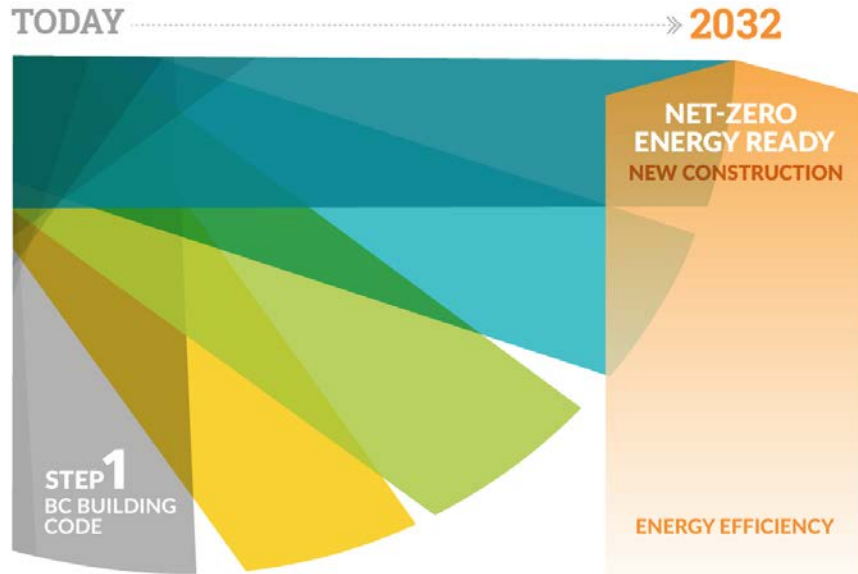


# Builder Breakfast

## Step Code in Surrey & Working with Energy Advisors



### Today's Agenda

**7:30 - 8:00**

Registration, Get Breakfast,  
and Get Settled

**8:00 - 9:00**

Step Code in Surrey,  
Maxwell Sykes, City of Surrey

**9:00 - 9:50**

Working with Energy Advisors,  
Einar Halbig, E3 EcoGroup

**9:50 - 10:15**

Energy Advisor Meet & Greet  
and Available for Questions



ENERGY  
**STEP CODE**  
BUILDING BEYOND THE STANDARD

# Builder Breakfast

## Step Code in Surrey & Working with Energy Advisors



Maxwell Sykes  
Climate and Energy Manager  
Apr 2, 2019



# Today's Agenda

- 7:30 - 8:00**      Registration, Get Breakfast,  
and Get Settled
- 8:00 - 9:00**      Step Code in Surrey,  
Maxwell Sykes, City of Surrey
- 9:00 - 9:50**      Working with Energy Advisors,  
Einar Halbig, E3 EcoGroup
- 9:50 - 10:15**      Energy Advisor Meet & Greet  
and Available for Questions

# Next Builder Breakfast

## Building Step 1 for Part 9 Homes & Succeeding with Airtightness with the Township of Langley

Thurs Apr 25, 2019

Langley Events Centre

7888 200 St, Langley

[www.surrey.ca/stepcode](http://www.surrey.ca/stepcode)

Township of  
Langley



Est. 1873



# Today's Agenda

- 7:30 - 8:00** Registration, Get Breakfast, and Get Settled
- 8:00 - 9:00** Step Code in Surrey, Maxwell Sykes, City of Surrey
- 9:00 - 9:50** Working with Energy Advisors, Einar Halbig, E3 EcoGroup
- 9:50 - 10:15** Energy Advisor Meet & Greet and Available for Questions

