

# Energy Step Code Performance Metrics

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**ENERGY**  
**STEP**CODE  
BUILDING BEYOND THE STANDARD



# Energy Step Code Targets Revised

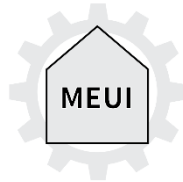
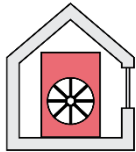
- Energy Step Code Council approved revision to the Part 9 targets in order to address:
  - Current TEDI & MEUI values set at different % savings by climate zones
  - PTL generally too easy in lower steps, and too hard for top steps
  - Current targets are not appropriate for climate zones 7a and above
  - Can sometimes achieve Steps 2 & 3 at below current code level
  - Communicated energy savings are not achieved (due to 4 points above)
  - Equity between large and small homes
  - Step 5 not achievable for some archetypes & most climate zones

# What are the New Targets?

## Performance Requirements

### Part 9, Climate Zone 4

Base on BCBC Table 9.36.6.3.A.



		ERS%<REF not less than 0% OR Conform to BCBC Subsection 9.36.5.					
1	N/A						
2	3.0	-10%	OR	60	3545	OR	35
3	2.5	-20%	OR	5045	3040	OR	30
4	1.5	-40%	OR	4035	2520	OR	25
5	1.0	N/A		25	15	OR	10
				kWh/m <sup>2</sup> /yr	kWh/m <sup>2</sup> /yr		W/m <sup>2</sup>

# Additional MEUI Allowance for Small Homes

→ Given that small homes are modelled with the same hot water energy use as large homes, it becomes difficult to achieve MEUI the small the home

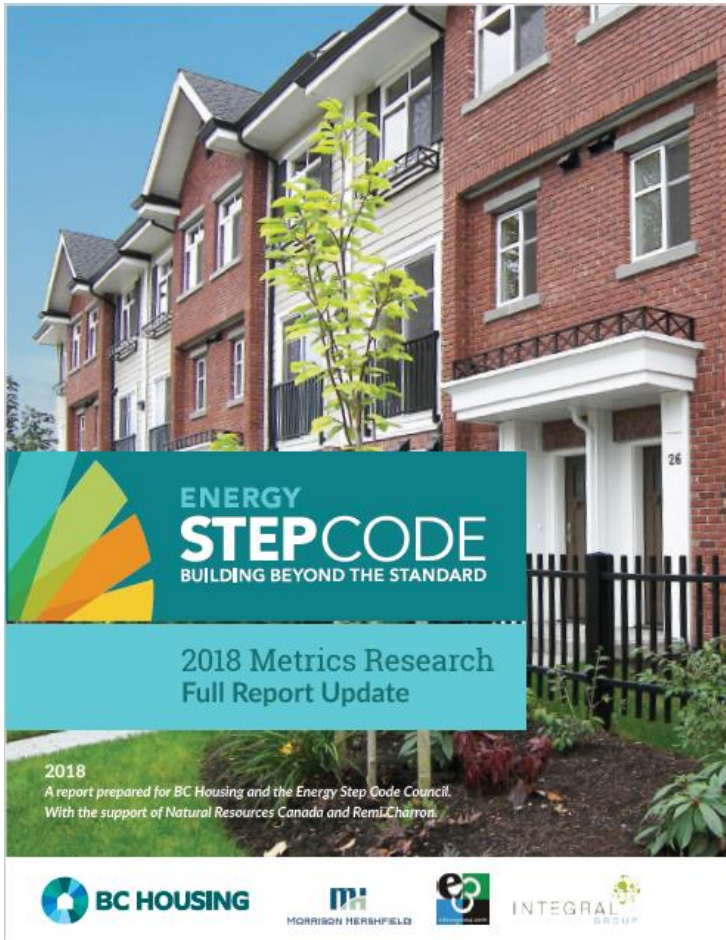
Step Level	Additional MEUI (kWh/m <sup>2</sup> /yr)				
	≤ 50 m <sup>2</sup> (538 ft <sup>2</sup> )	≤ 75 m <sup>2</sup> (807 ft <sup>2</sup> )	≤ 120 m <sup>2</sup> (1,292 ft <sup>2</sup> )*	≤ 165 m <sup>2</sup> (1,776 ft <sup>2</sup> )	≤ 210 m <sup>2</sup> (2,260 ft <sup>2</sup> )
1	85	65	35	15	5
2	75	60	30	15	5
3	70	50	25	13	3
4	50	40	20	8	0
5	40	30	15	5	0

