



# 2017 Builders & Designers Forum

**Presented November 2017**  
Community Services



**John de Ruiter**  
Manager, Inspections

**Tim Ryce**  
Assistant Manager, Inspections

## Agenda

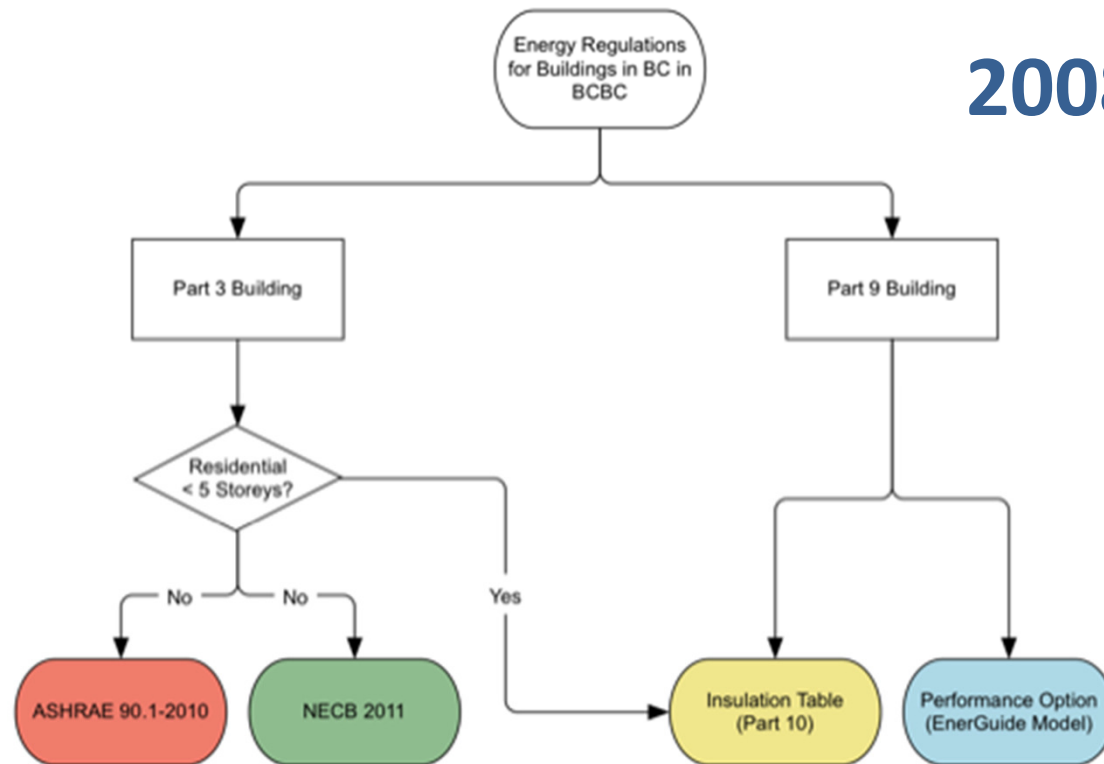
- Why are we here?
- What is the BC Energy Step Code?
- Where can I go to learn more?
- What are the City's new requirements?
- How is the City helping me?

