



Summary of Proposed Changes to Part 3 Buildings Climate Zone 5

September 14, 2018

The BC Energy Step Code can currently apply to the construction of Part 3 buildings in Climate Zone 4 (CZ4) (See Appendix C for a map of Climate Zones), which includes the Lower Mainland, Southern Vancouver Island, and the Sunshine Coast. The buildings that can be constructed to the BC Energy Step Code include Group C (Residential), Group D (Business and Personal Services) and Group E (Mercantile) occupancies that have four storeys or more or have a building footprint of at least 600 square metres. These categories of buildings include high-rise and mid-rise residential buildings, hotels and motels, offices, medical offices, laundromats, supermarkets, small retail and big box stores, among others.

The Energy Step Code Council is considering technical amendments to the BC Energy Step Code. The amendments aim to level the playing field for different Part 3 occupancies and to enable the use of the BC Energy Step Code across the province, including in Climate Zone 5 (CZ5), which includes the Thompson-Okanagan, Central and Northern Vancouver Island, the West Kootenays and the Central and North Coasts.

The specific technical changes, reasons for the changes, and their impact are described below. The proposed changes to the BC Building Code are in Appendix A. Implemented together, these proposed changes would enable the use of the BC Energy Step Code across the province, facilitate compliance for hotels, and improve performance for office buildings.

Proposal 1 – Make the Step Code Available Across British Columbia

Issue:

The BC Energy Step Code currently includes targets for Group C (Residential), Group D (Office and Personal Services) and Group E (Mercantile/Retail) Occupancy Part 3 buildings located in CZ4, but does not include targets for other areas of the province (See Appendix C for the Climate Zones in BC).

Recommendation:

Enable builders and building owners across BC to use the BC Energy Step Code as a compliance path for the BC Building Code for all Group C, Group D and Group E occupancy buildings.

Allow authorities having jurisdiction (AHJs) outside of CZ4 to reference the BC Energy Step Code.

Impact:

This change would enable the use of the BC Energy Step Code to Part 3 Group C, D, and E Occupancies in all jurisdictions governed by the BC Building Code. It would also enable jurisdictions outside of CZ4 to reference the Step Code.

Proposal 2 – Separate Targets for Hotels and Motels from Other Residential Occupancies

Issue:

Currently, Group C (Residential) occupancy targets apply to hotels and motels. However, hotels and motels have higher hot water loads and higher occupant densities than other residential buildings, which increases their energy use. This leads to higher Total Energy Use Intensity (TEUI) values per unit of floor area. In contrast, the opportunity for heat recovery is greater in hotels, which justifies a lower thermal energy demand intensity (TEDI) value.

Recommendation:

Increase the TEUI target (less stringent) for hotels and motels compared to other Group C (residential) occupancies buildings, to enable hotels to meet the BC Energy Step Code targets, while decreasing the TEDI targets (more stringent).

Impact:

As outlined in Appendix B, this change would reduce the challenges that hotels and motels face in complying with the current BC Energy Step Code residential targets, and create requirements that are in line with the energy demands of these buildings. The 2018 Metrics Research Report states hotel and motel developers may be able to comply with the BC Energy Step Code to Step 2 for less than a Code compliant building in CZ5. Step 3 could be achievable at no more than 1.2% above base BC Building Code compliance, and Step 4 could be achieved at an incremental cost of 2.1% above minimum Code compliance.

The updated 2018 Metrics Report with the new proposed targets for hotel and motel buildings is available at www.energystepcode.ca.

Proposal 3 – Extend Targets for Residential Occupancies Across British Columbia

Issue:

The BC Energy Step Code currently only has targets for Part 3 Group C occupancy buildings that are in CZ4. This does not allow for even the voluntary use of the BC Energy Step Code as a BCBC compliance path for these buildings outside of CZ4. AHJs outside of CZ4 are also unable to reference the BC Energy Step Code for Part 3 Group C buildings.

Recommendation:

Make the Group C Occupancy targets available across British Columbia as a compliance path for Part 3 buildings. This change would enable the use of the Step Code for Group C buildings outside of CZ4.

Impact:

The proposed change enables Group C occupancies across BC to demonstrate compliance with the BCBC using the BC Energy Step Code.

As outlined in Appendix B, the cost premium to achieve Step 2 compliance for the two residential archetypes assessed in the Metrics Research Report is at or below 1% in Climate Zone 5. Step 3 compliance in CZ5 (low- and high-rise) is above 2%, at 2.3%, while Step 4 compliance could be achieved at an incremental cost increase of 3.2%.

The Energy Step Code Best Practices Guide for Local Governments provides direction for local governments on how to effectively support housing affordability and improved energy efficiency. These strategies primarily rely on local consultation and collaboration between builders and local governments.