# Additional MEUI if Cooling is Planned

→ Since MEUI includes cooling loads, designers could have been tempted to not include a cooling system to achieve a higher Step since the same target applied whether cooling was used or not. New allowance given to MEUI if cooling is to be installed and is modelled:

Building Size	Additional MEUI (kWh/m <sup>2</sup> /yr)
≤ 50 m <sup>2</sup> (538 ft <sup>2</sup> )	35
≤ 75 m <sup>2</sup> (807 ft <sup>2</sup> )	28
≤ 120 m <sup>2</sup> (1,292 ft <sup>2</sup> )*	18
≤ 165 m <sup>2</sup> (1,776 ft <sup>2</sup> )	10
≤ 210 m <sup>2</sup> (2,260 ft <sup>2</sup> )	8
> 210 m <sup>2</sup> (2,260 ft <sup>2</sup> )**	5

# Metrics Report Updated with New Targets



## → Data from BC Housing *Metrics Study*

- › Cost optimization of bundles of energy upgrades
- › Found “cheapest” way to comply with Step Code
- › Optimized for both:
  - Incremental Capital Cost
  - Net Present Value

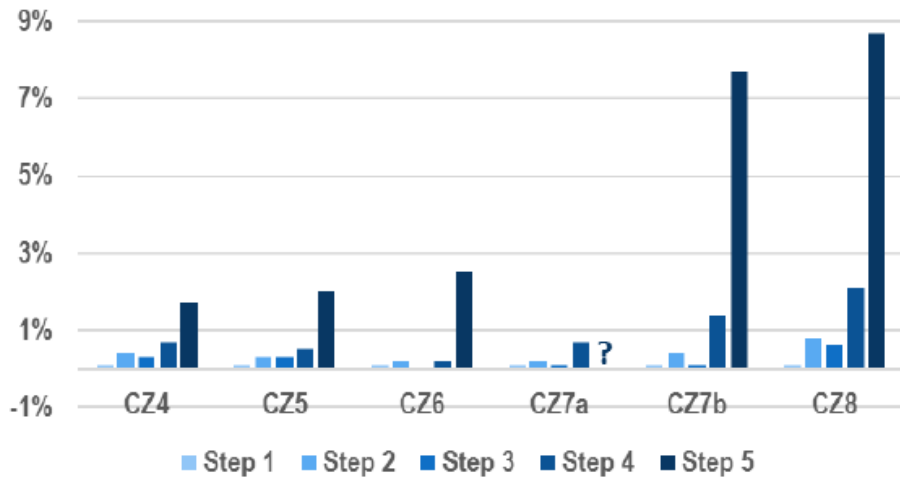
## → Data from 7 wood-frame archetypes

<http://energystepcode.ca/all-resources/>

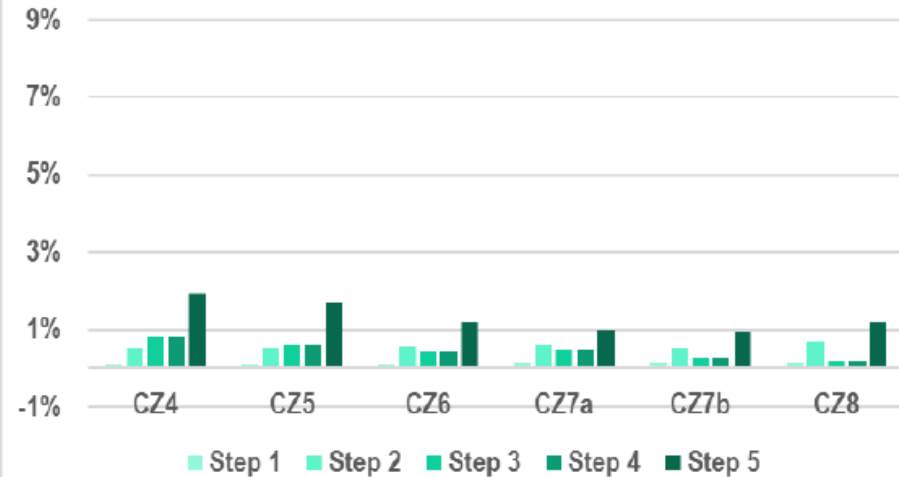
→ Provides a range of most cost-effective options to meet each Step

# Cost Impact of Old and New Targets – Part 9 MURB

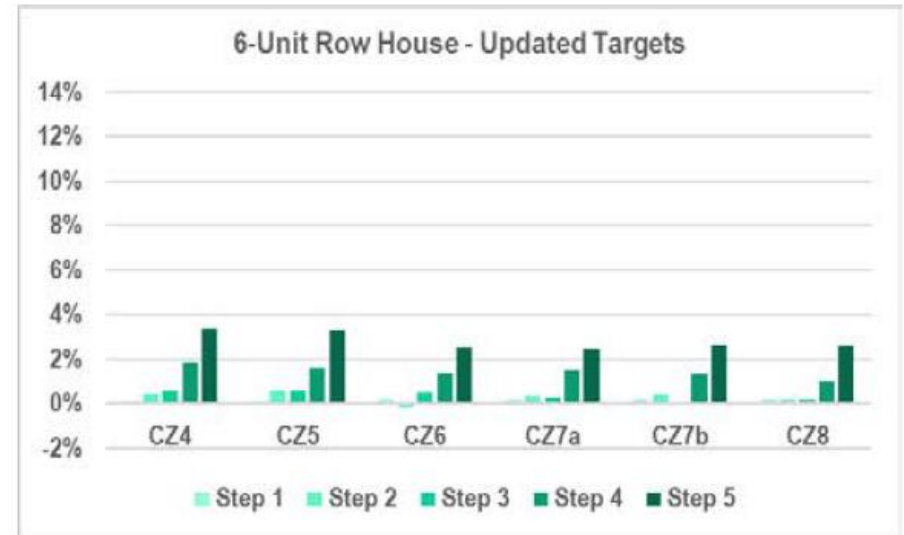
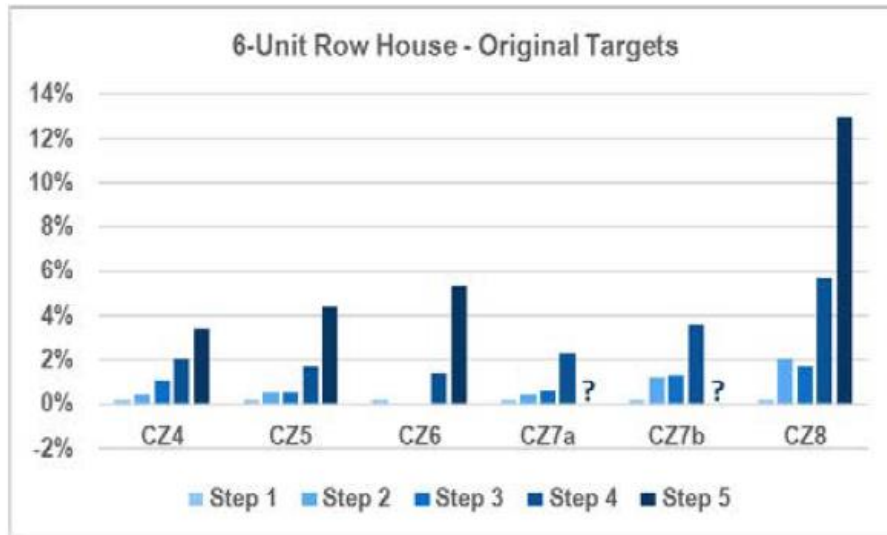
10-Unit MURB - Original Targets



