

# Unpacking the New BC Energy Step Code: A Step Towards Zero Carbon Emissions



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The BC Energy Step Code represents a critical shift in the way we approach construction, setting a roadmap for building practices where energy efficiency becomes the top priority. The recent refresh of the [BC Energy Step Code](#) (BCESC) and the introduction of the Zero Carbon Step Code are more than just updates to the existing building code. They are part of an overarching strategy to shape a future where all new buildings are zero carbon by 2030.

## A quick overview of the updates to BC Energy Step Code

Let's first get an understanding of the BC Energy Step Code's recent amendments, which primarily target new building constructions and aspire to achieve a 20 per cent improvement in energy efficiency. To simplify, we've listed the main changes below:

- Part 3 buildings, such as high-rise residential or commercial spaces, are now mandated to meet minimum Step 2 of the BCESC.
- The NECB 2020 and ASHRAE 2019 energy standards are now applicable to education and healthcare institutions, such as colleges, libraries, schools, recreation centers, care centers, and hospitals.
- The BCESC introduces the Zero Carbon Step Code, which manages GreenHouse Gas (GHG) emissions from buildings.
- Part 9 buildings, including single-family, duplexes, and townhouses, must meet a minimum of Step 3 of the BCESC.
- The BCESC now includes prescriptive requirements for Part 9 buildings for Step Code 3, contingent on municipal adoption.

## BC Building Code Revision 5: What's new

The BC Building Code (BCBC) 2018's Revision 5, effective since May 1, 2023, presents new energy efficiency requirements for both Part 3 and Part 9 buildings. These specifications also volunteer requirements for greenhouse gas reduction.

### Energy requirements for Part 3 buildings

For Part 3 buildings (e.g., shopping malls), the requirements call for:

- Adopting the National Energy Code for Buildings 2020 (NECB 2020) and ASHRAE 90.1 (2019)
- Discontinuing Step 1 as applicable to new construction, making Step 2 the new minimum Energy Step Code requirement
- Modifying TEUI targets for office and retail occupancies

### Energy requirements for Part 9 buildings

Part 9 buildings (e.g., single-family homes) will see these changes:

- New code language in line with National Building Code 2020 (NBC 2020) targeting a 20 per cent improvement
- Requiring Step 3 for all Part 9 residential buildings
- Allowing local authorities to permit the prescriptive approach for Part 9 buildings to which the BC Energy Step Code applies on a temporary basis, provided there's a by-law opt-in
- Giving log homes the choice of complying with the BC Energy Step Code or prescriptive pathway

The revisions to the BC Building Code align with the updates to the BC Energy Step Code and the introduction of the Zero Carbon Step Code. The modifications ensure buildings conform to stricter standards for energy efficiency and carbon emissions.

## A deeper dive into the BC Step Code 3 requirements

The new prescriptive requirements of Step 3 compliance for Part 9 buildings have been carefully designed to improve energy performance. With mandatory heat recovery, stringent [envelope requirements](#), and high equipment performance, the Step 3 requirements provide a clear path for communities to follow, even in the absence of energy advisors or testing professionals. This flexibility allows different communities to adopt energy-saving measures that best suit their unique circumstances and capabilities, ensuring a simpler path toward energy efficiency.

## Energy performance steps for Part 9 buildings and houses

Several energy performance steps for Part 9 buildings and houses have been laid out. These steps vary based on the total volume of conditioned space within the building and specify airtightness level, heat loss reduction, and MEUI improvement requirements.

### Airtightness metrics

Beyond energy performance, airtightness is another crucial aspect of the BC Energy Step Code. It introduces additional airtightness testing metrics, known as NLR (Normalized Leakage Ratio) and NLA (Normalized Leakage Area).

The BC Energy Step Code provides airtightness requirements across four levels (AL-1 to AL-4), with each level requiring lower air changes per hour (ACH50) and normalized leakage values (NLA10 and NLR50).