Step Code  
Overview

Surrey  
Requirements

Key Resources and  
Supports

From Application  
to Occupancy

# The BC Energy Step Code

An ongoing multi-year collaboration

Shift to performance-based requirements

A series of Steps to net zero ready

Start of a larger transition



# The BC Energy Step Code

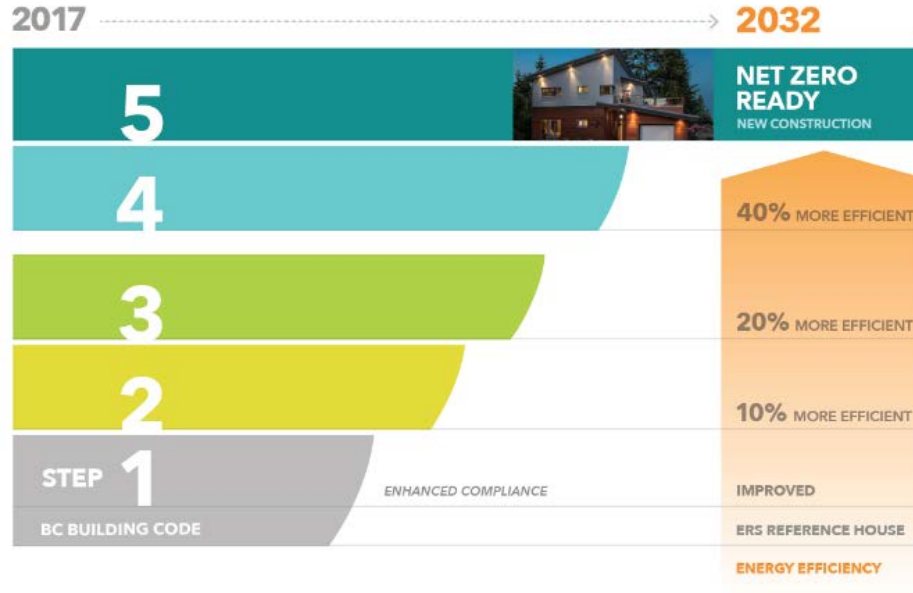
An ongoing multi-year collaboration

Shift to **performance-based** requirements

A series of Steps to net zero ready

Start of a larger transition

## PATHWAY TO 2032: PART 9 (HOMES)





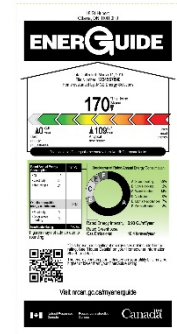
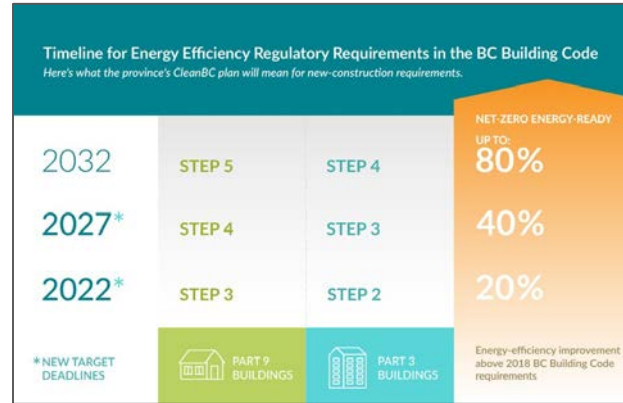
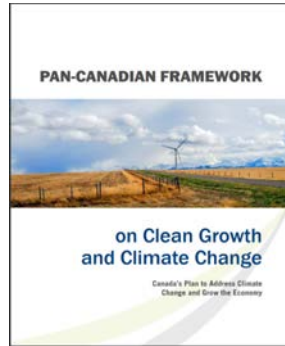
# The BC Energy Step Code

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Shift to performance-based requirements

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Start of a larger transition





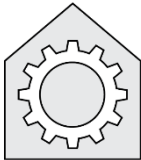




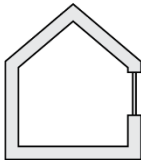
# From Prescriptive to Performance



**Airtight building**



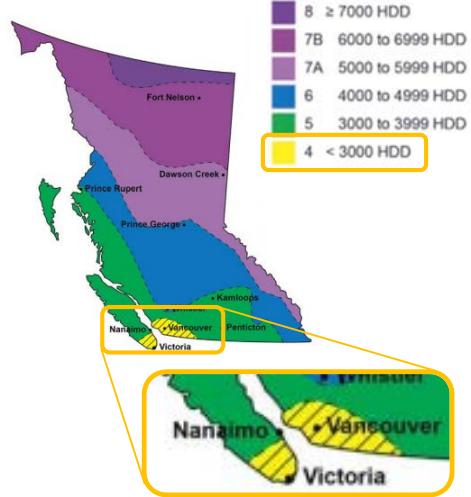
**Efficient mechanical equipment**



**Insulated envelope**



- |                        |                       |
|------------------------|-----------------------|
| Single-family homes    | Low-rise MURBs        |
| Duplexes               | High-rise MURBs       |
| Townhomes              | Hotels and motels     |
| Smaller MURBs          | Larger retail, office |
| Smaller retail, office |                       |