Proposal 4 – Separate Offices from Other Group D and E Occupancies

Issue:

Office buildings have lower total energy demands than other Group D and E occupancies. Some of the main reasons include:

- They have small refrigeration loads compared to some Group E occupancies such as supermarkets;
- They have smaller hot water or process loads compared to other Group D occupancies such as medical offices or self-service laundries; and
- They aren't occupied for as many hours as some other Group D and E occupancies.

The current Step 2 target for offices in CZ4 through CZ7A is greater than the energy consumption of a base BC Building Code compliant office building, as modelled in the Energy Step Code Metrics Research Report.

Recommendation:

Create new TEUI targets for Offices to improve the energy performance requirements of office buildings.

Impact:

This change will ensure that the BC Energy Step Code leads to measurable improvements over the base BC Building Code for office buildings, as they typically have lower total energy demands compared to other Group D and E occupancies. Without this change, office buildings that are required to comply with Step 2 could use more energy than those that comply with the base BC Building Code. The proposed change will close this potential loophole. The change is not expected to affect the cost of compliance at Step 2 or Step 3. The Commercial Office archetype in the 2018 Metrics Research Report achieved Step 2 compliance for less than base BC Building Code compliance, and Step 3 for 0.2% above base Code compliance.

Proposal 5 – Extend Targets for all Business and Personal Service and Mercantile Occupancies Across British Columbia

Issue:

The BC Energy Step Code currently only has targets for Part 3 Group D and E occupancy buildings that are in CZ4. This does not allow even the voluntary use of the BC Energy Step Code as a BCBC compliance path for these buildings outside of CZ4. AHJs outside of CZ4 are also unable to reference the BC Energy Step Code for Part 3 Group D and E buildings.

Recommendation:

Make Office and Other Group D and E Occupancy targets available across British Columbia as a compliance path for Part 3 buildings. This change would enable the use of the Step Code for Group D and E buildings outside of CZ4.

Impact:

The proposed change enables Group D and E occupancies across BC to demonstrate compliance with the BCBC using the BC Energy Step Code.

The cost of complying with the proposed Steps 2 and 3 in Climate Zone 5 is well below 1% for Office buildings (see Appendix B).

The costs of Step 2 for big box retail in CZ5 is estimated at 1.3% above minimum Code compliance, and 3.7% above minimum Code compliance for Step 3.

See the cost impacts in Appendix B for details on the costs of compliance to the proposed targets.

The Energy Step Code Best Practices Guide for Local Governments provides direction for local governments on how to effectively support housing affordability and improved energy efficiency. These strategies primarily rely on local consultation and collaboration between builders and local governments.

Appendix A – Proposed Code Changes

Proposal 1

The BC Energy Step Code currently only has targets for Part 3 buildings located in Climate Zone 4, where there are fewer than 3000 heating degree days. To enable the BC Energy Step Code to apply throughout British Columbia, the deletion of Clause 10.2.3.1.(1)(b) would be needed:

- 1) This Subsection applies to *buildings*
 - a) containing any of the following *major occupancies*:
 - i) *residential*,
 - ii) *business and personal services*, or
 - iii) *mercantile*. ~~and~~
 - ~~b) located where the degree-days below 18°C value is less than 3000.~~

Proposals 2 and 3

Update Table 10.2.3.3.A to create separate targets for Hotels and Motels (with changes in red text) that would apply across BC:

Table 10.2.3.3.A Energy Performance Requirements for Residential Occupancies Forming part of Sentences 10.2.3.3.(1) and (2)				
Step	Hotels and Motels	Other Group C Occupancies	Hotels and Motels	Other Group C Occupancies
	Equipment and Systems – Maximum Total Energy Use Intensity, kWh/(m ² ·year)		Building Envelope – Maximum Thermal Energy Demand Intensity, kWh/(m ² ·year)	
1	Conform to Part 8 of the NECB			
2	170	130	30	45
3	140	120	20	30
4	120	100	15	15

Proposals 4 and 5

Update Table 10.2.3.3.B to create separate targets for Offices (with changes in red text) that would apply across BC:

Table 10.2.3.3.B Energy Performance Requirements for Business and Personal Services or Mercantile Occupancies Forming part of Sentences 10.2.3.3.(1) and (2)				
Step	Offices	Other Group D and E Occupancies	Offices	Other Group D and E Occupancies
	Equipment and Systems – Maximum Total Energy Use Intensity, kWh/(m ² ·year)		<i>Building Envelope</i> – Maximum Thermal Energy Demand Intensity, kWh/(m ² ·year)	
1	Conform to Part 8 of the NECB			
2	130	170	30	30
3	100	120	20	20

Appendix B – Lowest Incremental Cost Upgrades for the Assessed Building Archetypes

The [full 2017 BC Energy Step Code Metrics Research Report](#), using a baseline of compliance with the 2011 National Energy Code for Buildings, found that meeting the BC Energy Step Code targets can be cost-effective (i.e. less than 2% cost increment on the construction) in CZ5 for both low-rise MURBs, high-rise MURBs, Offices and Retail at Step 2, as well as Step 3 for Offices.