## How Did We Get Here?



# Previous Energy Regulations - BC

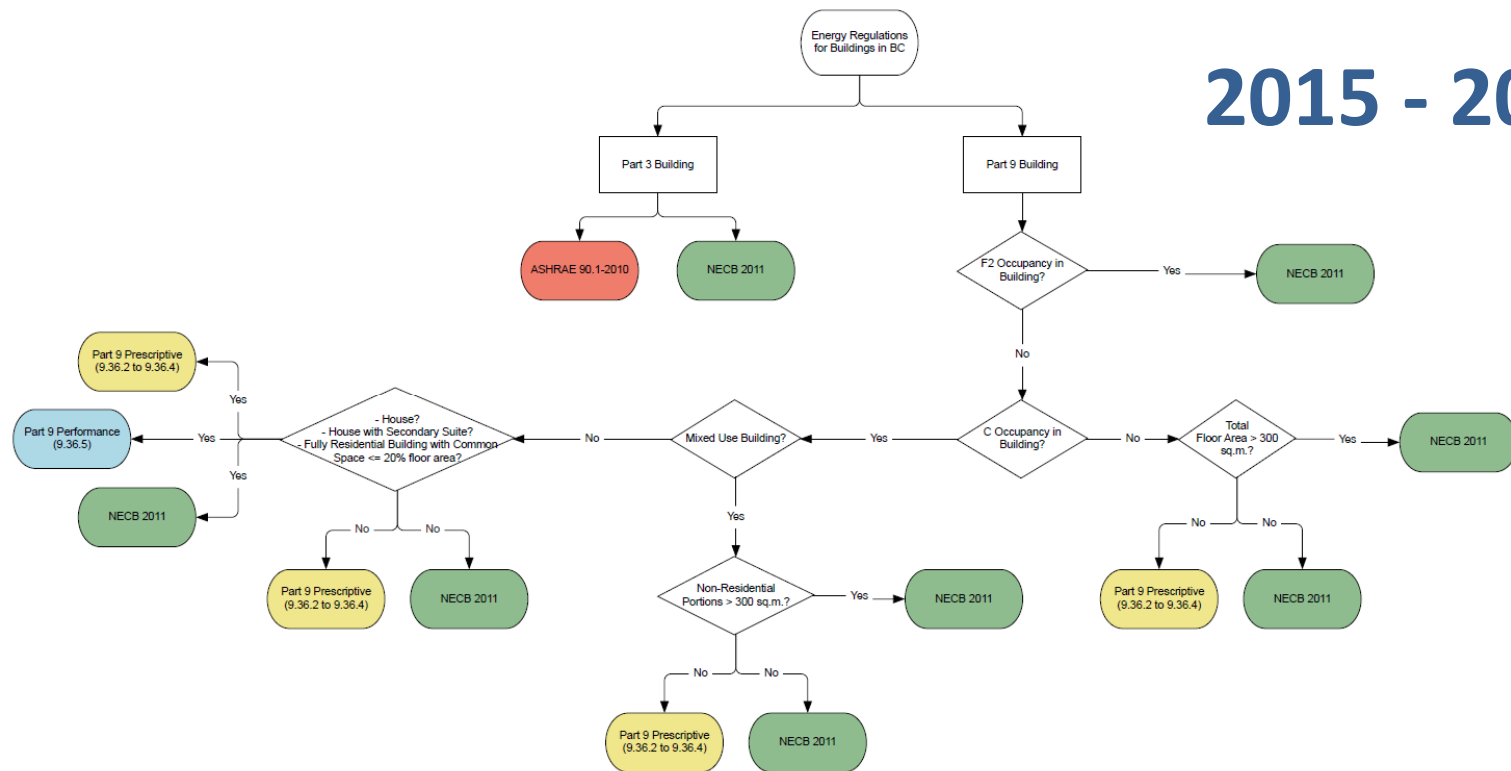
2008 - 2014





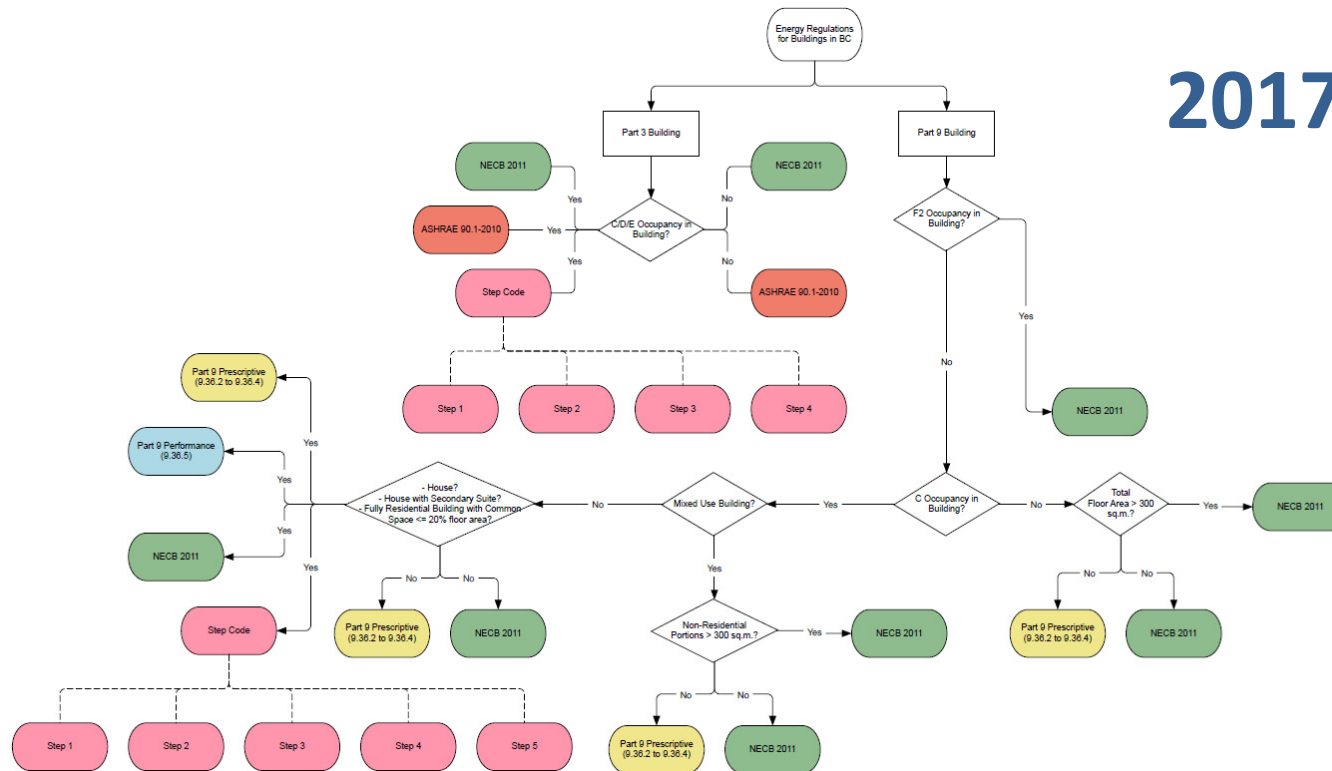
# Previous Energy Regulations - BC

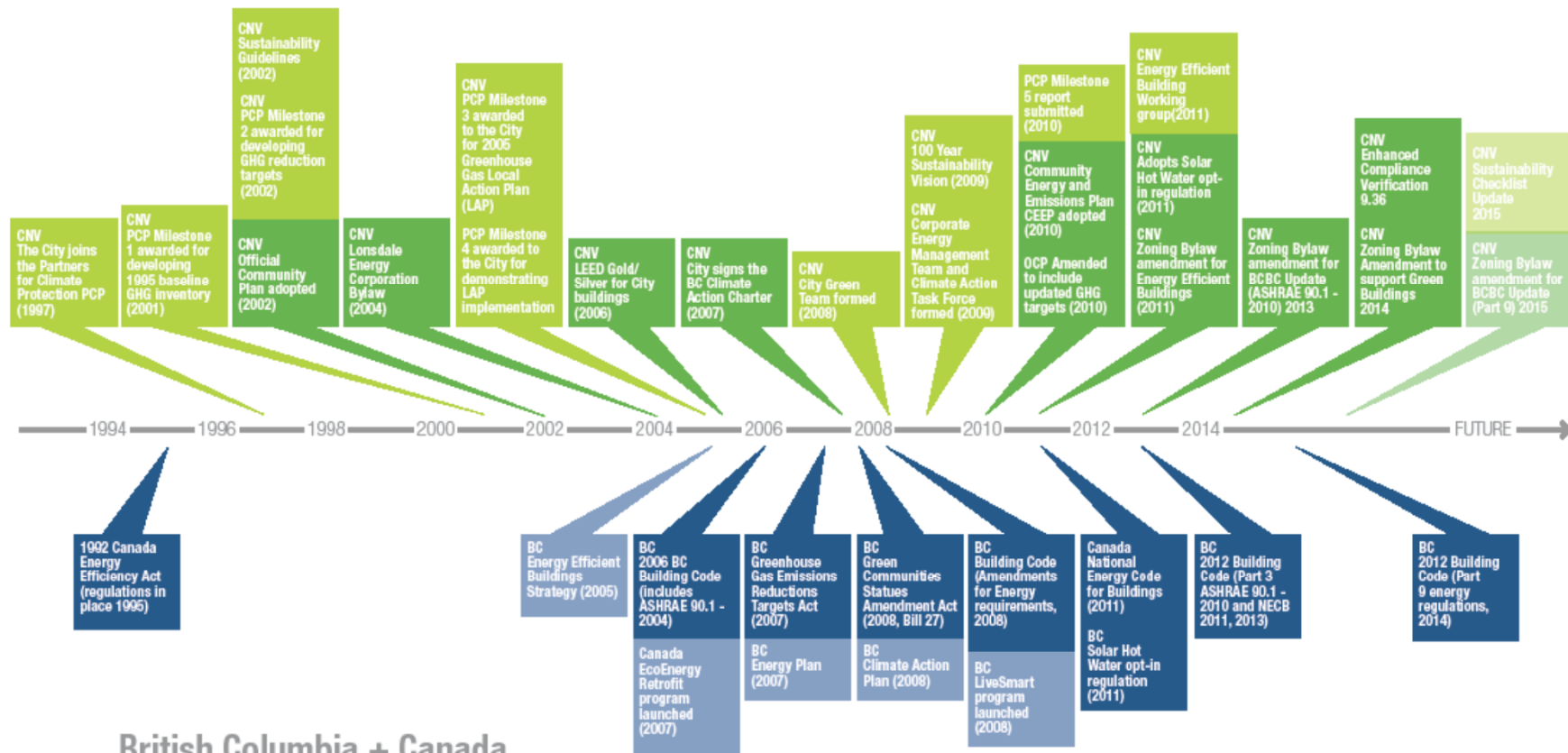
2015 - 2016



# Current Energy Regulations - BC

2017 - ?





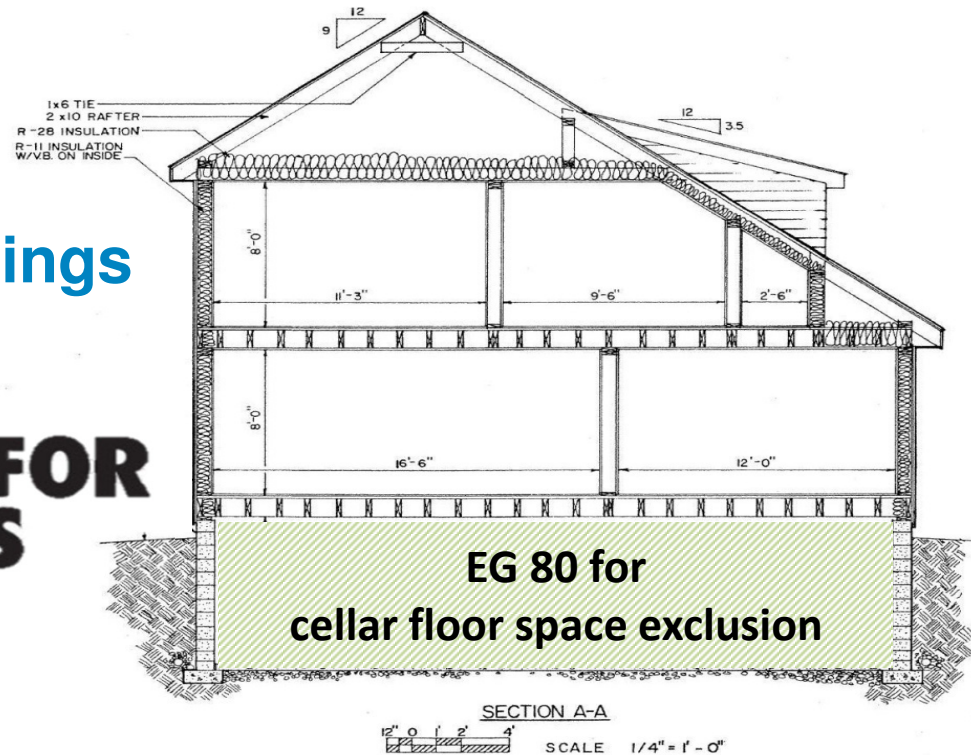
## British Columbia + Canada

Programs/Plans/Strategies  
Regulations

Mike van der Laan

CNV EEBI – 2011 to 2017

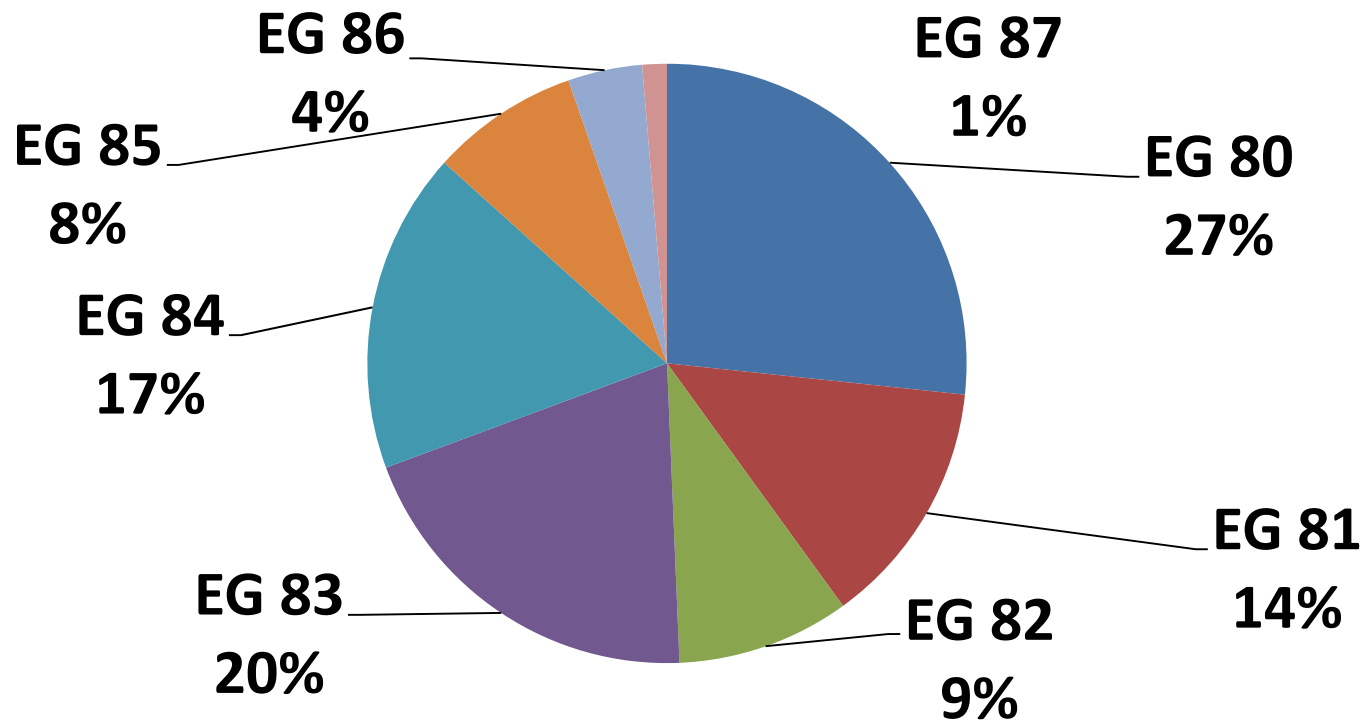
## Energy Efficient Buildings Initiative



city  
of north  
vancouver



## CNV EEBI – 2011 to 2017



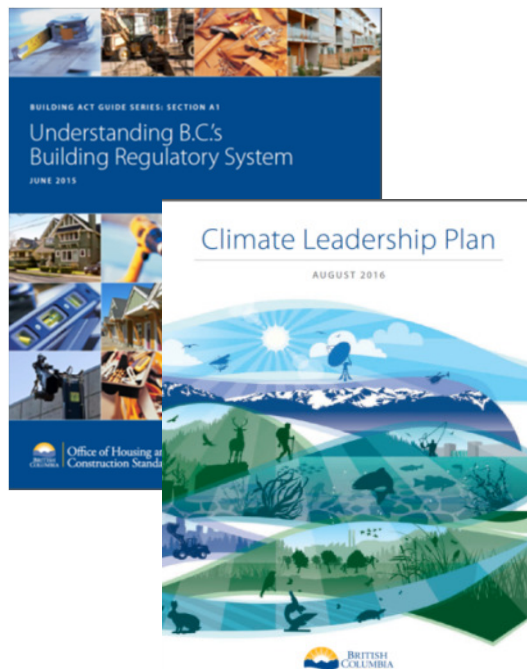
Why are we here?