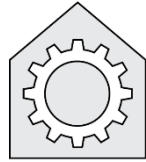


# From Prescriptive to Performance

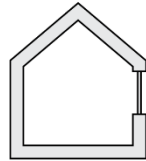
## Energy modelling at design stage



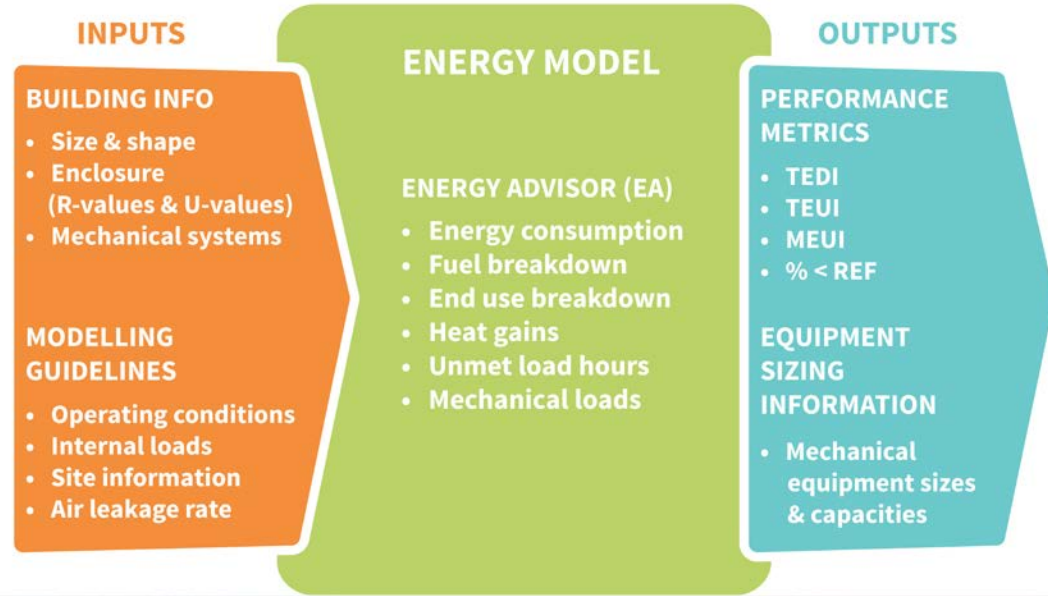
**Airtight  
building**



**Efficient  
mechanical  
equipment**



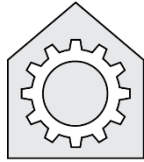
**Insulated  
envelope**



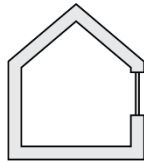
# From Prescriptive to Performance



**Airtight  
building**



**Efficient  
mechanical  
equipment**



**Insulated  
envelope**



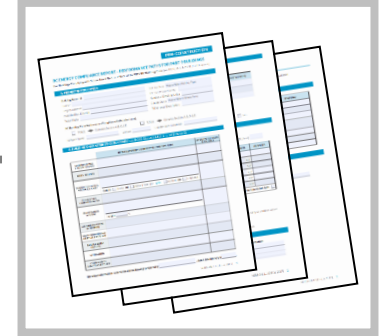
Airtightness  
testing and EA/RP  
walkthrough

+






Model home  
design with  
assumed and  
actual airtightness

+



Standard forms with  
design and  
performance data

## Part 9 Residential Requirements Climate Zone 4

Step	Building Energy Modelling	 <b>Airtightness</b>		 <b>Equipment and Systems</b>			 <b>Building Envelope</b>
		Blower door test	Air changes per hour <i>ACH<sub>50</sub></i>	% better than Reference House <i>ERS v15</i>	OR	Mechanical energy use intensity <i>MEUI, kWh/m<sup>2</sup>·year</i>	Thermal energy demand intensity <i>TEDI, kWh/m<sup>2</sup>·year</i>
<b>1</b>	✓	✓	report score	0%	OR	conform to Subsection 9.36.5	
<b>2</b>	✓	✓	≤ 3.0	10%	OR	≤ 60	≤ 35
<b>3</b>	✓	✓	≤ 2.5	20%	OR	≤ 50	≤ 30
<b>4</b>	✓	✓	≤ 1.5	40%	OR	≤ 40	≤ 20
<b>5</b>	✓	✓	≤ 1.0	≤ 25			≤ 15




MEUI can be higher for smaller buildings or buildings with more cooling




# Part 3 Residential Requirements

## Climate Zone 4

(not Hotels and Motels)

Step	Building Energy Modelling	 <b>Airtightness</b>		 <b>Equipment and Systems</b>	 <b>Building Envelope</b>
		Airtightness test	Air leakage rate $L/(s \cdot m^2)$	Total energy use intensity $TEUI, kWh/m^2 \cdot year$	Thermal energy demand intensity $TEDI, kWh/m^2 \cdot year$
<b>1</b>	✓	✓	use to report metrics	conform to Part 8 of the NECB	
<b>2</b>	✓	✓	use in final model to determine compliance	$\leq 130$	$\leq 45$
<b>3</b>	✓	✓		$\leq 120$	$\leq 30$
<b>4</b>	✓	✓		$\leq 100$	$\leq 15$

# Surrey's Requirements

	Surrey Building Bylaw		Estimated future reqs		Can Complete Forms	Required for Occupancy
	Apr 1, 2019	Jan 1, 2021	2023/24	2025/26		
Single-Family and Duplex	Step 1	Step 3	Step 4	Step 5	EA or RP	 SFDs now others soon
Townhouses and Small MURBs	Step 1	Step 3	Step 4	Step 5	RP (can work with EA)	
MURBs and Hotels/Motels	Step 3, or Step 2 with <i>Low-Carbon Energy System Pathway</i>		Step 4, or Step 3 with <i>Low-Carbon Energy System Pathway</i>			
Commercial Office	Step 2		Step 3			
Retail and Mercantile	Step 2		Step 3			

EA = Energy Advisor  
 RP = Registered Professional

  
 for eligible buildings

# Surrey's Requirements

## Surrey Building Bylaw

Apr 1, 2019   Jan 1, 2021

Single-Family and Duplex	Step 1	Step 3
Townhouses and Small MURBs	Step 1	Step 3
MURBs and Hotels/Motels	Step 3, or Step 2 with <i>Low-Carbon Energy System Pathway</i>	
Commercial Office	Step 2	
Retail and Mercantile	Step 2	

- 21 months at BCBC-equivalent
- Access airtightness resources
- Learn from Guides and Building Pathfinder