10-Unit MURB - Updated Targets

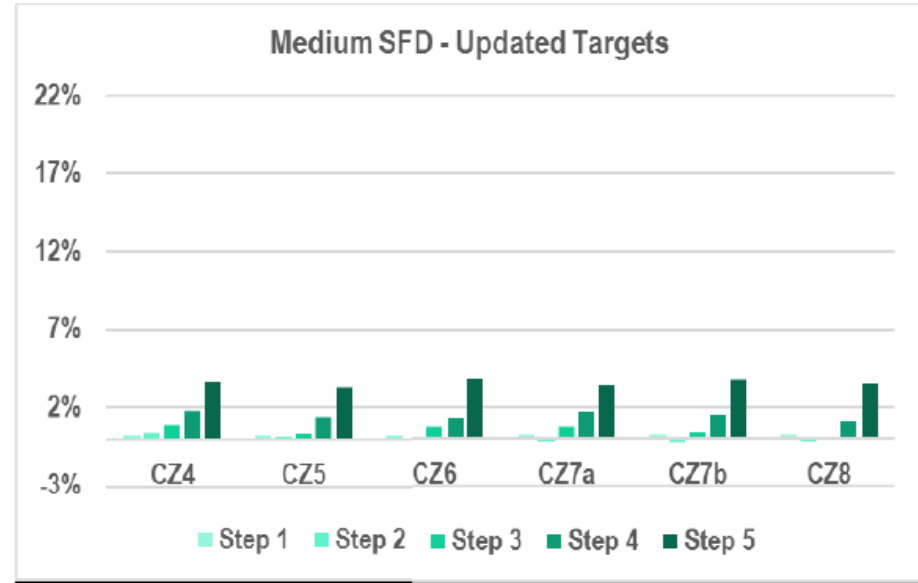
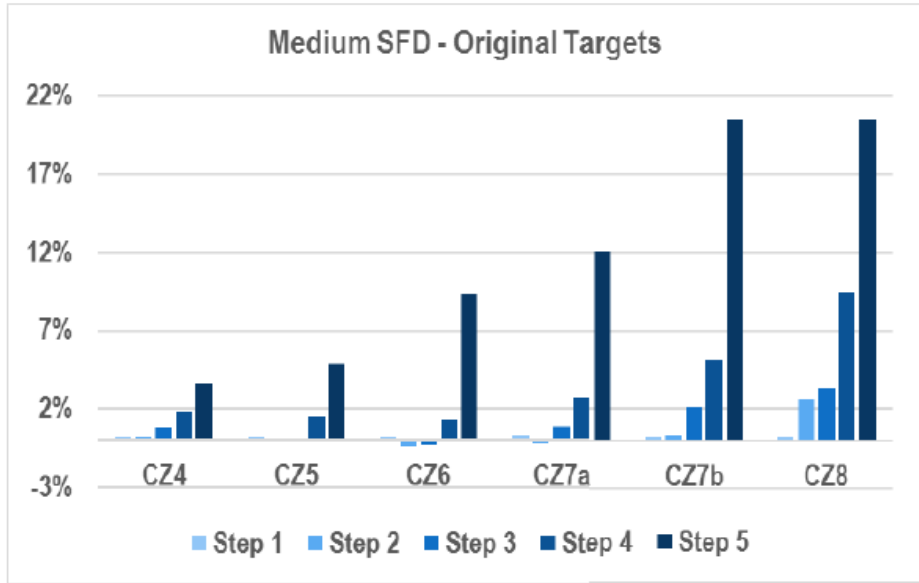


