



Builder Engagement Zero Carbon Step Code April 9, 2025

Agenda

Overview of Zero Carbon Step Code



Provincial Targets



Summerland Context



Zero Carbon Step Code Vs. Energy Step Code

The BC Energy Step Code sets <u>energy</u> <u>efficiency</u> requirements for NEW buildings.





Many types of buildings can be regulated under the Zero Carbon Step Code



Part 9: Smaller + simpler buildings, specifically... Part 3: Larger and more complex buildings, including...



Homes and smaller residential buildings



BCBC 9.37-Greenhouse Gas Emissions



500

1.5

265

EL-4

including equipment and appliances, have an emissions factor ≤ 0.011 kgCO_{2*}/kWh

What Counts in the Emissions Calculations



- Principle Heating System
 - Heat Pump
 - Gas Furnace
 - Combo system
- Supplementary Heating Equipment
 - Hybrid (gas)
 - Electric supplement in heat pump
- Hot water
 - tank
 - boiler
- Redundant backup systems
 - generator
 - gas or wood fireplace
- Equipment and Appliances
 - cooking
 - laundry

Performance Pathway

G: ZERO CARBON STEP CODE

ġ			· · · · · · · · · · · · · · · · · · ·			sed Calculations	
Proposed House Metrics Zero Carbon Step Code Level Total GHG		Unit	Unit Proposed Level Requirement EL-1 - EL-4 EL 1 - Measure Only		Proposed House	Proposed House	
		EL-1 - EL-4			EL 1 - Measure Only		Result
		kg CO _{2e} / year	NA	(max)	894	Pass	
CO2e per floor area	Per Floor area	kg CO _{2e} /m²/year	NA	(max)	3.5	Dees	
with max	Max	kg CO _{2e}	NA	(max)	894	Pass	
		Heating	NA		Carbon		
Perscriptive		Hot Water	NA		Carbon	Pass	
	All building systems, equipment and appliances		NA		Zero Carb		
				Та	rget Reached	Yes	



Prescriptive Pathway

G: ZERO CARBON STEP CODE

				-	Propos	ed Calculations	
Proposed House Metrics Zero Carbon Step Code Level Total GHG		Unit		osed Level quirement	Proposed House	Proposed House	
		EL-1 - EL-4	EL 1 - Measure Only		Result	Pass of Fall	
		kg CO _{2d} year	NA	(max)	894	Pass	
CO2e per floor area	Per Floor area	kg CO _{2e} /m³/year	NA	(max)	3.5	Dees	
with max	Max	kg CO _{te}	NA	(max)	894	Pass	
		Heating	NA		Carbon		
Perscriptive		Hot Water	NA		Carbon	Pass	
	All building sy	stems, equipment and appliances	NA		Zero Carb		
				Та	rget Reached	Yes	



Zero-carbon electric equipment

STEPCODE

98%

Electricity generated in BC is from renewable resources

- Electric heat pumps provide cooling in the summers and heat in the winters.
- Cold Climate heat pumps work efficiently down to -25C, with some maintaining efficiency over 200% at -18 C

 electric induction cooktops are gaining popularity in the marketplace



 efficient electric water heaters are readily available



BCBC 10.3- Greenhouse Gas Emissions



Table 10.3.1.3. Greenhouse Gas Emissions Forming Part of Sentence 10.3.1.3.(1)

GHG Emission Level	Maximum GHGI of the Building, Expressed in kgCO2e/m²/year						
	<u>Residentia</u>	I Major Occupancy	Business and Personal Service and Mercantile Major Occupancies				
	Hotels and Motels	Other Residential Occupancies	Offices	Other Business and Personal Service and Mercantile Occupancies			
EL-1		me	asure only				
<u>EL-2</u>	<u>9.0</u>	<u>7.0</u>	<u>5.0</u>	<u>6.0</u>			
<u>EL-3</u>	<u>4.0</u>	<u>3.0</u>	<u>3.0</u>	<u>3.0</u>			
<u>EL-4</u>	<u>2.0</u>	<u>1.8</u>	<u>1.5</u>	2.0			

Performance Pathway



Performance Pathway



Origin of the new regulation



"By 2030, all new buildings will be zero carbon, and all new space and water heating equipment will meet the highest standards for efficiency."

