



## Summary of Proposed Changes to Part 3 Buildings Climate Zone 4

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.

The specific technical changes, reasons for the changes, and their impact are described below. The proposed changes to the 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 – 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 Steps 2 and 3 for a cost that is less than or equal to the cost of a base BC Building Code compliant building in CZ4. Step 4 could be achieved at 1.2% above base BC Building Code compliance.

The updated 2018 Metrics Report with the new proposed targets for hotel and motel buildings is available at [www.energystepcode.ca](http://www.energystepcode.ca).

## Proposal 2 – 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 Commercial Office archetype in the 2018 Metrics Research Report achieved Step 2 and 3 compliance for the same cost or less than base Building Code compliance.

The updated 2018 Metrics Report with the new proposed targets for hotel and motel buildings is available at [www.energystepcode.ca](http://www.energystepcode.ca).

## 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 <sup>2</sup> -year)		Building Envelope – Maximum Thermal Energy Demand Intensity, kWh/(m <sup>2</sup> -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 <sup>2</sup> ·year)		<i>Building</i> Envelope – Maximum Thermal Energy Demand Intensity, kWh/(m <sup>2</sup> ·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 CZ4 for both low-rise MURBs, high-rise MURBs, Offices and Retail.

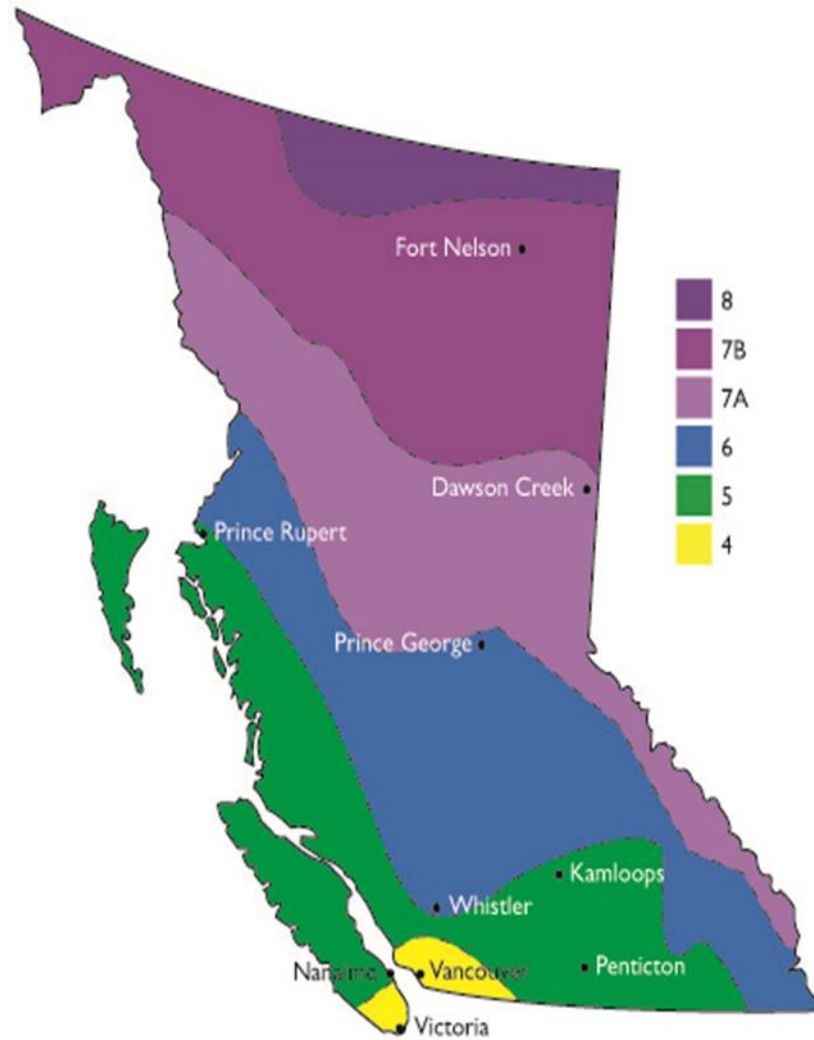
The 2017 version of the BC Energy Step Code Metrics Research Report did not address hotels or motels. The City of Richmond’s report “Getting to Zero: A High Performance Energy Policy for New Buildings in the City of Richmond” undertook an assessment of the costs to meet adjusted steps for hotels and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

Archetype	Step	CZ4	Archetype	Step	CZ4	Archetype	Step	CZ4
<b>High Rise MURB</b>	1	0.0%	<b>Commercial Office</b>	1	0.0%	<b>Hotel</b>	1	0.0%
	2	0.4%		2	-0.2%		2	-0.2%
	3	0.8%		3	0.0%		3	0.0%
	4	2.4%					4	1.2%
<b>Low Rise MURB</b>	1	0.0%	<b>Big-Box Retail</b>	1	0.0%			
	2	0.5%		2	0.8%			
	3	0.6%		3	2.0%			
	4	2.6%						

The updated 2018 Metrics Report with the new proposed targets for all building types and climates is available at [www.energystepcode.ca](http://www.energystepcode.ca).

## Appendix C – British Columbia Climate Zones



Source: BC Housing