## Two Provincial Initiatives Set the Stage



### Building Act

- Consistency, Competency & Innovation
- December 2017 marks the end of local building requirements in bylaws.

### Climate Leadership Plan

- Establishes a target that all new construction will be net-zero ready by 2032.

# Local Government Approaches to Energy Efficiency

## Eliminating the Patchwork:

- Local government adopted a wide range of programs and approaches to address building energy efficiency.
- Development industry struggled to stay on top of these requirements.
- BC Energy Step Code offers a common standard for achieving building energy goals.



# Energy Efficiency Working Group



PROVINCIAL GOV.

BUILDERS & DEVELOPERS

LOCAL GOVERNMENTS

TRADES & PROFESSIONALS

NGOs



UTILITIES



## A Focus on Performance



ENERGY  
**STEP**CODE  
BUILDING BEYOND THE STANDARD

city  
of north  
vancouver



## Part 9 | Step 1: Enhanced Compliance

2017 -----> 2032

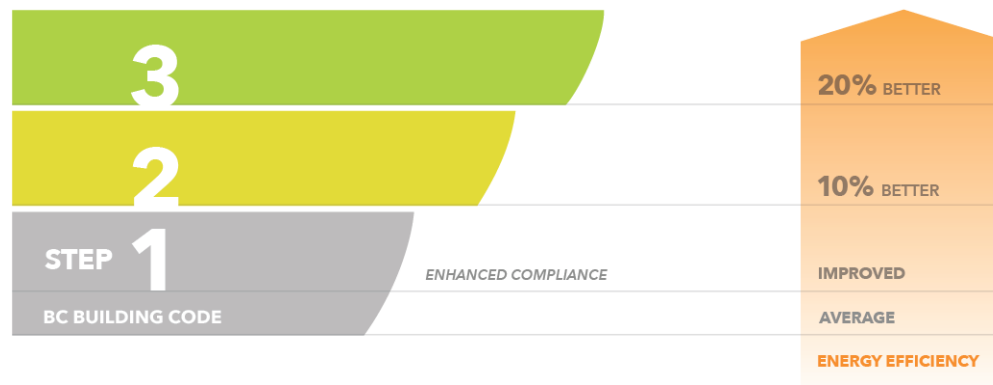
BC BUILDING CODE

AVERAGE

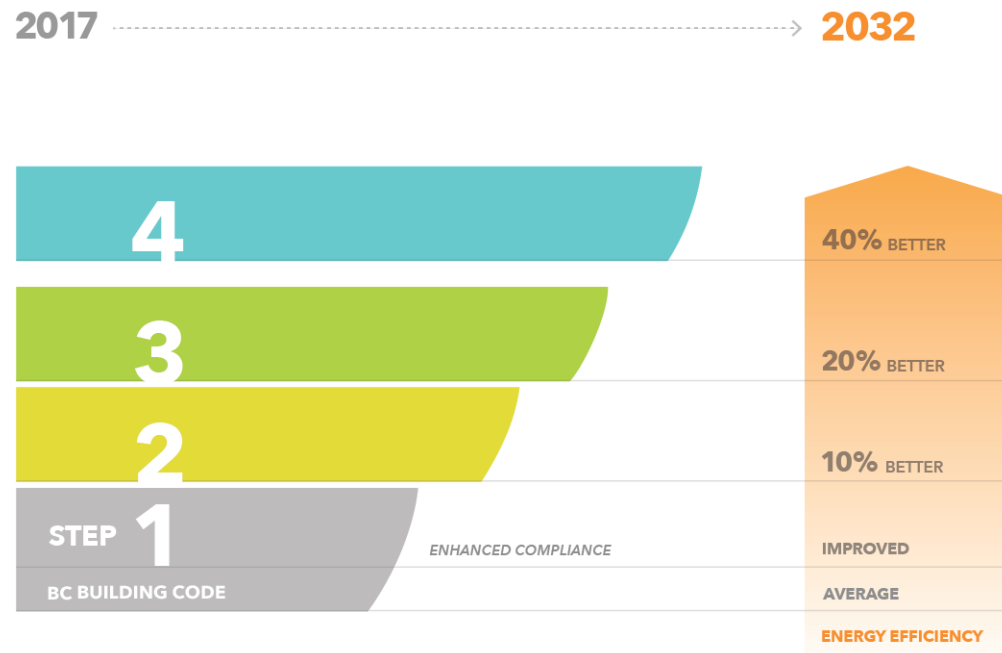
ENERGY EFFICIENCY

## Part 9 | Steps 2 and 3: The Lower Steps

2017 .....> 2032



## Part 9 | Step 4: The Threshold to the Upper Steps

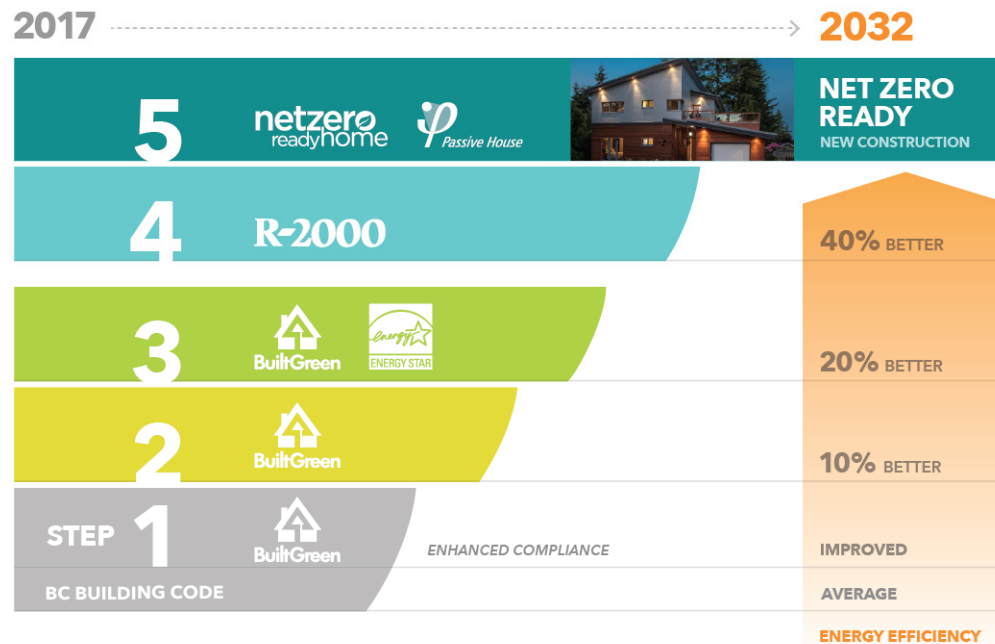