CleanBC Roadmap to 2030



Roadmap to 2030



Provincial Targets



The ZCSC is currently 'opt in' at this time until the Province directs an emission performance level to be met



2030

Provincial Targets



Local Governments	In Effect Date	Implementation Details (Part 9)
Burnaby	Jan 2024	Step 3 and EL-3
Central Saanich and Saanich	November 2023	Step 3 and EL-4
Vancouver Area	November 2023	Step 4 and EL-3 OR Step 5 and EL-1
Nanaimo	July 2024	Step 3 and EL-4
Nelson		
New Westminster	January 2024	Step 3 and EL-4, or Step 5 and EL-1
Richmond	October 2023	Step 3 and EL-4 or Step 4 and EL-3 OR Step 5 and EL-2
Victoria	May 2023	Step 3 and EL-4
Whistler	Jan 2024	Step 4 and EL-3
Penticton	2024	EL-1 (measure only)
Kelowna	TBD	Engagement in progress.

Fossil fuels burned in buildings are driving climate change



Buildings are either the number 1 or 2 source of carbon pollution



District of Summerland





12% British Columbia



40%

City of Kelowna

Why is the District concerned about reducing residential home emissions?

Buildings are the second highest contributor to greenhouse gas emissions in Summerland



33% District of Summerland

Natural gas space and water heating equipment contributes the majority of household carbon pollution.







- 1. Supports the Districts Community Emission reduction goals for 2025 and 2040.
- 2. Earlier adoption of the ZCSC can contribute to an accelerated avoidance of building emissions for the District.
- 3. Building trends in Summerland show many new builds are close to meeting EL-2 of the ZCSC
- 4. The cost of future home retrofits to governments and homeowners could be significant.
- 5. Supporting development standards that could reduce energy costs to homeowners.

New Homes Built with ZCSC



2023 New Homes Built to ZCSC Levels



- 52% of homes in 2023 were achieving EL-2 or greater.
- Of the EL-2 homes, 73% were 'As-builts'
- All the EL-4 homes were 'Asbuilts'
- 44% of the 'no data' were homes built prior to the enactment of ZCSC

New Homes Built with ZCSC



2024 New Homes Built to ZCSC Levels



- Majority of the homes built to EL-2 or EL-4 are 'Pre-Construction'
 - 40% of the EL-2 are 'As-Builds'
 - EL-2 makes up majority of new homes, followed by EL-4
- 68% of homes in 2024 were achieving EL-2 or greater

Updated Energy Reports



					Propos	sed Calculations	
Proposed Hou	se Metrics	Unit	Proposed Level Requirement		Proposed House	Proposed House Pass or Fall	
Zero Carbon Step Code Level		EL-1 - EL-4	EL 1 - Measure Only		Result		
Total GHG		kg CO _∆ / year	NA	(max)	590	Pass	
CO ₂ Per fibor	Per Floor area	kg CO ₂₄ /m²/year	NA	(max)	3	Pass	
area with Max	Max	kg CO _{2e}	NA	(max)	590		
		Heating	NA		Carbon	47.53.947	
Perscriptive	Hot Water		NA		Garbon	Pass	
	All building systems, equipment and appliances		NA		Carbon		
				Та	rget Reached	Yes	

Examples of homes in Summerland

STEPCODE

House #1

HOW YOUR RATED ENERGY IS USED:

The chart below represents the breakdown of rated annual energy consumption in your home under standard operating conditions. You can use these figures as a guide to help identify where you can lower home energy costs through proper home maintenance, efficient home operation, energy efficiency renovations or equipment replacement.



WHERE YOUR HOME LOSES HEAT: Houses lose heat through their exterior shell, or building envelope. The chart below shows where and how your name loses heat. The

This house in Summerland attains Step Code 3, but does not meet the emission target for EL-2 of 2,400 kg of CO2e annually.

