



Resort Municipality of Whistler

BC Energy Step Code - Low Carbon Energy Systems Pathway Implementation

November, 2021

ADDRESSING CARBON IN NEW BUILDINGS

On December 15th, 2020, the Resort Municipality of Whistler (RMOW) Council adopted Whistler's 2020 *Climate Action Big Moves Strategy* and a new target of reducing Whistler's greenhouse gas (GHG) emissions by 50% below 2007 levels. To meet these targets, the RMOW will need to address the emissions from buildings that account for over one-third of Whistler's total community-wide emissions.ⁱ One of the easiest ways to begin addressing these emissions is to ensure that buildings constructed today are designed and built to be low carbon in their operations.

The primary tool for regulating new building emissions in BC is the BC Energy Step Code ("Step Code"), which provides an incremental approach to energy efficient building design. It allows local governments to show leadership by implementing higher levels of the Step Code ahead of the provincial timeline, with an eventual province-wide requirement for all new buildings to be *net-zero energy-ready* by 2032.ⁱⁱ In 2019, Whistler adopted the Step Code at Step 3 for Part 9ⁱⁱⁱ buildings (Step 4 with In-Ground Basement Floor Area Exclusion).

LOW CARBON ENERGY SYSTEM REQUIREMENTS

While the Step Code specifies increasing levels of energy efficiency, it does not currently specify the building's operational GHG emissions. To address this gap, many local governments are implementing the Step Code with a *low carbon energy system (LCES)* pathway, which provides buildings with the option of a one or two-step "relaxation" of the Step Code (i.e. they can target a lower step than otherwise required) where they incorporate an LCES into the design. To date, 10 municipalities have implemented an LCES pathway as part of their Step Code implementation.

There is some variation among municipalities with respect to the metrics used to define what can be considered an LCES. Those that are currently in use include the following:

1. **GHG Intensity (GHGI) kg/m²/year.** This is the primary metric used to define an LCES and is used by all municipalities with an LCES pathway. GHGI requirements vary by jurisdiction but generally range between 6kg CO₂e/m²/year and 3kg CO₂e/m²/year. Table 1 summarizes high-level implications of GHGI requirements. The District of North Vancouver and the City of Richmond define LCES using only the GHGI metric.

Table 1: Implications of GHGI levels in BC.^{iv}

GHG Level	Implications for Residential Development	Examples
6kgCO ₂ e/m ² /year	Space heating tends to be predominantly electric DHW may remain gas	City of Port Moody, City of Surrey, and City of Burnaby
3kgCO ₂ e/m ² /year	Space heating & DHW tend to be electric (designing backup gas systems for peak capacity possible) Gas fireplaces and cookstoves possible	District of North Vancouver, City of Richmond, District of West Vancouver, and City of Vancouver
1kgCO ₂ e/m ² /year	(Nearly) all building systems electric (designing for backup gas system may be possible)	Currently not referenced by any BC municipality

2. **Coefficient of performance (COP).** This metric defines an LCES as a system with a COP greater than 2. Including this metric in the LCES definition effectively requires heat pumps and excludes electric resistance heating and natural gas furnaces as they cannot exceed a COP of 1. Municipalities using this definition include the District of West Vancouver, City of Surrey and City of Vancouver.
3. **Backup heating system.** This is a requirement for appropriately-sized natural gas backup heating equipment for peak demand. Including this metric in the LCES definition helps ensure that backup heating systems do not become the primary heating source once a building is in operation. Municipalities using this definition include the District of West Vancouver and the City of Vancouver.

There is also some variation among BC municipalities vary in terms of the step they have adopted and the level of relaxation they offer for pursuing an LCES pathway. They can be roughly grouped into the following two categories:

1. Adoption of a *lower* level of the Step Code as the base requirement with a *one*-step relaxation for the LCES pathway (e.g. requiring Step 3 or Step 2 with an LCES). The City of Surrey and the City of Richmond have used this approach.
2. Adoption of the *highest* level of the Step Code as the base requirement with a *two*-step relaxation for the LCES pathway (e.g. requiring Step 5 or Step 3 with an LCES). The North Shore municipalities and the City of Vancouver have adopted this approach.

The first approach has resulted in relatively low uptake of the LCES pathway. This is because Step 3 is relatively easy for most builders to achieve, and a one-step relaxation has not been found to provide a strong incentive to take the LCES pathway. In contrast, the second approach has resulted in significant uptake of LCES; for example, the District of West Vancouver reported over two-thirds of Part 9 buildings selected the LCES pathways.

