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Proposed Change 1843

Code Reference(s):	**NBC20 Div.A 2.1.1.2.(6) (first printing)** **NBC20 Div.A 2.2.1.1.(1) (first printing)** **NBC20 Div.A 3.1.1.2.(4) (first printing)** **NBC20 Div.A 3.2.1.1.(1) (first printing)**
Subject:	Greenhouse Gas Emissions
Title:	New Greenhouse Gas Emissions Objective and Functional Statement in the NBC
Description:	This proposed change adds a greenhouse gas emissions objective and functional statement to the NBC.
Related Code Change Request(s):	CCR 1805
Related Proposed Change(s):	PCF 1820, PCF 1989, PCF 2003, PCF 2004, PCF 2016

This change could potentially affect the following topic areas:

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

Problem

In 2011 and 2012, an energy efficiency objective (OE1.1, Excessive Use of Energy) and related design and construction requirements were introduced into the National Energy Code of Canada for Buildings (NECB) and the National Building Code of Canada (NBC).

At the time of the development of the energy efficiency objective, and when setting the Long-Term Strategy for Developing and Implementing More Ambitious Energy Codes in 2016, there was no consensus among provincial and territorial governments on an approach for addressing greenhouse gas (GHG) emissions. In addition, technical committees were directed to focus only on energy efficiency when proposing

performance requirements for future editions of the Codes. Thus, the National Model Codes do not presently address the type or quality of the energy source used by buildings and houses, nor do they address embodied GHG emissions.

In 2022, on advice from the provinces and territories, the Canadian Commission on Building and Fire Codes (CCBFC) decided that an objective related to limiting GHG emissions and requirements meeting this objective were needed in the National Model Codes to enable provincial and territorial regulation, and to further support provincial, territorial and federal GHG emissions reduction targets and climate action plans. The advice indicated that operational GHG emissions should be addressed in the 2025 editions of the Codes and that embodied GHG emissions should be addressed in the 2030 editions of the Codes. This direction was adopted by the newly formed Canadian Board for Harmonized Construction Codes (CBHCC) in November 2022.

"GHG" means any substance included in Canada’s GHG inventory in the National Inventory Report.

Justification

In order to meet provincial, territorial and federal GHG emissions reduction targets and climate action plans, including the goals to reduce Canada's total GHG emissions to 40–45% below the 2005 levels by 2030 and to reach net-zero GHG emissions by 2050, Code requirements need an objective and functional statement that pertain to limiting GHG emissions of new buildings and houses.

In the 2020 editions of the NECB and NBC, energy efficiency tiers were introduced with measures that progressively increase energy efficiency in new buildings and houses. While these requirements go a long way towards reducing the amount of energy used to operate a building or house, operational and embodied GHG emissions have not yet been addressed.

Excessive GHG emissions result in increased concentrations of GHGs in the atmosphere, which in turn can lead to climate change and a risk to the environment. This is the basis for the proposed change to add a new objective under the existing objective, OE Environment.

This proposed change would add an objective (OE2.1) and functional statement (F101) related to limiting GHG emissions to the NBC. A similar proposed change (PCF 1820) would add the GHG emissions objective and functional statement to the NECB.

The proposed objective and functional statement are needed for the introduction of objective-based technical requirements addressing GHG emissions. The objective and functional statement are not standalone and are not technical requirements of the NBC. Technical requirements that address this objective in the design and construction of buildings and houses are under development.

PROPOSED CHANGE

NBC20 Div.A 2.1.1.2.(6) (first printing)

[2.1.1.2.] 2.1.1.2. Application of Objectives

[1] 6) ~~Objective OE, Environment (including~~ Objective~~s OE1, Resources, and~~ OE1.1, Excessive Use of Energy~~)~~, applies only to

[a] a) *buildings* of *residential occupancy* to which Part 9 of Division B applies,

[b] b) *buildings* containing *business and personal services*, *mercantile* or *low-hazard industrial occupancies* to which Part 9 of Division B applies whose combined total *floor area* does not exceed 300 m^2, and

[c] c) *buildings* containing a mix of the *residential* and non-*residential occupancies* described in Clauses (a) and (b).

(See Note A-2.1.1.2.(6).) (See also Article 1.3.3.3.)

Note A-2.1.1.2.(6) Application of Objective OE1.1~~Environment Objective~~.

Objective ~~OE, Environment (including its sub-objectives)~~OE1.1, Excessive Use of Energy, is attributed to the requirements in Section 9.36. of Division B, which address energy efficiency for small residential buildings and certain small non-residential and mixed-use buildings (see Article 9.36.1.3. of Division B). The objectives, functional statements and energy efficiency requirements for larger Part 9 residential buildings as well as for non-residential buildings whose combined total floor area exceeds 300 m^2 and some mixed-use buildings are addressed in the National Energy Code for Buildings.

NBC20 Div.A 2.2.1.1.(1) (first printing)

[2.2.1.1.] 2.2.1.1. Objectives

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

OE Environment

An objective of this Code is to limit the probability that, as a result of the design or construction of the *building*, the environment will be affected in an unacceptable manner.

