>0</u>
<u>Propane</u>	<u>Propane</u>	<u>GEF < 200 ⁽⁴⁾</u>	<u>10 ⁽⁵⁾</u>
	<u>Electricity or other energy source ⁽³⁾</u>	<u>GEF < 200</u>	<u>0</u>
<u>Electricity, heat pump ⁽⁶⁾ with electric, utility gas, or propane supplemental system, ⁽⁷⁾ or other energy source ⁽³⁾</u>	<u>Utility gas, electricity, propane, or other energy source ⁽³⁾</u>	<u>GEF < 200</u>	<u>0</u>

Notes to Table [9.37.4.4.-F] :

- (1) GEF = GHG emissions factor
- (2) See ~~Sentence 9.36.16.3.(2)~~ Sentence 9.37.4.3.(2).
- (3) Other energy source with GEF ≤ 25 g CO₂e/kWh.
- (4) Accounts for GHG emissions from electricity used for non-heating systems and equipment that are regulated by this Code.

- (5) Based on the use of the GEFs for propane in ~~Table 9.36.15.5.-B~~ Table 9.37.2.1.-B.
- (6) Electrically operated.
- (7) The heat pump must have a percentage of rated capacity at 8.3°C to required capacity of heating appliances determined in accordance with Sentence 9.33.5.1.(1) that is greater than or equal to 60%; the remainder of the heating load must be met by either the heat pump or the supplemental system.

[2] --) Where the *building* cannot reasonably be connected to the provincial or territorial electrical power grid, the *building* shall be exempted from compliance with the requirements of this Subsection.

Note A-9.37.2.1. Unit Conversions.

A volumetric quantity of a fuel can be converted to an equivalent amount of energy, in kWh, using the conversion factors provided in Table A-9.37.2.1.

Table [9.37.2.1.]
Unit Conversions for Energy Sources

<u>Energy Source</u>	<u>Unit</u>	<u>Energy per Unit, ⁽¹⁾ kWh</u>
<u>Diesel</u>	<u>L</u>	<u>10.74</u>
<u>Natural gas</u>	<u>m³</u>	<u>10.36</u>
<u>Oil, heating or light fuel</u>	<u>L</u>	<u>10.20</u>
<u>Oil, heavy fuel</u>	<u>L</u>	<u>11.59</u>
<u>Propane</u>	<u>L</u>	<u>7.09</u>

Note to Table [9.37.2.1.] :

- (1) The energy per unit is the approximate energy content, in GJ, of the fuel from <https://apps.cer-rec.gc.ca/Conversion/conversion-tables.aspx> converted to kWh (1 GJ = 277.7778 kWh).
-

Note A-9.37.2.1.(4)(b) and (5) Qualified Person.

A qualified person is a person with training and expertise in building energy analysis and includes (a) a GHG verifier certified in accordance with ISO/IEC 17024, "Conformity assessment – General requirements for bodies operating certification of persons," who (i) demonstrates competence with the use of ISO 14064-1, "Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals," or (ii) is accredited in accordance with ISO 14065, "General principles and requirements for bodies validating and verifying environmental information," and ISO 14066, "Environmental information – Competence requirements for teams validating and verifying environmental information," and (b) a person qualified by the authority having jurisdiction.

Note A-9.37.3.5.(3) and (4) Thermal Energy Demand.

Thermal energy demand is the amount of heating energy that is output from all types of heating equipment.

For space heating, heating equipment includes electric, gas, hot water, and any other equipment used for the purpose of space heating and ventilation. The heating output of any equipment whose source of energy is not directly provided by a utility (electricity, gas or district) must still be counted towards TED_{SH} .

For service water heating, heating equipment includes electric resistance elements or gas heaters/burners of hot water storage tanks or instantaneous water heaters, heat pump water heaters, and any other equipment used for the purpose of service water heating. The heating output of any equipment whose source of energy is not directly provided by a utility (electricity, gas or district) must still be counted towards TED_{SWH} .

Impact analysis

This proposed change does not impact the application of requirements, but instead clarifies the objective of the requirements.

Enforcement implications

This proposed change can be enforced by the infrastructure currently available to enforce the Code.

Who is affected

Regulators, builders, designers, engineers, architects, contractors and consultants.

OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

[9.36.1.1.] 9.36.1.1. ([1] 1) no attributions

[9.36.1.3.] 9.36.1.3. ([1] 1) no attributions

[9.36.1.3.] 9.36.1.3. ([1] 1) ([c] c)

[9.36.1.3.] ~~9.36.1.3. ([2] 2) no attributions~~

[9.36.1.3.] 9.36.1.3. ([3] 3) no attributions

[9.36.1.3.] 9.36.1.3. ([4] 4) no attributions

[9.36.1.3.] ~~9.36.1.3. ([5] 5) no attributions~~

[9.36.1.4.] 9.36.1.4. ([1] 1) no attributions

[9.36.1.4.] 9.36.1.4. ([1] 1) no attributions

[9.36.1.4.] 9.36.1.4. ([2] 2) no attributions

[9.36.1.4.] 9.36.1.4. ([3] 3) no attributions

[9.36.15.1.] ~~9.36.15.1. ([1] 1) no attributions~~

[9.36.15.2.] ~~9.36.15.2. ([1] 1) no attributions~~

[9.36.15.3.] ~~9.36.15.3. ([1] 1) no attributions~~

[9.36.15.3.] ~~9.36.15.3. ([2] 2) no attributions~~

[9.36.15.4.] ~~9.36.15.4. ([1] 1) no attributions~~

[9.36.15.4.] ~~9.36.15.4. ([1] 1) [F101-OE2.1]~~

[9.36.15.4.] ~~9.36.15.4. ([2] 2) [F101-OE2.1]~~

[9.36.15.4.] ~~9.36.15.4. ([3] 3) no attributions~~

[9.36.15.4.] ~~9.36.15.4. ([4] 4) no attributions~~

[9.36.15.4.] ~~9.36.15.4. ([5] 5) [F101-OE2.1]~~

[9.36.15.5.] ~~9.36.15.5. ([1] 1) no attributions~~

[9.36.15.5.] ~~9.36.15.5. ([2] 2) [F101-OE2.1]~~

[9.36.15.5.] ~~9.36.15.5. ([3] 3) [F101-OE2.1]~~

[9.36.15.5.] ~~9.36.15.5. ([4] 4) [F101-OE2.1]~~

[9.36.15.5.] ~~9.36.15.5. ([5] 5) no attributions~~

[9.36.15.6.] ~~9.36.15.6. ([1] 1) [F101-OE2.1]~~

[9.36.15.7.] ~~9.36.15.7. ([1] 1) [F101-OE2.1]~~

~~[9.36.15.7.] 9.36.15.7. ([2] 2) [F101-OE2.1]~~
~~[9.36.15.7.] 9.36.15.7. ([3] 3) [F101-OE2.1]~~
~~[9.36.15.7.] 9.36.15.7. ([4] 4) [F101-OE2.1]~~
~~[9.36.16.1.] 9.36.16.1. ([1] 1) no attributions~~
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[9.37.3.3.] -- ([4] --) no attributions
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[9.37.4.1.] -- ([1] --) no attributions
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[9.37.4.3.] -- ([2] --) no attributions
[9.37.4.3.] -- ([3] --) no attributions
[9.37.4.4.] -- ([1] --) [F101-OE2.1]
[9.37.4.4.] -- ([2] --) [F101-OE2.1]