SFDs now  
others soon



for eligible buildings

# Surrey's Requirements

## Surrey Building Bylaw Apr 1, 2019 Jan 1, 2021

Single-Family and Duplex	Step 1	Step 3
Townhouses and Small MURBs	Step 1	Step 3
MURBs and Hotels/Motels	Step 3, or Step 2 with <i>Low-Carbon Energy System Pathway</i>	
Commercial Office	Step 2	
Retail and Mercantile	Step 2	

- Learn from Guides and Building Pathfinder
- Comply with lower Step using LCES Pathway
  - ✓ Eligible system type
  - ✓  $\text{GHGI} \leq 6\text{kgCO}_2\text{e/m}^2\text{a}$
  - ✓ Part of DP application



SFDs now  
others soon



for eligible buildings

# Surrey's Requirements: Details in Bulletins

[www.surrey.ca/stepcode](http://www.surrey.ca/stepcode) ← “Changes to the Building Process”

## Residential Building Permits

Read the [BCBC 2018 Bulletin](#) regarding the upcoming changes to the Building Code and the [Energy Step Code Bulletin](#) regarding the upcoming implementation of the B

## Commercial Building Permits

The British Columbia Energy Step Code for applicable [Part 3](#) and [Part 9](#)



Subscribe to Step Code Alerts

BCBC Bulletins at <https://energystepcode.ca/>

**CITY OF SURREY PLANNING AND DEVELOPMENT** 13400 104 Avenue Surrey, BC V2T 1V9 604.591.4411 **INFORMATION**

March 20, 2019 BUILDING DIVISION

### BC Energy Step Code Requirements: Part 3 Buildings

**DISCLAIMER:** of this Bulletin will be notified

**Purpose**  
On July 23, 2018, the City of Surrey will begin construction of buildings that are subject to the BC Energy Step Code. The City of Surrey encourages professionals to become familiar with the requirements of the BC Energy Step Code.

- Residential
- Commercial
- Industrial

**Implement Effective:** A demonstration project will be completed by the City of Surrey to encourage professionals to become familiar with the requirements of the BC Energy Step Code.

**Part 3 Buildings**

**DISCLAIMER:** of this Bulletin will be notified

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**Implement Effective:** A demonstration project will be completed by the City of Surrey to encourage professionals to become familiar with the requirements of the BC Energy Step Code.

**Part 9 Buildings**

**DISCLAIMER:** of this Bulletin will be notified

**Purpose and Background:**  
On July 23, 2018, the City of Surrey Council approved Corporate Report R179<sup>1</sup> that requires new buildings to be constructed to the energy efficiency requirements set under the BC Energy Step Code. This bulletin is provided to inform applicants and designers of new single- and two-family dwellings about the City of Surrey's BC Energy Step Code and building energy labelling requirements.

- Refer to the **Additional Information** section at the bottom of this bulletin for additional Step Code information and resources.
- Refer to **Appendix 1** for details on the City's building energy labelling requirements.
- BC Energy Step Code and associated requirements for other building types can be found in similar City bulletins for **Part 9 Multi-Family Residential Buildings** and **Part 3 Buildings**.

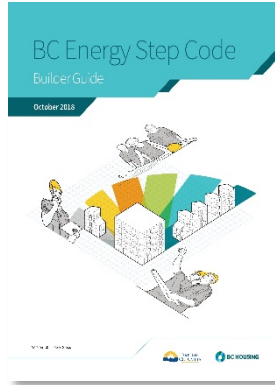
**Implementation:**  
Effective April 1, 2019, Step 1 of the BC Energy Step Code will apply to all new building permit applications.

<sup>1</sup> The July 20, 2018, Surrey City Council approved Corporate Report R179<sup>1</sup> that requires new buildings to be constructed to the energy efficiency requirements set under the BC Energy Step Code. This bulletin is provided to inform applicants and designers of new single- and two-family dwellings about the City of Surrey's BC Energy Step Code and building energy labelling requirements.  
<https://www.surrey.ca/stepcode>

www.surrey.ca

# Resources and Supports

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



## Builder Guide

Key strategies builders can use for houses and low-rise (Part 3 and Part 9) wood-frame residential buildings.



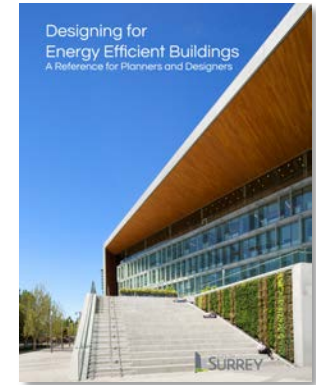
## Design Guide

Key strategies to for mid- and high-rise (Part 3) wood-frame and non-combustible residential buildings



## Low Thermal Demand Guide

How large buildings can meet Passive House and other high levels of performance.



## Surrey's Designing for Energy Efficient Buildings

For Planners and Designers, mostly Part 3.



# Resources and Supports

From Case Study Series 1:

<https://energystepcode.ca/case-studies/>

## The Six Strategies that cost-effectively boost performance

### 1. BOOST INSULATION

To reduce heat loss, increase insulation in walls, floors, roof, and foundation.



### 2. VENTILATE SMARTLY

Bring plenty of fresh air into the home and recover heat from the exhaust air leaving the building.