# Cost Impact of Old and New Targets– Row House



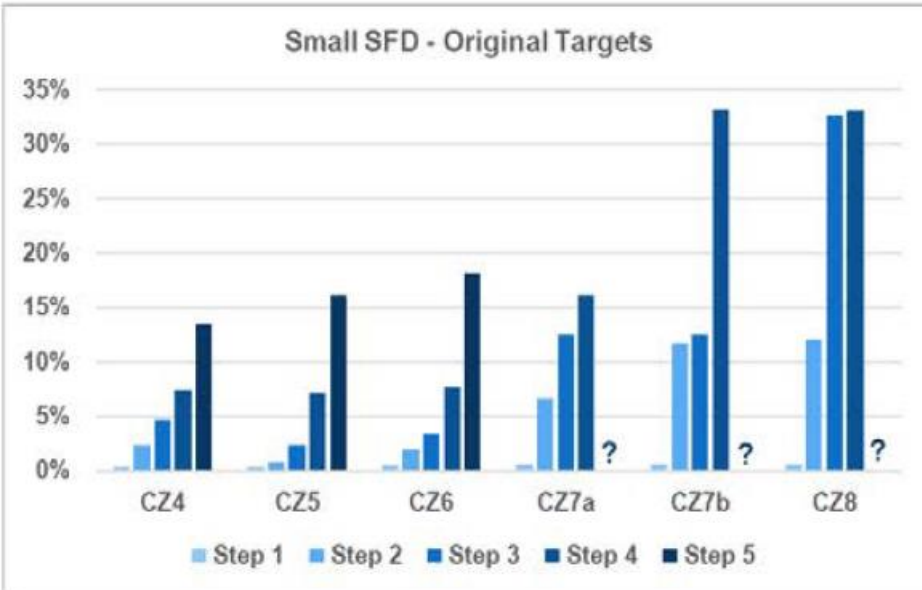


# Cost Impact of Old and New Targets – Medium House



# Cost Impact of Old and New Targets – Small House

Small SFD - Original Targets



Small SFD - Updated Targets



# Impact of New Targets on Small House



→ Small SFD

1,100 ft <sup>2</sup> SFD	Current Step 2 Vancouver	Proposed Step 2 Vancouver	Current Step 3 Vancouver	Proposed Step 3 Vancouver
Walls	16	16	16	Same result
Attic	50	<b>60</b>	60	Same result
Slab Insulation	11.1	11.1	11.1	Same result
Foundation	11.3	11.3	11.3	Same result
Windows/Doors	1.6	1.6	1.2	Same result
Heating	Baseboard	Baseboard	Baseboard	Same result
HRV/ERV	0%	<b>75%</b>	60%	Same result
DHW	Tankless	Elec. Strg.	.67EF NG Tank	Same result
Airtightness	2.5	2.5	2.5	Same result

Step 2 requirement is 3.0 ACH, used 2.5 ACH as 3.0 ACH not modeled in Metrics study

# Impact of New Targets on Small House



→ Small SFD

1,100 ft <sup>2</sup> SFD	Current Step 4 Vancouver	Proposed Step 4 Vancouver	Current Step 5 Vancouver	Proposed Step 5 Vancouver
Walls	22	<b>40</b>	Not achieved	40
Attic	70	<b>60</b>	Not achieved	100
Slab Insulation	11.1	11.1	Not achieved	11.1
Foundation	11.3	11.3	Not achieved	11.3
Windows/Doors	1.0	<b>1.8</b>	Not achieved	0.8
Heating	Baseboard	Baseboard	Not achieved	Baseboard
HRV/ERV	84%	<b>75%</b>	Not achieved	75%
DHW	Heat Pump	<b>Tankless</b>	Not achieved	Heat Pump
Airtightness	1.5	<b>1.0</b>	Not achieved	0.6