## Part 9 | Step 5: Net Zero Ready New Construction



# Existing Program Equivalencies



# Energy Step Code

2017

2032

5



**NET ZERO  
READY**  
NEW CONSTRUCTION

## Lower Steps

3

20% BETTER

2

10% BETTER

STEP 1

ENHANCED COMPLIANCE

IMPROVED

BC BUILDING CODE

AVERAGE

## Energy Step Code

# Upper Steps

2017

2032

5



**NET ZERO  
READY**  
NEW CONSTRUCTION

4

**40% BETTER**

3

2

**10% BETTER**

STEP

1

ENHANCED COMPLIANCE

IMPROVED

BC BUILDING CODE

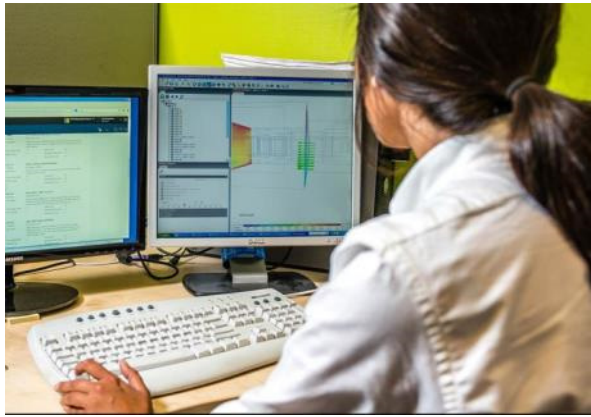
AVERAGE

**ENERGY EFFICIENCY**

city  
of north  
vancouver



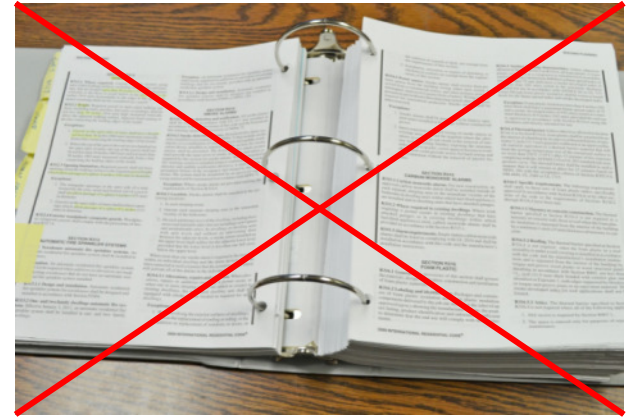
# Performance Compliance



**Energy modeling**

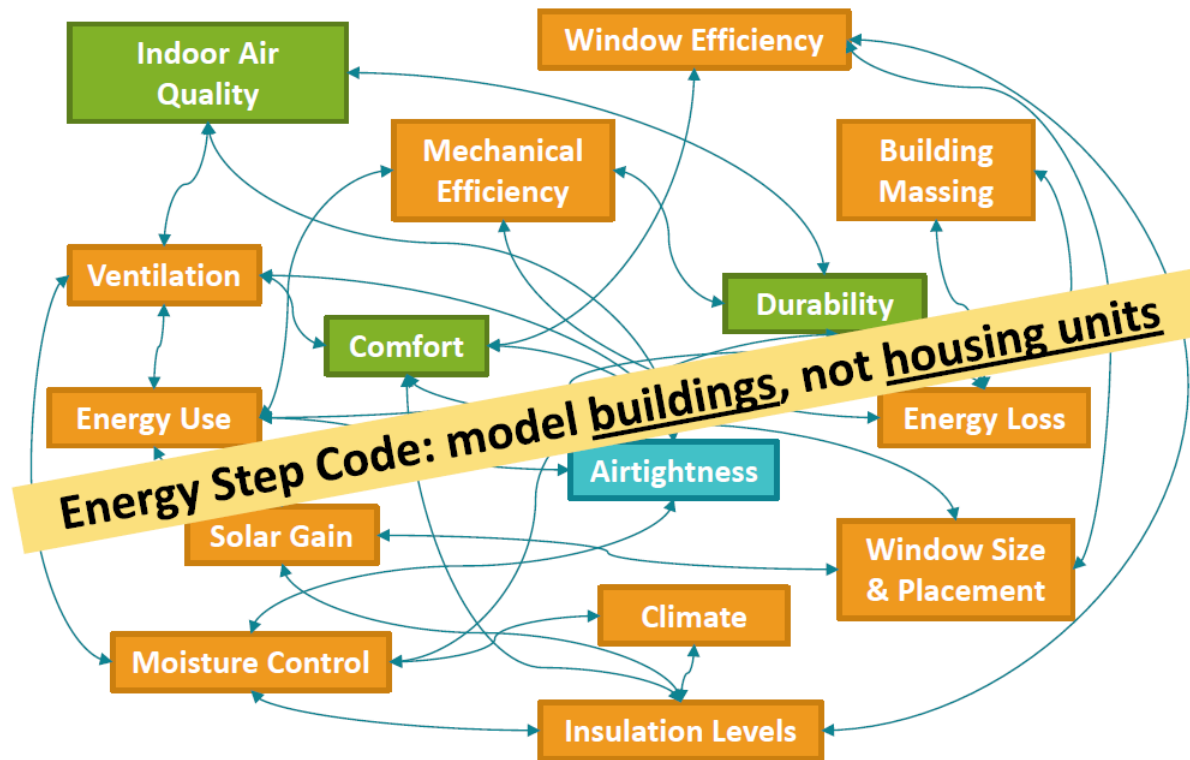


**Air-Tightness Testing**



**No Prescriptive Requirements**

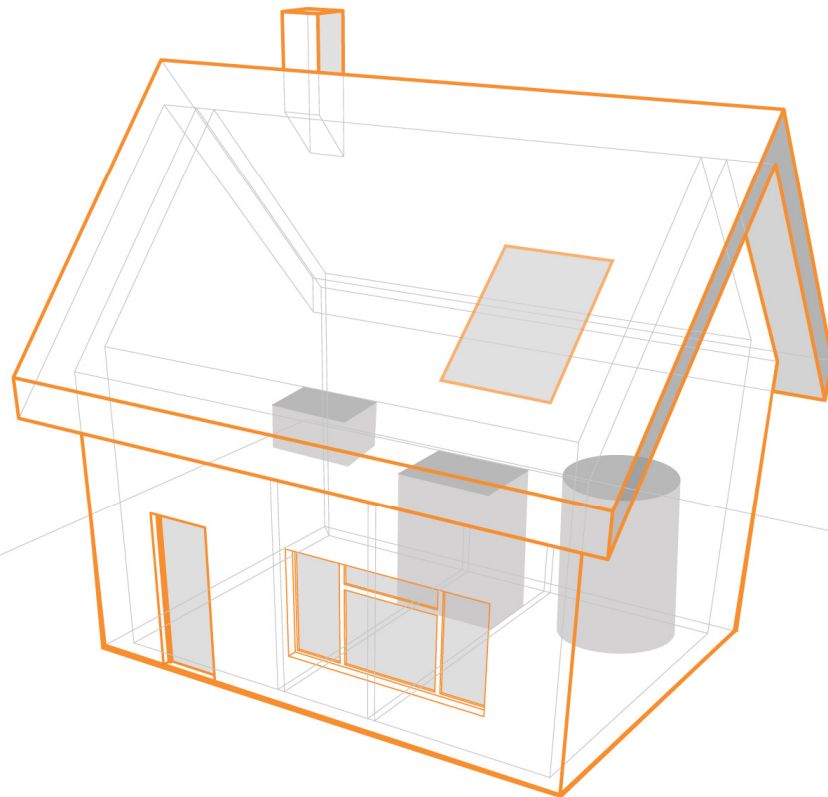
# What Does the BC Energy Step Code Measure?



# What Does the BC Energy Step Code Measure?

Performance Requirements For:

✓ **Building envelope**





# Building Envelope Efficiency Metrics

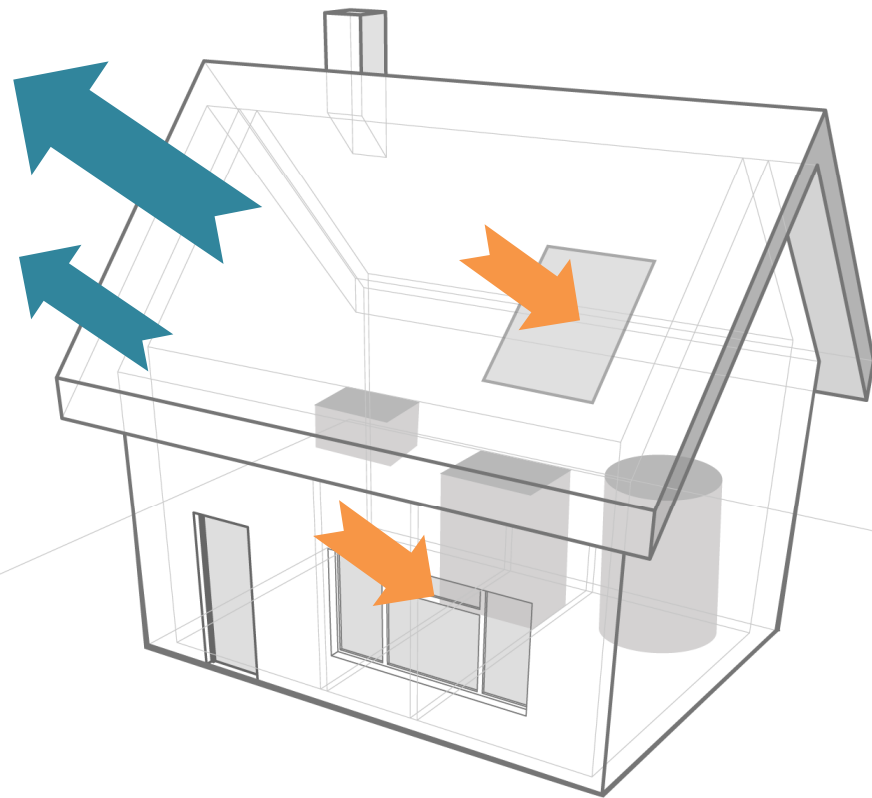
## Losses

- Air tightness
- Insulation

## Gains

- Solar gain
- People and equipment

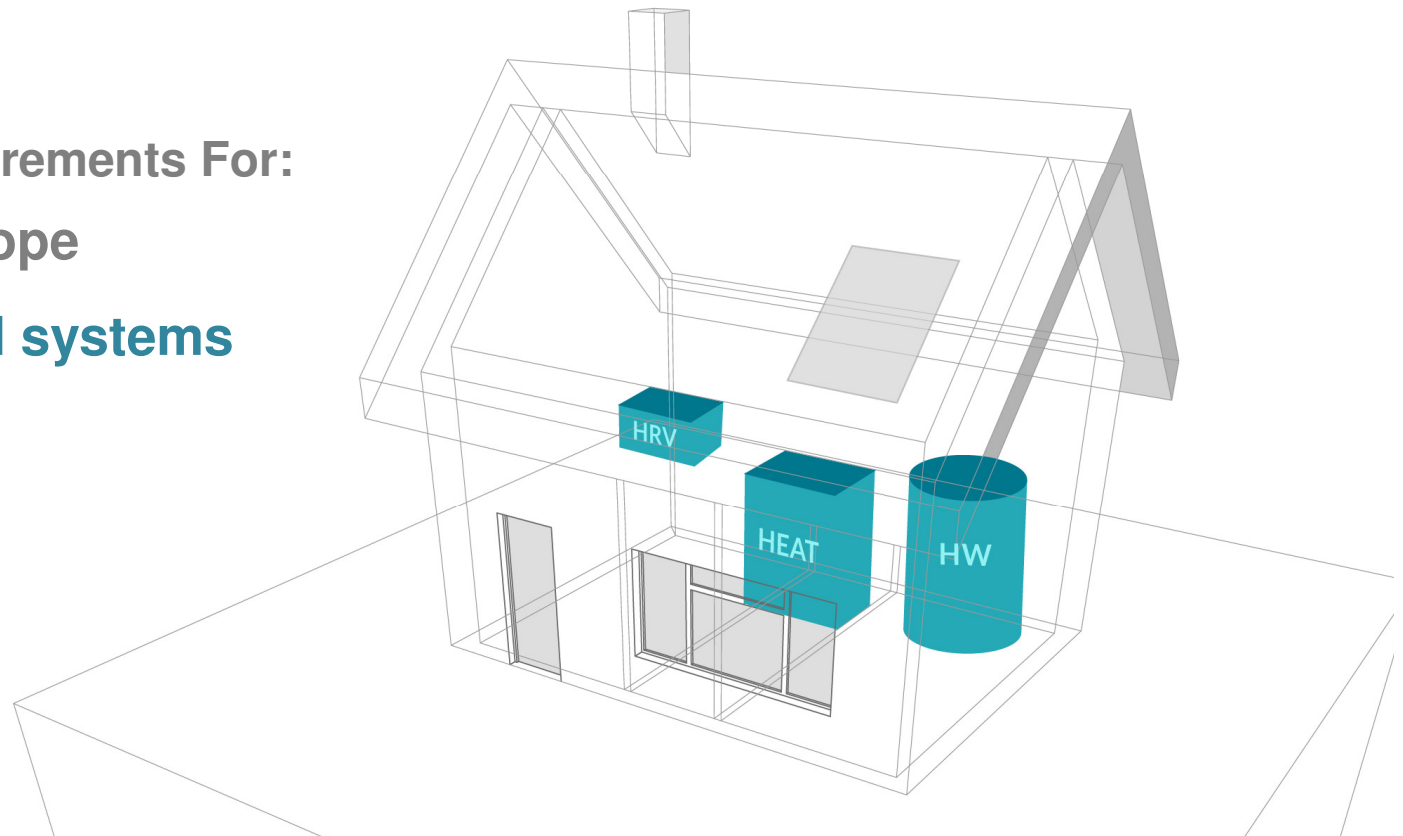
*Units of heat energy required for constant temperature after losses and gains (ignores equipment efficiency).*