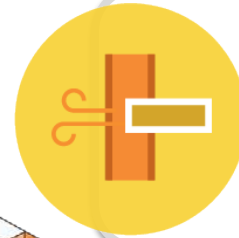
### 3. MIND YOUR MACHINES

Specify efficient appliances, and ensure your heating system will meet – but not exceed – the home's needs.



### 4. BAN BRIDGES

A break in your insulation acts like a bridge that carries heat straight out of the house. Take care with corners, junctions, gaps and studs!



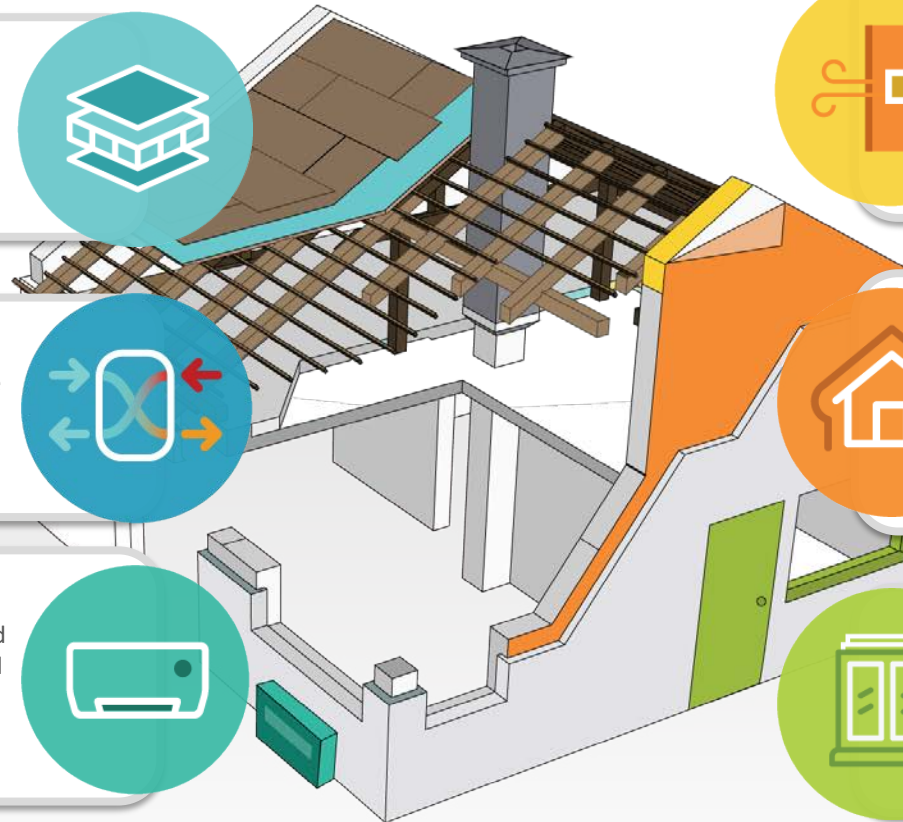
### 5. SEAL IT UP

Air leaks are heat leaks. Wrap the home tightly, taking care to seal around ducts, pipes, fixtures, and wires that pass through walls, ceilings, and roof.

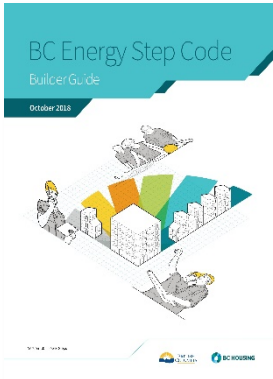


### 6. THINK ABOUT DOORS & WINDOWS

Carefully consider their energy performance, size, and location.



# Resources and Supports



### Above-Grade Walls

This graphic provides information about how different above-grade wall assemblies can be used to address various thermal performance goals. The graphic shows the relative thermal performance of various wall types. Refer to the Quality Checklist for more information. See also the document below: [Quality Checklist for Residential Construction](#). Click on the document below for more information. See also the document below: [Quality Checklist for Residential Construction](#). Click on the document below for more information. See also the document below: [Quality Checklist for Residential Construction](#).

### Envelope Performance Ranges for Part 3 Buildings in Climate Zone 4

This graphic shows envelope performance ranges for Part 3 buildings in Climate Zone 4. The ranges are published in the Building Code. Refer to the Quality Checklist for more information. See also the document below: [Quality Checklist for Residential Construction](#). Click on the document below for more information. See also the document below: [Quality Checklist for Residential Construction](#).

### Mechanical Examples for Part 3 Single Family Homes in Climate Zone 4

This graphic shows the typical breakdown of energy of common mechanical systems for Part 3 single family homes in Climate Zone 4. The information was generated based on modeling each system from the British Columbia, updated from the previous version of the code. This information was generated based on modeling each system from the British Columbia, updated from the previous version of the code. This information was generated based on modeling each system from the British Columbia, updated from the previous version of the code.