Airtightness Levels	Max. ACH <sub>50</sub> [1/hr]	Max. NLA <sub>10</sub> [cm <sup>2</sup> /m <sup>2</sup> ]	Max. NLR <sub>50</sub> [L/s.m <sup>2</sup> ]
AL-1	2.5	1.20	0.89
AL-3	1.5	0.72	0.53
AL-4	1.0	0.48	0.35

Table 1: Airtightness Requirements for Part 9 Buildings and Houses.

With these stringent requirements, the BC Energy Step Code aims to minimize the amount of uncontrolled air leakage in buildings, thereby significantly improving their energy efficiency.

## Introducing the zero carbon step code

The Zero Carbon Step Code is a new inclusion by the province, serving as an optional building carbon pollution standard for operational carbon. Its aim is to set the path to zero operational

carbon in all types of new buildings by 2030. The Zero Carbon Step Code is based on performance tiers, similar to the Energy Step Code.

## What does it entail?

This new code introduces an operational carbon emission metric, effectively granting local governments the authority to enforce varying degrees of greenhouse gas (GHG) performance and thus reduce carbon emissions within the construction sector. It offers four GHG Emission Levels (EL):

- EL-1: Measure-only
- EL-2: Moderate/Medium Carbon Performance
- EL-3: Strong/Low Carbon Performance
- EL-4: Zero Carbon Performance

Each level presents increasingly stringent greenhouse intensity (GHGI) requirements for Part 3 buildings, whereas, for Part 9 buildings, the code offers multiple compliance options such as a minimum GHG allowance, capped GHGI, and a prescriptive path. The highest level, EL-4, signals a complete transition to renewable energy sources.

## Carbon performance levels

Carbon Diagram.png

The BC Energy Step Code introduces staggered carbon performance levels to guide the reduction of carbon emissions in buildings. Let's explore the different performance levels:

- EL-2: Moderate/Medium Carbon Performance: This level represents the introduction of carbon reduction measures. At this stage, [designers](#) have to contemplate switching to a low-carbon fuel for either space heating or domestic hot water systems. For example, they might consider implementing heat pumps or providing domestic hot water through electric sources.
- EL-3: Strong/Low Carbon Performance: The EL-3 level introduces the requirement for a predominantly low-carbon facility. In this scenario, allowances might be made for certain equipment, like a gas stove. However, most base building systems will need to use low-carbon fuel.
- H4: EL-4: Zero Carbon Performance: The final EL-4 level represents the peak of the new code's aspirations, with facilities expected to transition fully to zero-carbon fuel sources.

# GreenHouse Gas Intensity (GHGI) targets

The use of the Zero Carbon Step Code for Part 3 and Part 9 buildings has defined parameters. Detailed GHG Intensity (GHGI) targets for these buildings are provided below.

GHG Emission Level	Hotels and Motels	Other Residential Occupancies	Offices	Other Business and Personal Service and Mercantile Occupancies
EL-1	Measure Only	Measure Only	Measure Only	Measure Only
EL-2	9.0	7.0	5.0	6.0
EL-3	4.0	3.0	3.0	3.0
EL-4	2.0	1.8	1.5	2.0

Table 2: GreenHouse Gas Intensity (GHGI) Targets for Part 3 Buildings.

These GHGI targets emphasize the code’s focus on minimizing carbon emissions from buildings, thereby contributing to the ultimate objective of achieving zero carbon emissions in all new buildings by 2030.

## Final thoughts

The evolution of the BC Energy Step Code and the inception of the Zero Carbon Step Code mark a significant milestone for BC’s building industry. As we move towards more [sustainable building](#) practices, these codes serve as a beacon, guiding us towards a future where zero carbon emissions is an achievable goal.

## Navigating the transition with RJC Engineers

Adapting to the new Zero Carbon Step Code, in conjunction with the BC Energy Step Code updates, may present some challenges. However, it also offers opportunities for key industry players like RJC Engineers to innovate and lead the way in sustainable construction.

At RJC Engineers, we have consistently demonstrated expertise in building science and sustainable design. Our team can provide valuable insights into successfully navigating these updated standards, ensuring that the new metrics are met and effectively integrated into the entire building process. [Contact us today](#) to guide your project towards its energy efficiency and zero carbon goals.