Space Conditioning Heating: Natural Gas Condensing Furnace (Heating & Cooling) Cooling: Central Air Conditioner

> Electrification of the space heating could be one way in which the emissions can be reduced and meet EL-2

#	Metric	Units	Reference House	Proposed House	As-Built House
1	Airtightness NLA@10Pa	cm²/m²	1.15	0.75	1.10
2	Rated Greenhouse Gas Emissions	kg/year	11585	3000.00	3100.00
3	Rated Greenhouse Gas Intensity	kg/m²/year	47	12.00	13.00
4	Rated Energy Use Intensity	GJ/m ² /year	0.44	0.33	0.37
5	Peak Thermal Load (PTL)	W/m ¹	43		33.55
6	% of the Building's Conditioned Space Served by Space-Cooling	36	N/A	Not more than 50%	More than 50%
7	% Lower Than Reference House With Baseloads Included	%	N/A	18.8%	16.5%

Examples of homes in Summerland



House #2



0			2		Propos	sed Calculations	
Proposed Hou	as Metrica	Unit	Proj Re	oosed Level quirement	Proposed House	Proposed House Pass or Fall	
Zero Carbon S	tep Code Level	EL-1-EL-4		Measure On	Keson	CONTRACTOR	
Total GHG		kg CO ₅₀ / year	NA	(max)	590	Pass	
00, Per floor	Per Floor area	kg CO _{Se} /m/lyear	NA.	(max)	3	Pass	
area with Max	Max	kg CO _M	NA.	(01800)	590		
		Heating	NA.		Carbon		
Perscriptive	5	Hot Water	NA		Carbon	Pass	
	All building systems, equipm	ent and appliances	NA		Carbon		
3					Turget Reached	Yes	

Table 9.37.1.3. Greenhouse Gas Emissions Forming part of Sentence 9.37.1.3.(1)



This home would fall under EL-2 (but lands between an EL-2 and EL-3).

Furnace and DHW use natural gas. Switch one out to electric and likely meeting EL-3

What is Summerland doing to implement the Zero Carbon Step Code?

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Fall 2023 CCAAC Engagement Spring 2024 Council Report Summer 2024 Community and Builder Engagement

Spring 2025 Additional Builder Engagement

Next Steps

Bring back a staff report with findings from research and engagement to Council for consideration of the ZCSC in Summerland

We want to hear from you!



- What are the challenges of implementing higher steps of the ZCSC in Summerland?
- What would help ease the transition to higher step levels of the ZCSC in Summerland for builders?
- Do your clients ask to have a home that achieves higher levels of ZCSC? Are they aware of the ZCSC?

How much more will it cost to build homes that meet Zero Carbon Step Code?



Table 3. Incremental capital costs (\$/m²) for Zero Carbon Step Code (EL-4) in Part 9 buildings, by climate zone17.18

	CLIMATE ZON	IES	5						
PART 9 - BUILDING TYPE	4	5	6	7a	7b	8			
Small single-family dwelling (~100-200m²)	38.4	41.2	43.2	58.4	57.7	57.6			
Medium single-family dwelling (~200-300m²)	13.2	17.8	18.6	24.4	24.9	24.9			
Large single-family dwelling (>300m²)	7.7	8.2	8.6	57.9	11.5	11.5			
Multi-family building (10 unit)	23.7	27.5	27.2	37.4	37.4	37.4			
High-rise MURB	65	66.7	80.9						

How much more will it cost to build homes that meet Zero Carbon Step Code?



A technical report from the BC Building Safety and Standards Branch examined the potential incremental costs associated with building new homes to EL-2, EL-3 and EL-4.

Part 3 Buildings (Energy Step Code Level 2)



Part 9 Buildings (Energy Step Code Level 3)

Myth Busting: Natural Gas

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Does the highest level of the ZCSC (EL-4) ban the use of natural gas in new builds? No

Can renewable natural gas be used to comply with the Zero Carbon Step Code?

Yes

Are the use of gas stoves in new building construction permitted?

For **Part 9 buildings** (such as single family homes and townhouses), Yes and No

For **Part 3 buildings** (mid- and high-rise apartment buildings)

Principle Heating System

- Heat Pump
- Gas Furnace
- Combo system
- Supplementary Heating Equipment
 - Hybrid (gas)
 - Electric supplement in heat pump
- Hot water
 - ∘ tank
 - boiler
- Redundant backup systems
 - generator
 - gas or wood fireplace
- Equipment and Appliances
 - cooking
 - laundry

Myth Busting: Going Electric

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Will there be enough locally available electricity?

Yes, and Solar!

Is heating with natural gas cheaper than electricity?

Depends, but possibly

What will happen to our homes if electricity goes out? What options are there for distributed power generation as back up?

There are options!