System	Gas furnace 90% AFUE	Gas furnace 98% AFUE	Electric baseboard	Air source heat pump
Heating	100%	100%	100%	100%
Cooling	100%	100%	100%	100%
Water heating	100%	100%	100%	100%

### Thermal Comfort, Combustion and Hygiene

Building heat energy use is a primary function of the building envelope. The envelope must be designed to provide thermal comfort and hygiene. The envelope must be designed to provide thermal comfort and hygiene. The envelope must be designed to provide thermal comfort and hygiene.

### 1. Overheating

Overheating occurs when a building envelope allows too much heat energy to enter the building. Overheating occurs when a building envelope allows too much heat energy to enter the building. Overheating occurs when a building envelope allows too much heat energy to enter the building.

### 2. Humidity

Humidity occurs when a building envelope allows too much moisture to enter the building. Humidity occurs when a building envelope allows too much moisture to enter the building. Humidity occurs when a building envelope allows too much moisture to enter the building.

### 3. Combustion

Combustion occurs when a building envelope allows too much combustion products to enter the building. Combustion occurs when a building envelope allows too much combustion products to enter the building. Combustion occurs when a building envelope allows too much combustion products to enter the building.

### 4. Airborne Particles

Airborne particles occur when a building envelope allows too much particles to enter the building. Airborne particles occur when a building envelope allows too much particles to enter the building. Airborne particles occur when a building envelope allows too much particles to enter the building.

### Above-Grade Wall Exterior Air Barrier Systems

Exterior air barrier systems are used to prevent air from entering the building. Exterior air barrier systems are used to prevent air from entering the building. Exterior air barrier systems are used to prevent air from entering the building.

### Sheathing Membrane Approach

Sheathing membrane approach is used to prevent air from entering the building. Sheathing membrane approach is used to prevent air from entering the building. Sheathing membrane approach is used to prevent air from entering the building.

### Sealed Exterior Sheathing

Sealed exterior sheathing is used to prevent air from entering the building. Sealed exterior sheathing is used to prevent air from entering the building. Sealed exterior sheathing is used to prevent air from entering the building.

### Liquid Applied Membrane

Liquid applied membrane is used to prevent air from entering the building. Liquid applied membrane is used to prevent air from entering the building. Liquid applied membrane is used to prevent air from entering the building.

### Air Barrier Materials

Air barrier materials are used to prevent air from entering the building. Air barrier materials are used to prevent air from entering the building. Air barrier materials are used to prevent air from entering the building.

### Air Barrier and Ventilation Systems

Air barrier and ventilation systems are used to prevent air from entering the building. Air barrier and ventilation systems are used to prevent air from entering the building. Air barrier and ventilation systems are used to prevent air from entering the building.

### Rate of Ventilation

Rate of ventilation is used to prevent air from entering the building. Rate of ventilation is used to prevent air from entering the building. Rate of ventilation is used to prevent air from entering the building.

### Solar Control

Solar control is used to prevent air from entering the building. Solar control is used to prevent air from entering the building. Solar control is used to prevent air from entering the building.

### Industry Best Practice

Industry best practice is used to prevent air from entering the building. Industry best practice is used to prevent air from entering the building. Industry best practice is used to prevent air from entering the building.

### Quality of Installation

Quality of installation is used to prevent air from entering the building. Quality of installation is used to prevent air from entering the building. Quality of installation is used to prevent air from entering the building.

### Installation and Commissioning

Installation and commissioning is used to prevent air from entering the building. Installation and commissioning is used to prevent air from entering the building. Installation and commissioning is used to prevent air from entering the building.



**Low Performance Building**  
No solar control. Potentially over-heated in summer; significant mechanical cooling may be required.



**High-Performance Building**  
Solar control. Reduces cooling requirement and reduces risk of overheating.

## Builder Guide

### Key strategies builders can use for houses and low-rise (Part 3 and Part 9) wood-frame residential buildings.

#### 1. Mechanical Energy Efficiency (MEEC)

MEEC is the ratio of energy used for heating and cooling to the energy available from the fuel source. MEEC is the ratio of energy used for heating and cooling to the energy available from the fuel source. MEEC is the ratio of energy used for heating and cooling to the energy available from the fuel source.

#### 2. Part 3 Buildings and Building Details

Part 3 buildings are those that are less than 10 stories high. Part 3 buildings are those that are less than 10 stories high. Part 3 buildings are those that are less than 10 stories high.

#### 3. Building Envelope Details

Building envelope details are used to prevent air from entering the building. Building envelope details are used to prevent air from entering the building. Building envelope details are used to prevent air from entering the building.

#### 4. Building Envelope and Air Barrier

Building envelope and air barrier are used to prevent air from entering the building. Building envelope and air barrier are used to prevent air from entering the building. Building envelope and air barrier are used to prevent air from entering the building.

#### 5. Solar Control

Solar control is used to prevent air from entering the building. Solar control is used to prevent air from entering the building. Solar control is used to prevent air from entering the building.

#### 6. Industry Best Practice

Industry best practice is used to prevent air from entering the building. Industry best practice is used to prevent air from entering the building. Industry best practice is used to prevent air from entering the building.

#### 7. Quality of Installation

Quality of installation is used to prevent air from entering the building. Quality of installation is used to prevent air from entering the building. Quality of installation is used to prevent air from entering the building.