# What Does the BC Energy Step Code Measure?

Performance Requirements For:

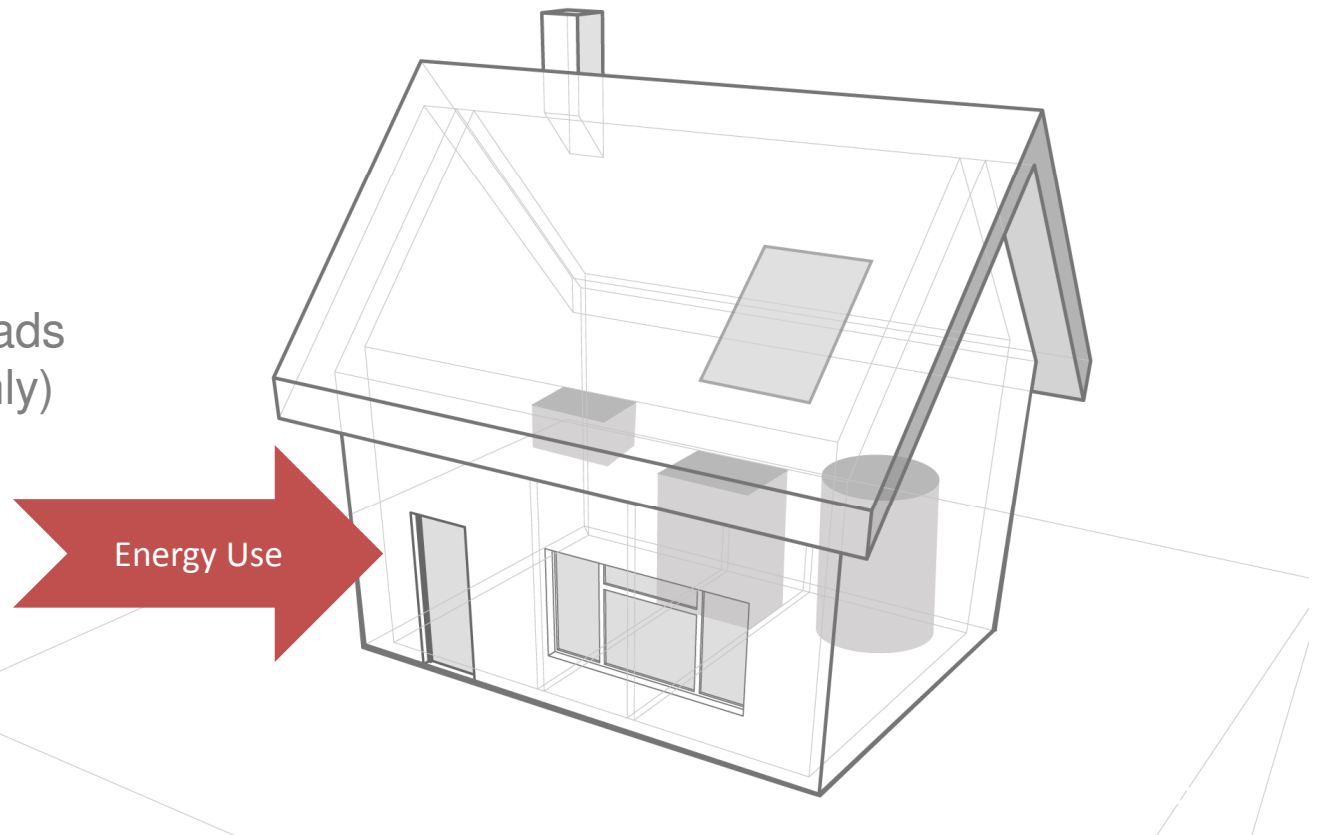
- ✓ Building envelope
- ✓ Equipment and systems



# Equipment Efficiency Metrics

## Energy Use

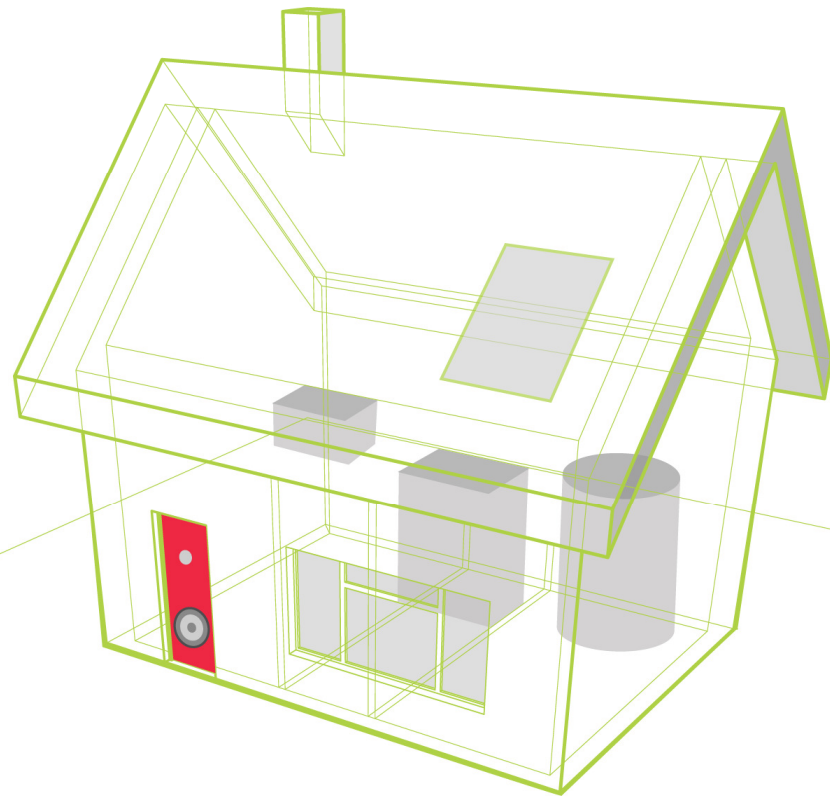
- Heat
- Water heating
- Ventilation
- Lights and plug loads (large buildings only)



# What Does the BC Energy Step Code Measure?

## Performance Requirements For:

- ✓ **Building envelope**
- ✓ **Equipment and systems**
- ✓ **Post-construction testing**
  - Airtightness



# Airtightness Testing



## What Does the BC Energy Step Code Measure?

- Energy Use Intensity (EUI)
  - metric used to describe the building's total modeled annual energy consumption including
    - Heating
    - Cooling
    - Ventilation
    - Lighting and plug loads



## What Does the BC Energy Step Code Measure?

- Thermal Energy Demand Intensity (TEDI)
  - metric of the building's modeled heating needs that is primarily influenced by
    - building enclosure insulation
    - Airtightness
    - ventilation system.

### AIRTIGHT BUILDING



NO DRILLING  
AIRTIGHT  
CONSTRUCTION



NO CUTTING  
AIRTIGHT  
MEMBRANES

REPORT ALL PENETRATIONS TO SUPERVISOR



## What Does the BC Energy Step Code Measure?

- Peak Thermal Load (PTL)
  - The modelled maximum amount of energy needed to heat a building on the modelled coldest day of the year.

### AIRTIGHT BUILDING



NO DRILLING  
AIRTIGHT  
CONSTRUCTION



NO CUTTING  
AIRTIGHT  
MEMBRANES



REPORT ALL PENETRATIONS TO SUPERVISOR

## What Does the BC Energy Step Code Measure?

- Mechanical Energy Use Intensity (MEUI)
  - The modelled amount of energy used by:
    - space heating and cooling
    - ventilation, and
    - domestic hot water systems,



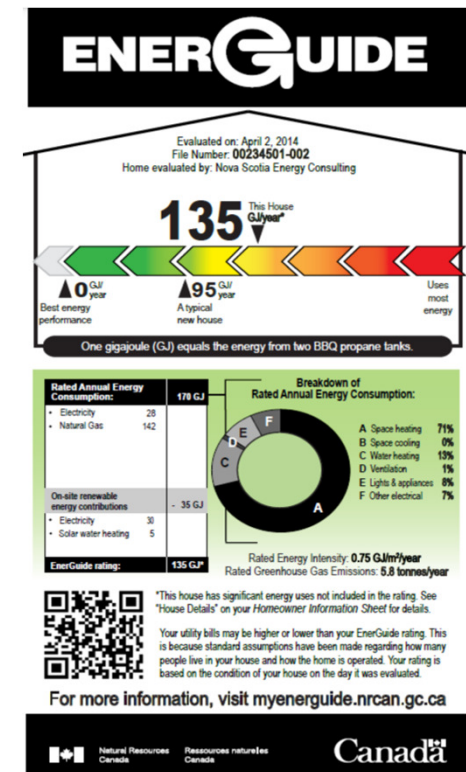
## What Does the BC Energy Step Code Measure?

- TEDI, PTL and airtightness testing requirements ensure that the **building loads are *reduced* to a reasonable level.**
- MEUI requirements ensure that the **building equipment and systems use energy *efficiently*.**

## Alternate Metrics

# ENERGUIDE

- EnerGuide Version 15
  - No more 0-100 Rating
  - Conversion to GJ scale
  - Automatic Generation of “Reference House”



## Alternate Metrics

“*Buildings* designed and constructed to conform to Step 5 of any of Tables 9.36.6.3.A. to C. and to the Passive House Planning Package, version 9 or newer, are deemed to comply with this Subsection if the energy model according to which the *building* is designed and constructed is prepared by a Certified Passive House Designer, or Certified Passive House Consultant, who is approved by the Passive House Institute.”