The 2017 version of the BC Energy Step Code Metrics Research Report did not address hotels or motels. The City of Richmond’s report “Getting to Zero: A High Performance Energy Policy for New Buildings in the City of Richmond” undertook an assessment of the costs to meet adjusted steps for hotels and motels in the BC Energy Step Code. The targets in the Richmond study informed the proposed targets in Appendix A. The 2018 update to the BC Energy Step Code Metrics Research Report assessed the cost of compliance to the proposed Hotel and Motel targets at less than 2% for Steps 2 and 3 and 2.1% for Step 4.

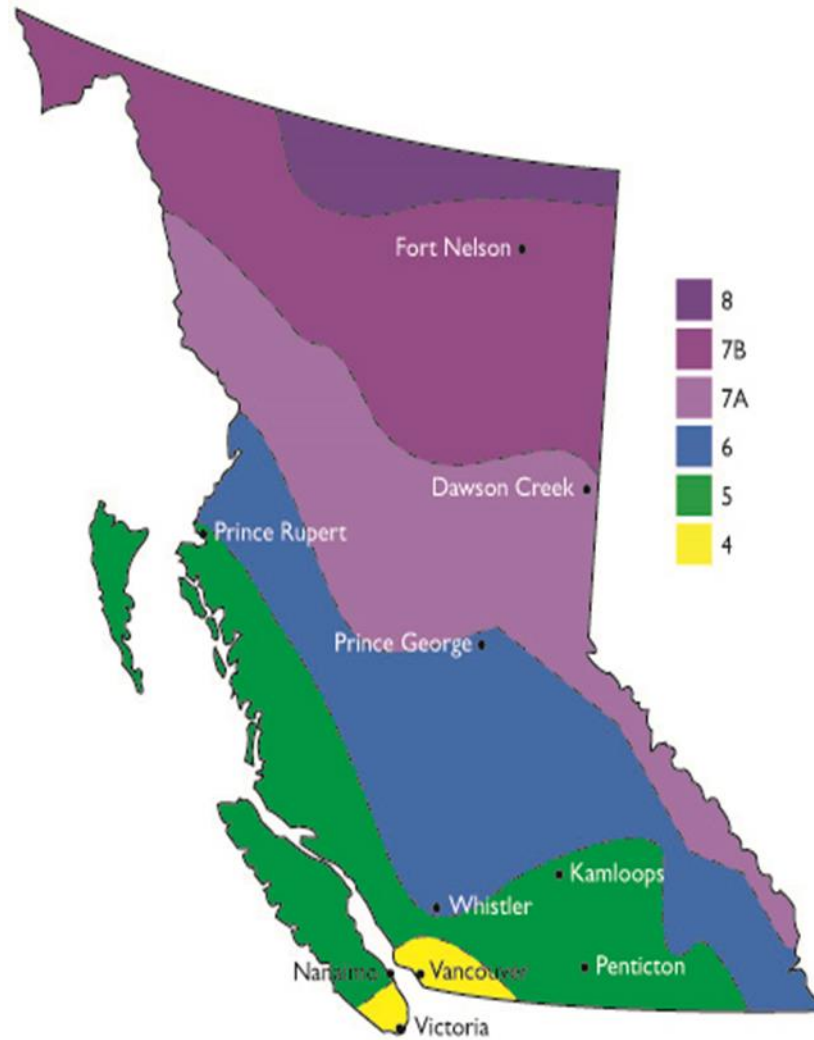
Table 1 shows the lowest incremental cost to comply with the steps.

Table 1. Lowest Incremental Capital Cost in % change for Part 3 Buildings, Climate Zone 5.

Archetype	Step	CZ5	Archetype	Step	CZ5	Archetype	Step	CZ5
High Rise MURB	1	0.0%	Commercial Office	1	0.0%	Hotel	1	0.0%
	2	1.0%		2	-0.1%		2	-0.1%
	3	2.3%		3	0.2%		3	1.2%
	4	3.2%					4	2.1%
Low Rise MURB	1	0.0%	Big-Box Retail	1	0.0%			
	2	0.5%		2	1.3%			
	3	2.3%		3	3.7%			
	4	3.2%						

The updated 2018 Metrics Report with the new proposed targets for all building types and climates is available at www.energystepcode.ca.

Appendix C – British Columbia Climate Zones



Source: BC Housing