#### 8. Installation and Commissioning

Installation and commissioning is used to prevent air from entering the building. Installation and commissioning is used to prevent air from entering the building. Installation and commissioning is used to prevent air from entering the building.



# Design Guide

## Key strategies to for mid- and high-rise (Part 3) wood-frame and non-combustible residential buildings

### 03.3 Achieving the BC Energy Step Code

The strategies presented in this guide represent the lowest cost strategies to achieve Steps 2, 3, and 4 of the BC Energy Step Code in Climate Zone 4, as determined by the 2017 BC Step Code Metrics Study. However, this is only one set of strategies that can be used to achieve the performance targets in the BC Energy Step Code. There are many different possible combinations of measures that can be taken to achieve the same level of performance, depending on the nature and goals of the project. Designers should use energy models to explore the different trade-offs between strategies and identify the appropriate set of architectural, envelope, and mechanical strategies for their project.

This chart presents a summary of the kinds of measures required to meet each step of the BC Energy Step Code.

#### Step 1

Step 1 is often referred to as "enhanced compliance", because it simply requires builders to demonstrate that they have achieved the energy-efficiency requirements of the existing BC Building Code. In a Step 1 project, builders must supply officials with an energy model to demonstrate that their design will meet the code requirements. Upon substantial completion, a builder must also submit the results of an airtightness test. He or she would ideally do so before installing drywall or other interior surfaces, to allow opportunities to address leaks.

#### Step 2

Builders can achieve Step 2 using conventional practices and widely available materials. However, they will need to improve the building's overall airtightness and use additional measures. For example, they should:

- Design for a lower overall window-to-wall ratio (e.g. 40% WWR)
- Require higher building R-values (e.g. minimum effective R-10 for walls and effective R-20 for roofs)
- Improve window performance (e.g. double- and triple-glazed windows with lower U-values)
- Improve heat-recovery efficiency (e.g. 60%)

#### Step 3

To comply with the requirements of Step 3, designers will use many of the Step 2 strategies noted here. However, they will also begin to take a more integrated approach. To reach Step 3, they might also:

- Consider sealing off individual building units and uses from one another to improve airtightness, a practice known as compartmentalization
- Reduce thermal bridging

#### Step 4

Designers wishing to achieve Step 4's more rigorous energy efficiency and airtightness requirements will need to reconsider multiple practices and systems. Although they can achieve this level of performance using wall systems applicable to the Lower Steps, they will want to consider the building envelope first. Designers should look to the strategies we suggest for Step 3 and also:

- Specify very high levels of heat recovery efficiency (e.g. at least 80%)
- Source triple-glazed windows with high performance frames and reduce frame elements
- Eliminate all significant thermal bridges

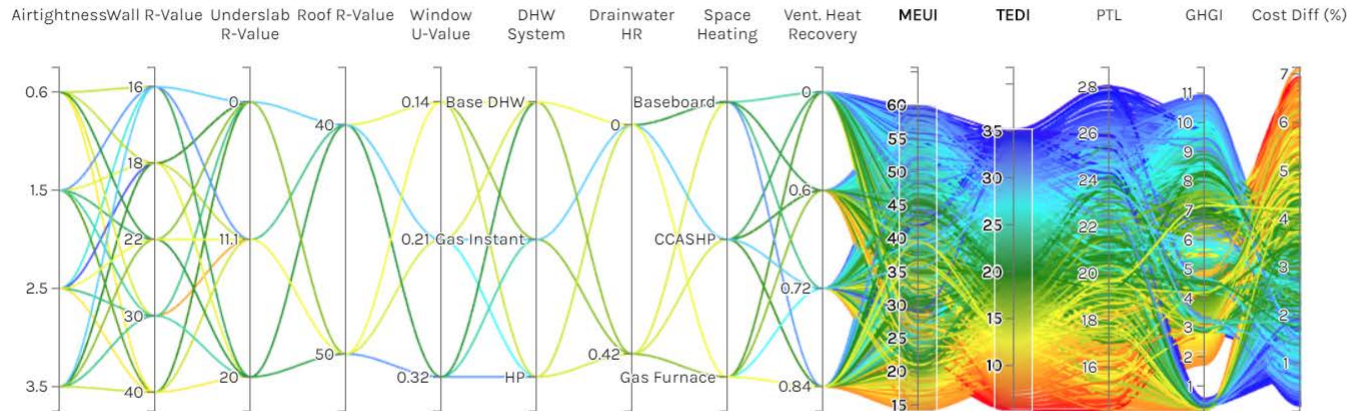
Higher Performance

# Resources and Supports

<http://www.buildingpathfinder.com>



[Launch](#) [Tutorial](#) [About](#) [Contact](#)



Airtightn...	Wall R-Value	Underslab R-Value	Roof R-Value	Window U-Value	DHW System	Drainwat... HR	Space Heating	Vent. Heat Recovery	MEUI	TEDI	PTL	GHGI	Cost Diff (%)
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0	41.32	16.87	21.53	4.47	3.01
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0.6	38.92	14.47	19.73	4.5	3.24
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0.72	38.44	14	19.34	4.5	3.37
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0.84	37.97	13.52	18.96	4.49	3.59
0.6	16	0	40	0.14	Base DHW	0	CCASHP	0	36.09	16.89	21.55	4.45	3.01
0.6	16	0	40	0.14	Base DHW	0	CCASHP	0.6	34.62	14.48	19.77	4.46	3.24
0.6	16	0	40	0.14	Base DHW	0	CCASHP	0.72	34.22	14	19.34	4.45	3.27