# What Does the BC Energy Step Code Measure?

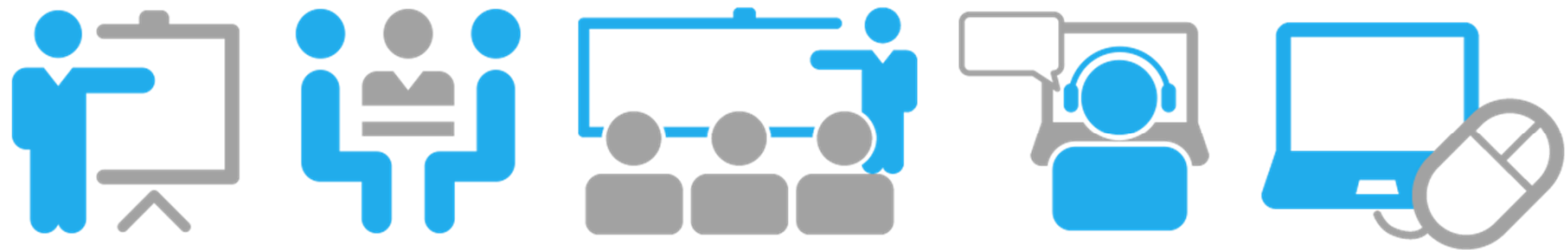
## 1. Airtightness

## 2. Equipment and Systems

## 3. Envelope

<b>Table 9.36.6.3.A.</b> <b>Requirements for Buildings Located Where the Degree-Days Below 18° C Value is less than 3000<sup>(1)</sup></b> Forming Part of Sentence 9.36.6.3.(1)			
Step	<b>1</b> Airtightness (Air Changes per Hour at 50 Pa Pressure Differential)	<b>2</b> Performance Requirement of Building Equipment and Systems	<b>3</b> Performance Requirement of Building Envelope
1	N/A	EnerGuide Rating % lower than EnerGuide Reference House: not less than 0% lower energy consumption or conform to Subsection 9.36.5.	
2	≤ 3.0	EnerGuide Rating % lower than EnerGuide Reference House: not less than 10% lower energy consumption or mechanical energy use intensity ≤ 60 kWh/m <sup>2</sup> ·year	thermal energy demand intensity ≤ 45 kWh/(m <sup>2</sup> ·year) or peak thermal load ≤ 35 W/m <sup>2</sup>
3	≤ 2.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 20% lower energy consumption or mechanical energy use intensity ≤ 45 kWh/m <sup>2</sup> ·year	thermal energy demand intensity ≤ 40 kWh/(m <sup>2</sup> ·year) or peak thermal load ≤ 30 W/m <sup>2</sup>

# Training Opportunities



## Training Opportunities

- BC Housing
  - Design Guidelines

July 2017	TECHNICAL BULLETIN NO. 1-2017
SUBJECT:	REVISIONS to BC Housing's Sustainability Standards as described in
REFERENCE:	BC Housing's Design Guidelines & Construction Standards 2014, Section 3 Energy and Environmental Design



# Training Opportunities

- BC Housing
  - Design Guidelines
  - Illustrated Guides

## Illustrated Guide - R22+ Effective Walls in Residential Construction in B.C.

### Guide



This guide applies to low-rise detached and semi-detached homes, row-houses/townhomes, and multi-unit residential buildings up to six storeys. Although the guide generally focuses on wood-frame, concrete, and steel-frame walls that use traditional construction methods, some guidance is included for other less common wall types.

[Download](#)[pdf](#) | 13.78 MB

# Training Opportunities

- BC Housing
- Training Videos

## Video/Recorded Materials

- Energy Step Code Technical Training Series - each session is about 1 hour long
  - [Session 1: Introduction to the Energy Step Code \(video\)](#) - [summary \(PDF, 251KB\)](#)
  - [Session 2: The Energy Step Code for Part 9 Buildings \(video\)](#) - [summary \(PDF, 252KB\)](#)
  - [Session 3: The Energy Step Code for Part 3 Buildings \(video\)](#) - [summary \(PDF, 253KB\)](#)
  - [Session 4: Enforcement of the Energy Step Code \(video\)](#) - [summary \(PDF, 275KB\)](#)

# Training Opportunities

- BC Housing
- Training Videos
- Building Smart Seminars

## Upcoming Events

Event	Location	Date
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 5/6: In-person</a>	Cranbrook	Jan 08, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 5: In-person</a>	Kamloops	Jan 10, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 5: In-person</a>	Kelowna	Jan 11, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 5: Webinar</a>	Online	Jan 11, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 4: In-person</a>	Vancouver	Jan 16, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 4: Webinar</a>	Online	Jan 16, 2018
<a href="#">Designing Safe and Durable Wood Decks and Balconies: In-person</a>	Vancouver	Jan 23, 2018
<a href="#">Designing Safe and Durable Wood Decks and Balconies: Webinar</a>	Online	Jan 23, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 5: In-person</a>	Nanaimo	Feb 01, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 6+: In-person</a>	Fort St. John	Feb 27, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 5: In-person</a>	Penticton	Mar 03, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 6+: In-person</a>	Prince George	Mar 06, 2018
<a href="#">BC Energy Step Code – Lower Steps, Climate Zone 6+: Webinar</a>	Online	Mar 06, 2018
<a href="#">BC Energy Step Code – Lower Steps, All Climate Zones: In-person</a>	Vancouver	Mar 13, 2018


## Training Opportunities

- BC Housing
- Training Videos
- Building Smart Seminars
- GVHBA



### Builders' Breakfast Series: Step Code – Steps 1 – 4

[Event Description](#) [Who Should Attend](#) [Agenda](#)



**BUILDERS' BREAKFAST SERIES**

Categories: [In-Class Courses](#)

Event date: February 22, 2018

Showtime: 7:30am - 9:00am

Location: Trev Deeley (1875 Boundary Road Vancouver)

[Register Now](#)

# Training Opportunities

- BC Housing
- Training Videos
- Building Smart Seminars
- GVHBA
- CHBA



ABOUT US | LOCAL CHBA OFFICES | GOVERNMENT RELATIONS | EDUCATION | FIND A MEMBER | NEWS & EVENTS | ENERGY PROGRAMS

**ENERGY PROGRAMS**

- Licensed Energy Advisors
- EnerGuide Rating System
- ENERGY STAR®
- R-2000 Certification
- Net Zero Qualification
- Home Labeling Benefits
- FAQ

**ENERGUIDE**  **R-2000**

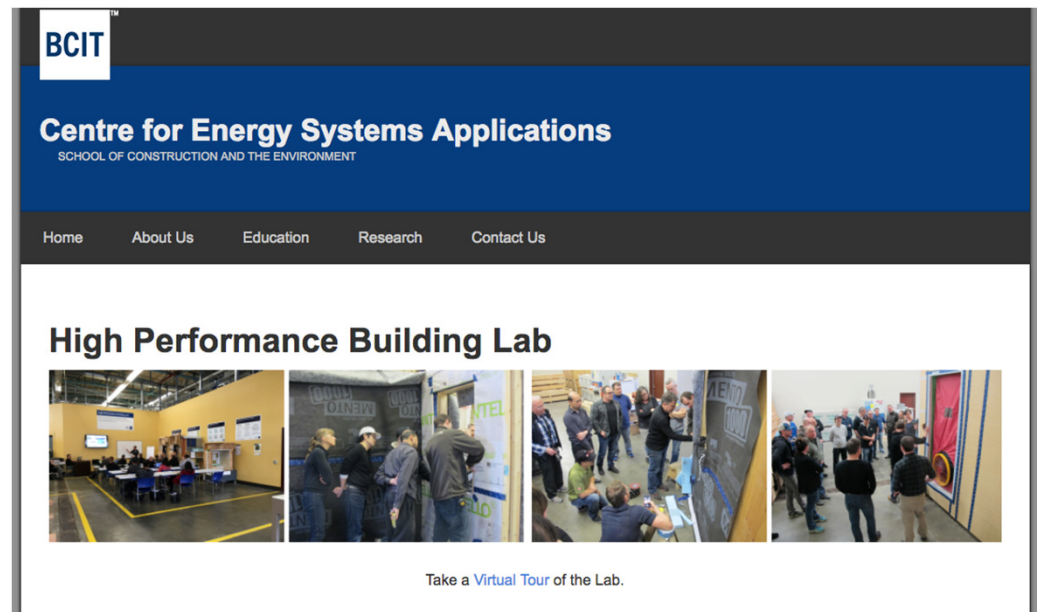
Canada is a leader in many aspects in the world. It is often cited as being one of the livable and desirable places to live on Earth. However, we're also the leaders in a few other categories that aren't so flattering. Canada is the largest consumer of energy in the world on a per capita basis and is the second-largest producer of greenhouse gas (GHG) emissions.

- By having an energy-efficient home you will not only save money but also reduce greenhouse gas emissions that may contribute to climate change.
- The average Canadian family spends up to 90 per cent of their time indoors so air quality is ever more relevant than in other parts of the world. Poor air quality in homes and buildings are cited as likely contributors to asthma, which now affects about 13 per cent of Canadian children.
- Seventeen per cent of GHG emissions in Canada are produced by residential energy use so by cutting down your own home's emissions is helping the nation as a whole.

Whether you go with an ENERGY STAR® or R-2000® certified home – or both – it is always beneficial to get an EnerGuide® rating that will tell you how much energy your home may consume.