A PROPOSED LCES PATHWAY FOR THE RESORT MUNICIPALITY OF WHISTLER

Swiftly adopting policy solutions targeted at reducing emissions is critical to meeting our established climate targets and providing sufficient lead time to allow industry time to adjust. As such, the RMOW is exploring options to incorporate carbon requirements into the Step Code by 2023 by:

- (1) Adopting the Province's contemplated inclusion of optional GHGI limits in the Step Code in the longer term (explained further below), or
- (2) Allowing a lower step with a voluntary LCES pathway in the (outlined in Table 2) in the interim.

This proposed implementation approach and timeline aims to provide clarity and time for industry to adjust, while achieving a significant reduction in GHG emissions. Ultimately, the hope is that the Province will create a consistent provincial framework in the coming year to enable local governments to set GHGI limits in Step Code. In the absence of this option, the RMOW will align with leading municipalities by incorporating a voluntary LCES pathway into Step Code. Both options will create significant GHG emission reductions for new buildings and demonstrate leadership for other small, cold weather or resort municipalities to take similar action.

Table 2: Current and future envisioned B.C. Step Code requirements in Whistler

Building type		Current Building Bylaw	Interim Proposed Approach	Potential Long-Term Approach
			Step Code with Voluntary LCES Pathway	With Provincial GHGI for Step Code
		January 1st, 2019	January 2023	January 2023
Part 9 - Residential Buildings	Single Family Dwelling (SFD) <325m ² or detached secondary suite	Step 3	Step 5 or Step 3 with LCES*	Step 4 with GHGI
	Single Family Dwelling >325m ² Duplex and Townhomes	Step 3	Step 5 or Step 3 with LCES*	Step 4 with GHGI
	SFD or DUP with In-Ground Basement Floor Area Exclusion	Step 4	Step 4 with mandatory LCES*	Step 4 with GHGI
Part 3	Residential	-	Step 4 or Step 2 with LCES*	Step 3 with GHGI
	Commercial	-	Step 3 or Step 2 with LCES*	Step 3 with GHGI
Re-zoning	Initiated by the applicant	-	+1 Step and mandatory LCES*	N/A

* Note: When calculating GHGI, any gas mechanical systems implemented in Part 9 buildings must be modelled to serve as the primary source energy for that end-use.

Interim LCES Pathway

The RMOW is proposing to define an LCES as a mechanical system that provides all thermal conditioning and domestic hot water heating for a building using primarily low-carbon energy sources with a maximum modelled GHGI of 3 kg CO₂e/m²/year or less. The approach to the LCES will be to require the uppermost step of the Step Code for Part 3 and 9 buildings, with a two-step relaxation for the LCES pathway. This performance level and approach has been modelled after the City of Vancouver and the North Shore municipalities, who have demonstrated that the technology, industry, and market are ready to build with low-carbon energy systems and/or achieve the Step Code's highest step. While, using the GHGI metric alone creates more flexibility and will likely align better with the forthcoming provincial requirements.

Longer-Term Alignment with Upcoming Provincial Requirements

In response to the interest expressed by BC municipalities and other key stakeholders, the Province of BC has recently committed to incorporating GHG standards into the BC Building Code to support a transition to zero-carbon new buildings by 2030. While the specific approach has not been announced, it is expected that the Province will allow local governments to implement voluntary GHGI limits in advance of the Province-wide requirement. These GHGI metrics will not likely be tied to specific steps of the Step Code; instead, local governments will select specific GHGI limits regardless of which step they have implemented.

The RMOW is planning on adopting GHGI limits in the Step Code when the Province grants local governments this authority. If this authority is granted in the coming year, the RMOW is proposing to require Step 4 for Part 9 buildings and Step 3 for Part 3 buildings with a GHGI requirement between 3 - 6 kg CO₂e/m²/year. This approach would replace the LCES pathway and likely have a similar impact on the community's carbon emissions and energy use. Requiring Step 4 by 2023 will also allow for a gradual phase-in of net-zero carbon and energy requirements by 2030.

ⁱ Buildings made up 38% of Whistler's emissions in 2019.

ⁱⁱ Net-zero energy buildings produce as much clean energy as they consume. A net-zero energy ready building is one that has been designed and built to a level of performance such that it could, with the addition of solar panels or other renewable energy technologies, achieve net-zero energy performance.

ⁱⁱⁱ The B.C. Building Code regulates building in two main categories: simple buildings and complex buildings, commonly called Part 9 and Part 3 buildings. In general, a single-family home is a good example of a Part 9 building while a shopping mall is an example of a Part 3 building.

^{iv} Table adapted from: Brendan McEwan, *Low Carbon Building Systems in Energy Step Code Requirements: A Best Practice Bulletin & Report on Low Carbon Energy System Options in Energy Step Code Requirement* (AES). https://docs.communityenergy.ca/wp-content/uploads/LowCarbonBuildingSystems_in_ESC_Requirements_Report.pdf

Note: multiple means of achieving GHGI target exist, this is intended to be used as general guidance.