OE2 Greenhouse Gas Emissions

An objective of this Code is to limit the probability that, as a result of the design or construction of the *building*, greenhouse gas emissions will have an unacceptable effect on the environment. The risks of unacceptable effect on the environment due to greenhouse gas emissions addressed in this Code are those caused by—

OE2.1 - excessive emissions of greenhouse gases

NBC20 Div.A 3.1.1.2.(4) (first printing)

[3.1.1.2.] 3.1.1.2. Application of Functional Statements

[1] 4) Functional Statements F90 to F93, F95, F96 and F98 to ~~F100~~ F101 apply only to

[a] a) *buildings* of *residential occupancy* to which Part 9 of Division B applies,

[b] b) *buildings* containing *business and personal services*, *mercantile* or *low-hazard industrial occupancies* to which Part 9 of Division B applies whose combined total *floor area* does not exceed 300 m^2, and

[c] c) *buildings* containing a mix of the *residential* and non-*residential occupancies* described in Clauses (a) and (b).

(See also Article 1.3.3.3.)

NBC20 Div.A 3.2.1.1.(1) (first printing)

[3.2.1.1.] 3.2.1.1. Functional Statements

[1] 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)):

F01 To minimize the risk of accidental ignition.

F02 To limit the severity and effects of fire or explosions.

F03 To retard the effects of fire on areas beyond its point of origin.

F04 To retard failure or collapse due to the effects of fire.

F05 To retard the effects of fire on emergency egress facilities.

F06 To retard the effects of fire on facilities for notification, suppression and emergency response.

F10 To facilitate the timely movement of persons to a safe place in an emergency.

F11 To notify persons, in a timely manner, of the need to take action in an emergency.

F12 To facilitate emergency response.

F13 To notify emergency responders, in a timely manner, of the need to take action in an emergency.

F20 To support and withstand expected loads and forces.

F21 To limit or accommodate dimensional change.

F22 To limit movement under expected loads and forces.

F23 To maintain equipment in place during structural movement.

F30 To minimize the risk of injury to persons as a result of tripping, slipping, falling, contact, drowning or collision.

F31 To minimize the risk of injury to persons as a result of contact with

hot surfaces or substances.

F32 To minimize the risk of injury to persons as a result of contact with energized equipment.

F33 To limit the level of sound of a fire alarm system.

F34 To resist or discourage unwanted access or entry.

F35 To facilitate the identification of potential intruders.

F36 To minimize the risk that persons will be trapped in confined spaces.

F40 To limit the level of contaminants.

F41 To minimize the risk of generation of contaminants.

F42 To resist the entry of vermin and insects.

F43 To minimize the risk of release of hazardous substances.

F44 To limit the spread of hazardous substances beyond their point of release.

F46 To minimize the risk of contamination of potable water.

F50 To provide air suitable for breathing.

F51 To maintain appropriate air and surface temperatures.

F52 To maintain appropriate relative humidity.

F53 To maintain appropriate indoor/outdoor air pressure differences.

F54 To limit drafts.

F55 To resist the transfer of air through environmental separators.

F56 To limit the transmission of airborne sound into a *dwelling unit* from spaces elsewhere in the *building* (see Sentence 3.1.1.2.(2) for application limitation).

F60 To control the accumulation and pressure of water on and in the ground.

F61 To resist the ingress of precipitation, water or moisture from the exterior or from the ground.

F62 To facilitate the dissipation of water and moisture from the *building*.

F63 To limit moisture condensation.

F70 To provide potable water.

F71 To provide facilities for personal hygiene.

F72 To provide facilities for the sanitary disposal of human and domestic wastes.

F73 To facilitate access to and circulation in the *building* and its facilities by persons with physical or sensory limitations (see Sentence 3.1.1.2.(3) for application limitation).

F74 To facilitate the use of the *building*'s facilities by persons with physical or sensory limitations (see Sentence 3.1.1.2.(3) for application limitation).

F80 To resist deterioration resulting from expected service conditions.

F81 To minimize the risk of malfunction, interference, damage, tampering, lack of use or misuse.

F82 To minimize the risk of inadequate performance due to improper maintenance or lack of maintenance.

F90 To limit the amount of uncontrolled air leakage through the *building* envelope.

F91 To limit the amount of uncontrolled air leakage through system components.

F92 To limit the amount of uncontrolled thermal transfer through the *building* envelope.

F93 To limit the amount of uncontrolled thermal transfer through system components.

F95 To limit the unnecessary demand and/or consumption of energy for heating and cooling.

F96 To limit the unnecessary demand and/or consumption of energy for service water heating.

F98 To limit the inefficiency of equipment.

F99 To limit the inefficiency of systems.

F100 To limit the unnecessary rejection of reusable waste energy.

F101 To limit operational greenhouse gas emissions.

Impact analysis

The impact analysis for proposed measures to limit GHG emissions will be provided in each of the respective proposed change forms that address the specific technical changes proposed for the NBC.

Enforcement implications

The addition of an objective and functional statement would provide important information to assist with the assessment of alternative solutions.

Who is affected

Designers, manufacturers, building officials, builders and specification writers.