## Training Opportunities

- BC Housing
- Training Videos
- Building Smart Seminars
- GVHBA
- CHBA
- BCIT



# What are the City's New Requirements?



## Current Energy Efficiency Programs





# CNV Transition to Energy Step Code



# CNV Transition to Energy Step Code

	Current (Density Bonus)	December 15, 2017	July 1, 2018
<b>Part 9 Small Residential</b> (Less than 1200 sq.ft.)	BCBC (for coach houses)	BCBC	Step 1
<b>Part 9 Residential</b> (Greater than 1200 sq.ft.)	1% Bond + EnerGuide 80	Step 2	Step 3
<b>Moodyville Neighbourhood</b> (all w/ 1% Bond )	Highest Step of ESC or Passive House or EnerGuide 86	Energy Step Code or Passive House	Energy Step Code or Passive House

## Estimated Cost Impact of Step Code Adoption in CNV

	December 15, 2017	July 1, 2018
<b>Part 9 Small Residential</b> (Less than 1200 sq.ft.)	0.0%	0.5%
<b>Part 9 Residential</b> (Greater than 1200 sq.ft.)	0.0%	0.0% - 1.1%
<b>Moodyville Neighbourhood</b>	0.0%	0.0%

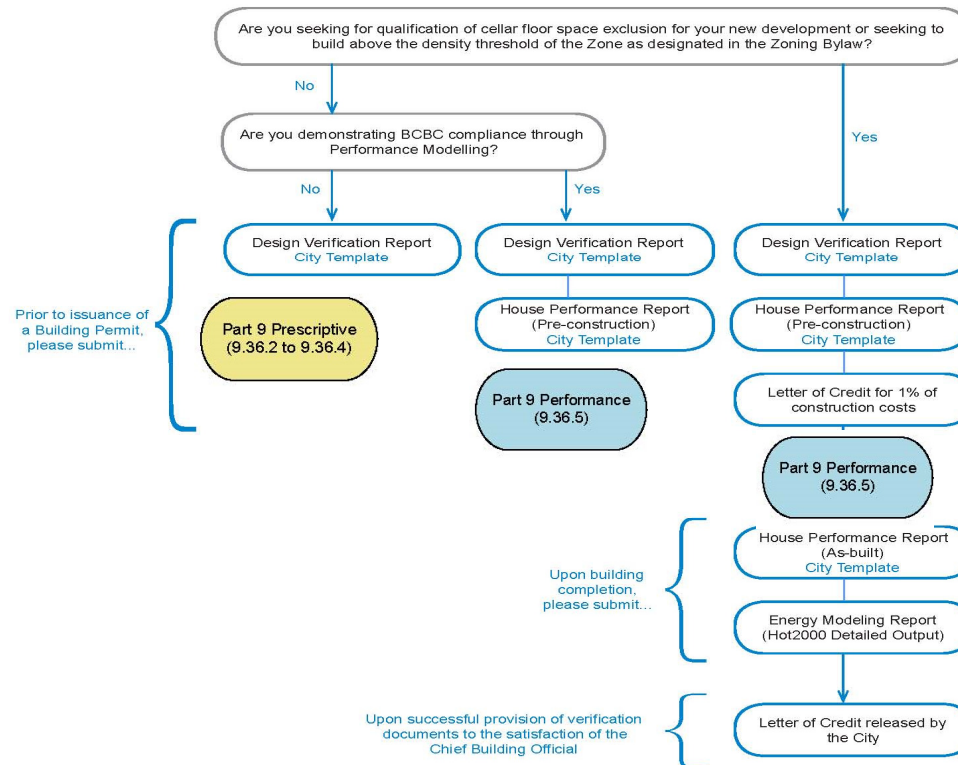
## BC Energy Step Code – Development Advantages

	Enhanced Design Flexibility	Clear Areas of Responsibility	Simplified Permit Process	Streamlined Inspections Processes	Confirmed Envelope Performance	Industry Capacity
<b>Developers</b>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Design Team</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Construction Team</b>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Municipalities</b>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

# Submission Requirements



# Updated CNV Energy Efficiency Verification Documents



# Updated CNV Energy Efficiency Verification Documents

- Design Verification Report
  - Required for all Part 9 Projects

**The City of North Vancouver**  
Community Services Department

**city**  
of north  
vancouver

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**DESIGN VERIFICATION REPORT**  
for Buildings Complying with Section 9.36 of the BCBC  
Last updated November 30, 2017

**Instructions**

1. Effective December 15, 2017.
2. To be completed by the Applicant.
3. To be submitted at the time of Building Permit application, accompanied with supporting documentation.

**To: Manager of Inspections, Community Services Department, City of North Vancouver**

I, \_\_\_\_\_, am the Applicant for the below-mentioned project and have coordinated the design to substantially comply with the requirements of Section 9.36 of the 2012 BC Building Code, based on pursuing the Energy Regulation indicated in the Project Details below.

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**PROJECT DETAILS**

Project Address: \_\_\_\_\_ Building Permit #: \_\_\_\_\_

BCBC Compliance Pathway (check one)

- ☐ 1. Prescriptive: 9.36.2 to 9.36.4 (COMPLETE SECTION A)
- ☐ 2. Performance: 9.36.5 (COMPLETE SECTION A + C)
- ☐ 3. Performance: 9.36.6 – Energy Step Code (COMPLETE SECTION A + C)  
Step pursued: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
- ☐ 4. Prescriptive: NECB-2011 Part 3-7 (COMPLETE SECTION A)
- ☐ 5. Performance: NECB-2011 Part 8 (COMPLETE SECTION A + C)

City of North Vancouver  
Energy Efficiency Commitment

- ☐ Rezoning, and/or DP Commitment (COMPLETE SECTION A + C)  
Required Performance Metric and Rating: \_\_\_\_\_

# Updated CNV Energy Efficiency Verification Documents

- Design Verification Report
- House Performance Report
  - Required for Part 9 Residential following performance paths

**The City of North Vancouver**  
Community Services Department

**HOUSE PERFORMANCE REPORT (PRE-CONSTRUCTION)**  
for 9.36.5 or 9.36.6 (Energy Step Code) Energy Performance Compliance  
Last updated November 29, 2017

**city of north vancouver**

**Instructions**

1. Effective December 15, 2017.
2. To be submitted prior to the issuance of Building Permit, accompanied with supporting documentation.

**PROJECT INFORMATION**

Project Address: \_\_\_\_\_

Building Type: ☐ Coach House ☐ Single-family ☐ Duplex ☐ Rowhouse/Townhome ☐ Apartment <4 storeys ☐ Other \_\_\_\_\_

BCBC Compliance Pathway: ☐ 9.36.5 (COMPLETE SECTION A + B)  
☐ 9.36.6 (Energy Step Code) \_\_\_\_\_ Step Pursued: \_\_\_\_\_ (COMPLETE SECTION A + C)

Total Heated Floor Area: \_\_\_\_\_ m<sup>2</sup>

Building Height: \_\_\_\_\_ storeys

Building Permit #: \_\_\_\_\_

**COMPLETE IF APPLICABLE**  
Rezoning, and/or DP Commitment  
Required Performance Metric and Rating:  
\_\_\_\_\_



# Updated CNV Energy Efficiency Verification Documents

- Design Verification Report
- House Performance Report
  - Pre-Construction

SECTION C: 9.36.6 (ENERGY STEP CODE) - ENERGY PERFORMANCE COMPLIANCE (complete if applicable)				
Energy Consumption:		Reference: _____(GJ/year)	Proposed: _____(GJ/year)	
Metric		Units	Required (by CNV Regulation)	Proposed
Step Code Level		1-5		
Airtightness		ACH @ 50 Pa		
Building Equipment and Systems	ERS Improvement over Reference House OR	% lower		
	Mechanical Energy Use Intensity (MEUI)	kWh/(m <sup>2</sup> ·yr)		
Building Envelope	Thermal Energy Demand Intensity (TEDI) OR	kWh/(m <sup>2</sup> ·yr)		
	Peak Thermal Load (PTL)	W/m <sup>2</sup>		

# Updated CNV Energy Efficiency Verification Documents

- Design Verification Report
- House Performance Report
  - Pre-Construction
  - As-Built

**The City of North Vancouver**  
Community Services Department

**HOUSE PERFORMANCE REPORT (AS-BUILT)**  
for 9.36.5 or 9.36.6 (Energy Step Code) Energy Performance Compliance  
Last updated November 29, 2017

**Instructions**

1. Effective December 15, 2017.
2. To be submitted prior to the issuance of Building Permit, accompanied with supporting documentation.

**PROJECT INFORMATION**

Project Address: \_\_\_\_\_ Building Permit #: \_\_\_\_\_

BCBC Compliance Pathway: ☐ 9.36.5 (COMPLETE SECTION A + B)  
☐ 9.36.6 (Energy Step Code) - Step Pursued: \_\_\_\_\_ (COMPLETE SECTION A + C)

Check one: ☐ This House Performance Report is unchanged from Pre-Construction  
☐ This House Performance Report includes modifications from Pre-Construction

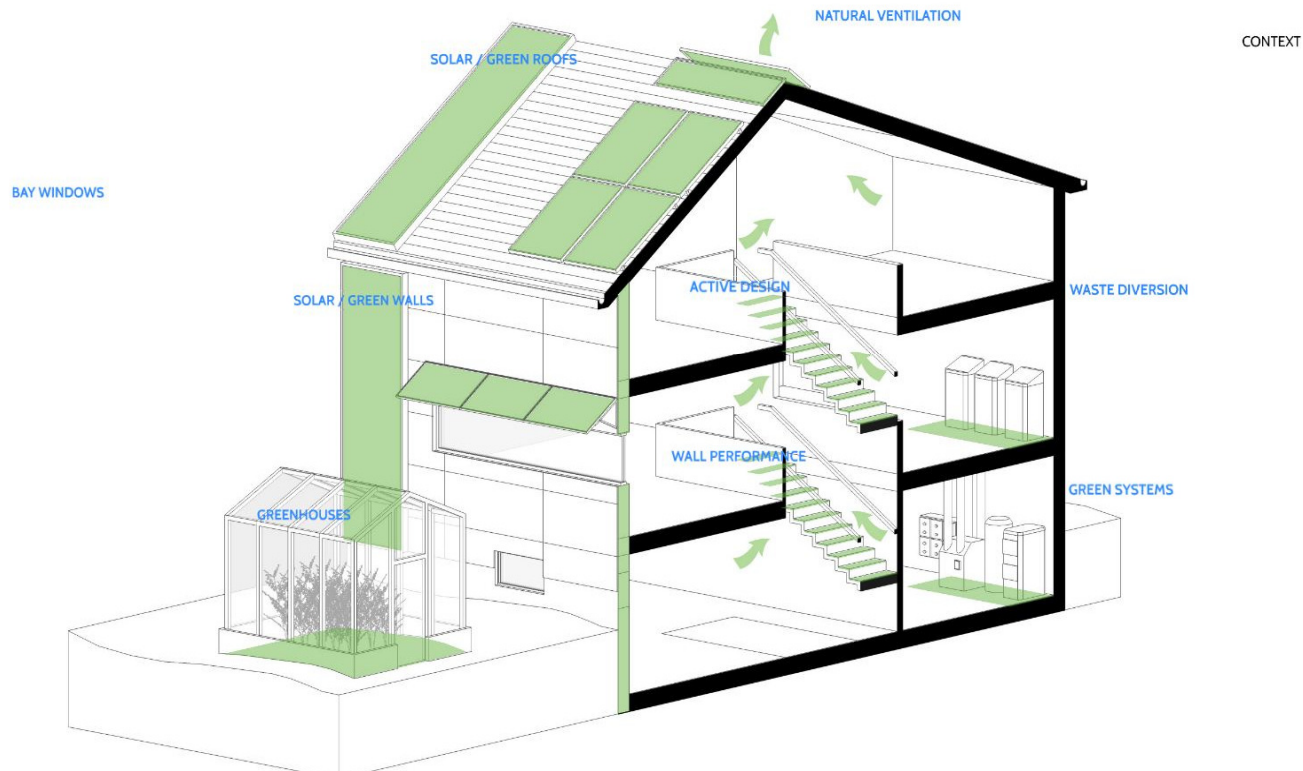
**COMPLETE IF APPLICABLE**

Rezoning, and/or DP Commitment  
Required Performance Metric and Rating:  
\_\_\_\_\_