# Impact of New Targets on Medium House



2,550 ft <sup>2</sup> SFD	Current Step 2 Vancouver	Proposed Step 2 Vancouver	Current Step 3 Vancouver	Proposed Step 3 Vancouver
Walls	16	16	18	18
Attic	40	40	40	40
Slab Insulation	0	0	0	0
Foundation	16.9	<b>25</b>	11.3	<b>19.6</b>
Windows/Doors	1.8	1.8	1.8	<b>1.4</b>
→ Medium SFD Heating	Baseboard	Baseboard	Baseboard	92% Furnace
HRV/ERV	None	None	70%	<b>75%</b>
DHW	Instant	<b>.67EF Tank</b>	Heat pump	<b>Elec. Tank</b>
Airtightness	2.5	2.5	2.5	2.5

Step 2 requirement is 3.0 ACH, used 2.5 ACH as 3.0 ACH not modeled in Metrics study

# Impact of New Targets on Medium House



→ Medium SFD

2,550 ft <sup>2</sup> SFD	Current Step 4 Vancouver	Proposed Step 4 Vancouver	Current Step 5 Vancouver	Proposed Step 5 Vancouver
Walls	24	18	24	Same result
Attic	40	70	40	Same result
Slab Insulation	0	0	11.1	Same result
Foundation	11.3	11.3	19.6	Same result
Windows/Do ors	1.6	1.2	1.2	Same result
Heating	Baseboard	92% Furnace	Baseboard	Same result
HRV/ERV	60%	60%	70%	Same result
DHW	Heat pump	Tankless	Heap pump	Same result
Airtightness	1.5	1	0.6	Same result

# Impact of New Targets on Large House



→ Large SFD

5,500 ft <sup>2</sup> SFD	Current Step 2 Vancouver	Proposed Step 2 Vancouver	Current Step 3 Vancouver	Proposed Step 3 Vancouver
Walls	16	16	16	<b>24</b>
Attic	50	50	50	<b>100</b>
Slab Insulation	0	0	0	0
Foundation	11.3	<b>16.9</b>	11.3	<b>19.6</b>
Windows/Doors	1.8	<b>1.4</b>	1.8	<b>1.2</b>
Heating	Baseboard	92% furnace	Heat pump	92% furnace
HRV/ERV	70%	70%	70%	<b>none</b>
DHW	Tankless	Tankless	Tankless	<b>.67EF Tank</b>
Airtightness	2.5	2.5	2.5	2.5

Step 2 requirement is 3.0 ACH, used 2.5 ACH as 3.0 ACH not modeled in Metrics study

# Impact of New Targets on Large House



→ Large SFD

5,500 ft <sup>2</sup> SFD	Current Step 4 Vancouver	Proposed Step 4 Vancouver	Current Step 5 Vancouver	Proposed Step 5 Vancouver
Walls	16	<b>30</b>	40	40
Attic	40	<b>80</b>	70	70
Slab Insulation	0	<b>11.1</b>	0	0
Foundation	11.3	11.3	16.9	<b>16.9</b>
Windows/Doors	1.8	<b>1.2</b>	1.2	1.2
Heating	Heat pump	<b>92% furnace</b>	Heat pump	<b>95% furnace</b>
HRV/ERV	84%	84%	70%	70%
DHW	Elec. Tank	Tankless	Elec. Tank	Elec. Tank
Airtightness	1.5	<b>1.0</b>	0.6	0.6



A decorative vertical line in a teal color is positioned on the left side of the page. On the right side, there is a large, abstract graphic composed of several overlapping, fan-shaped segments in various colors: yellow, orange, light green, medium green, and teal. These segments are arranged in a way that they appear to radiate from a common point on the right edge of the page, creating a sense of depth and movement.

# Discussion