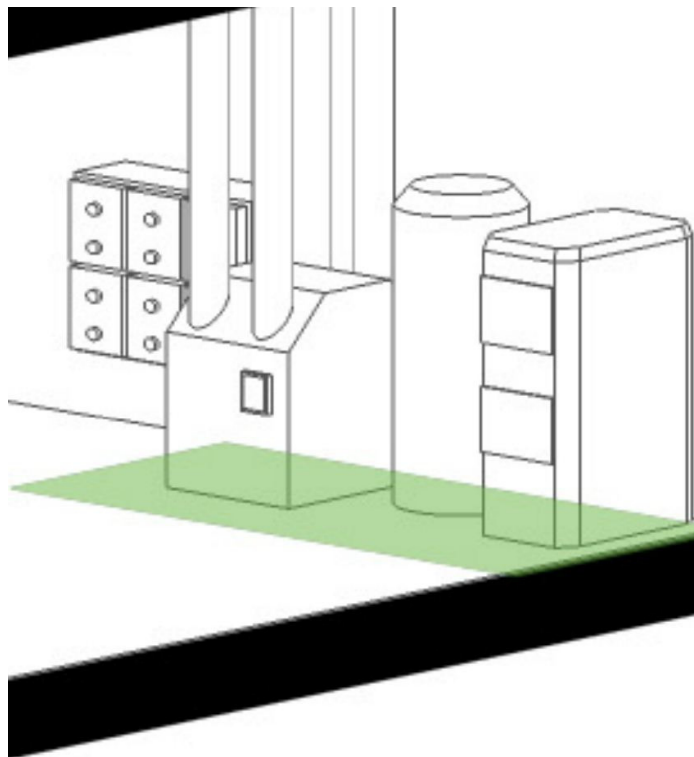
## How is the City Helping Me?



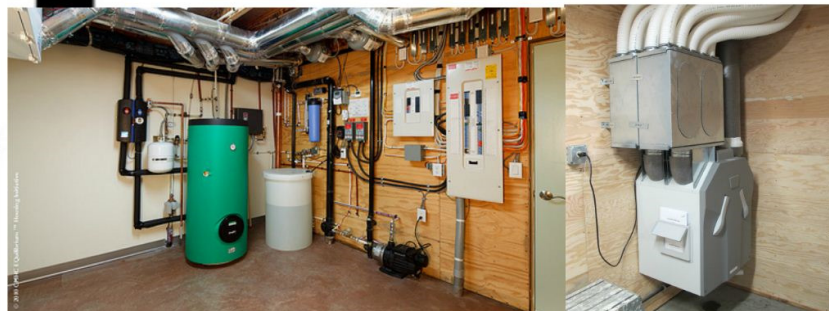
# Barrier Removal: Greening the CNV Zoning Bylaw



# Green Building Zoning Amendments (2014)



## GREEN SYSTEMS



### CHANGE

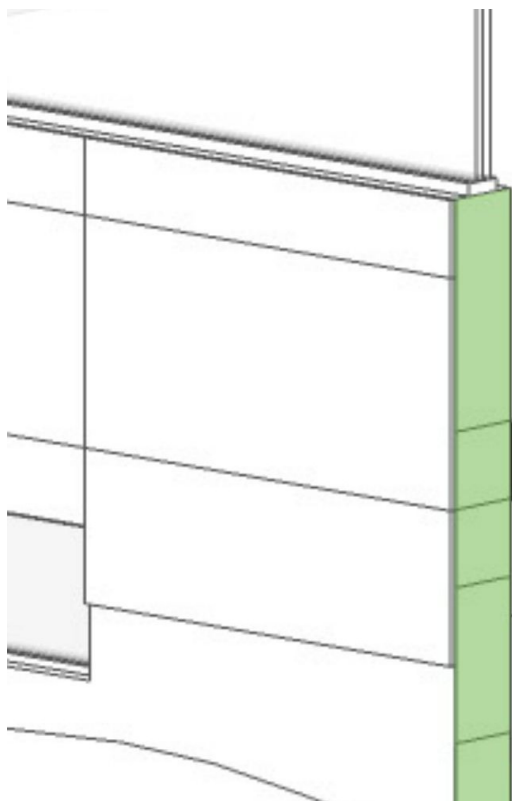
A floor area **exclusion** for **Green Building Systems**, up to a maximum of 100 sq.ft. per building and 15 sq.ft. per dwelling.

### RATIONALE

To incentivize **sufficiently-sized** and **accessible mechanical rooms** and **sustainable technology**.

- Cellars in principal buildings are already excluded for approximately 97% of new construction
- Exclusions for Solar Collectors, heat pump systems, waste heat recovery systems, biomass systems, rainwater and grey water equipment

# Green Building Zoning Amendments (2014)



## WALL PERFORMANCE



### CHANGE

A floor area **exclusion** for **wall thicknesses** in excess of 6.5 inches if used exclusively for the provision of **insulating materials**.

### RATIONALE

This amendment is to **remove** an existing regulatory **barrier** to **wall assemblies** that exceed the minimum insulation required by code.

- This exclusion adds to the existing rainscreening wall assembly exclusion
- Higher levels of insulation are needed for the Passive House standard.



# Green Building Zoning Amendments (2014)

## SOLAR / GREEN ROOFS



### CHANGE

**Solar collector height exemption** (4 feet for Ground-oriented Residential and 6 feet for all other Zones) and **Green Roof height exemption** (1.5 feet for Ground-oriented Residential and up to 3.5 feet for all other Zones).

### RATIONALE

To remove a barrier to green building designs that **provide insulation, harness the sun's energy**, and **storm-water mitigation**.

- Chimneys, antennae, church spires, flagpoles, elevator shafts, already exempt
- Building permit to address interconnection between systems

# Green Building Zoning Amendments (2014)

## SOLAR / GREEN WALLS



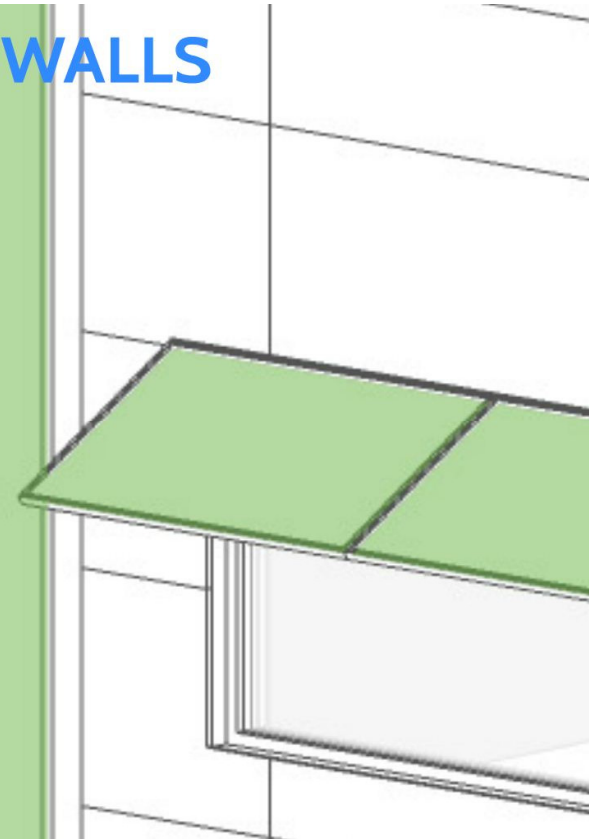
### CHANGE

Include **Solar Shading**, **Solar Panels**, and **Green Walls** into allowable **setback projections**.

### RATIONALE

To remove a barrier to green building designs that provide **sun control**, **harness** the **sun's energy**, and provide **pleasing street-scapes**.

- Similar provisions have been adopted by the City of Vancouver since 2008.
- BC Building Code spatial separation requirements will remain in place
- Building permit requirements will address interconnection between systems





## Tips 'n Tricks / Common Challenges

- Design Stage
  - Involve an Energy Advisor early on
  - Design once... revisions will be challenging
  - Pay attention to:
    - Orientation (location of glazing)
    - Exterior wall/wall, wall/roof, roof/roof intersections (bump-outs, window boxes, butterfly roofs, etc.)

## Tips 'n Tricks / Common Challenges

- Construction Stage
  - Construct according to plan
  - Coordinate with all Trades / Sub-Trades
  - Pre-Drywall Blower Door Test
  - Get the ventilation system right

# Inter-Municipal Alignments



	Current	July 1 <sup>st</sup> , 2018 (*anticipated)
CNV	EnerGuide 80	ESC Step 3
DNV	Built Green Gold + EnerGuide 80-86	*ESC Step 3
DWV	---	*ESC Step 3

# A Final Word on Resources

## LOCAL GOVERNMENTS

NGOs



TRADES &  
PROFESSIONALS

PROVINCIAL  
GOVERNMENT

BUILDERS &  
DEVELOPERS

## UTILITIES



- Website: [energystepcode.ca](http://energystepcode.ca)
- Best Practice Guide (print and e-version)
- On-Demand Training Videos
- Seminars
  - BC Housing
  - CHBA-BC
  - GVHBA

city  
of north  
vancouver





Thank you.



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