**Start Here!**

### Building Info

Climate Region:

Building Type:

### Controls

Colour by Axis:

Colour Scheme:

Font Size:



# Resources and Supports

Airtightness Guidance in BCBC Bulletins at <https://energystepcode.ca/>

## Apr 25 Builder Breakfast

### Building Step 1 for Part 9 Homes & Succeeding with Airtightness

with the Township of Langley

[www.surrey.ca/stepcode](http://www.surrey.ca/stepcode)

Township of  
Langley



Est. 1873



SHOP BARRIERS INSULATION MECHANICAL LOCATIONS WORKSHOPS NETWORK ABOUT US CAREERS SPS BLOG



Step Code Airtightness Training

Learn how to detail an air barrier now and prepare for the BC Energy Step Code airtightness standards with hands-on training held near you.



Mid-Construction Blower Door Test

\$400 Rebate – *more info soon*

# Resources and Supports

**efficiencyBC**

INCENTIVES  
INFORMATION  
SUPPORT

Have questions? Get in touch with an Energy Coach at 1.844.881.9292 or email

**efficiencyBC**

INCENTIVES  
INFORMATION  
SUPPORT

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I am renovating a home

I am building a new home

I am renovating a commercial building

I am building a new commercial building



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**FORTIS BC™**

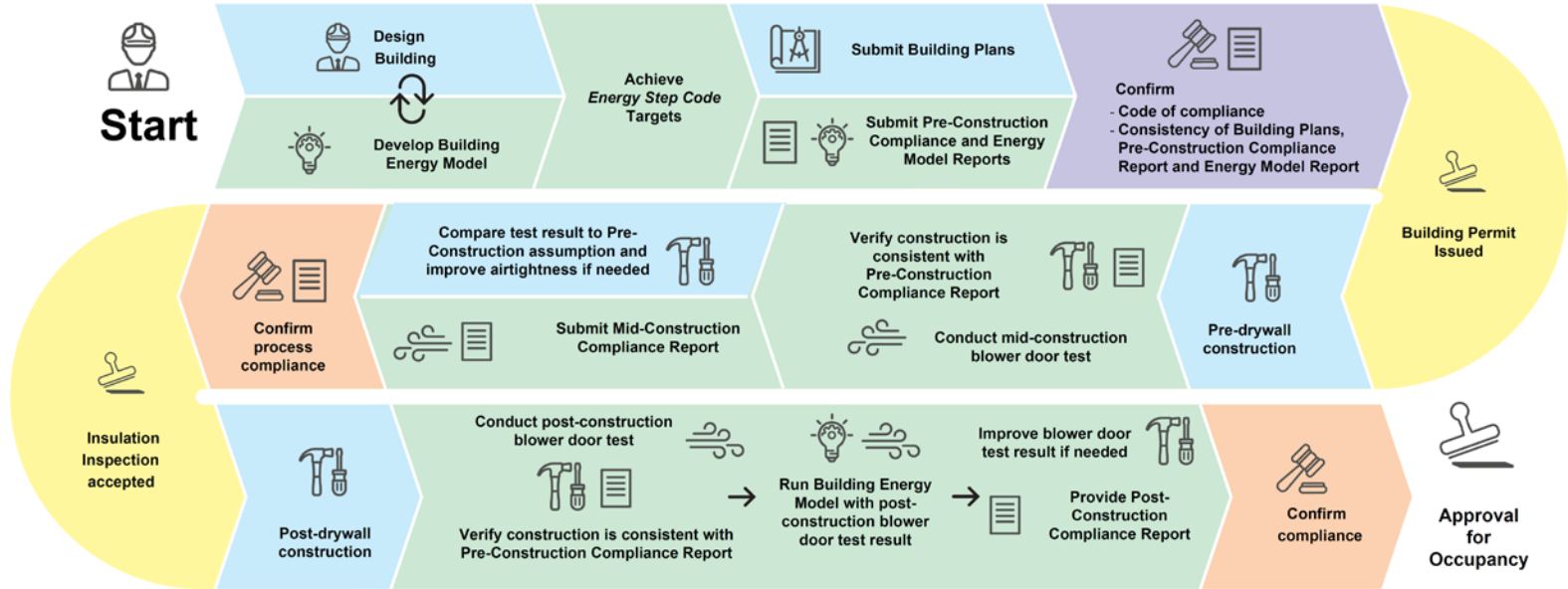
## Available Incentives

BC Energy Step Code	Whole-home performance	
	Rebate	Energy Advisor Rebate*
Step 1	n/a	\$400
Step 2	\$1,000	\$400
Step 3	\$2,000	
Step 4	\$4,000	\$0 or \$400**
Step 5	\$8,000	

<https://efficiencybc.ca/>



# From Application to Occupancy: Part 9 Residential

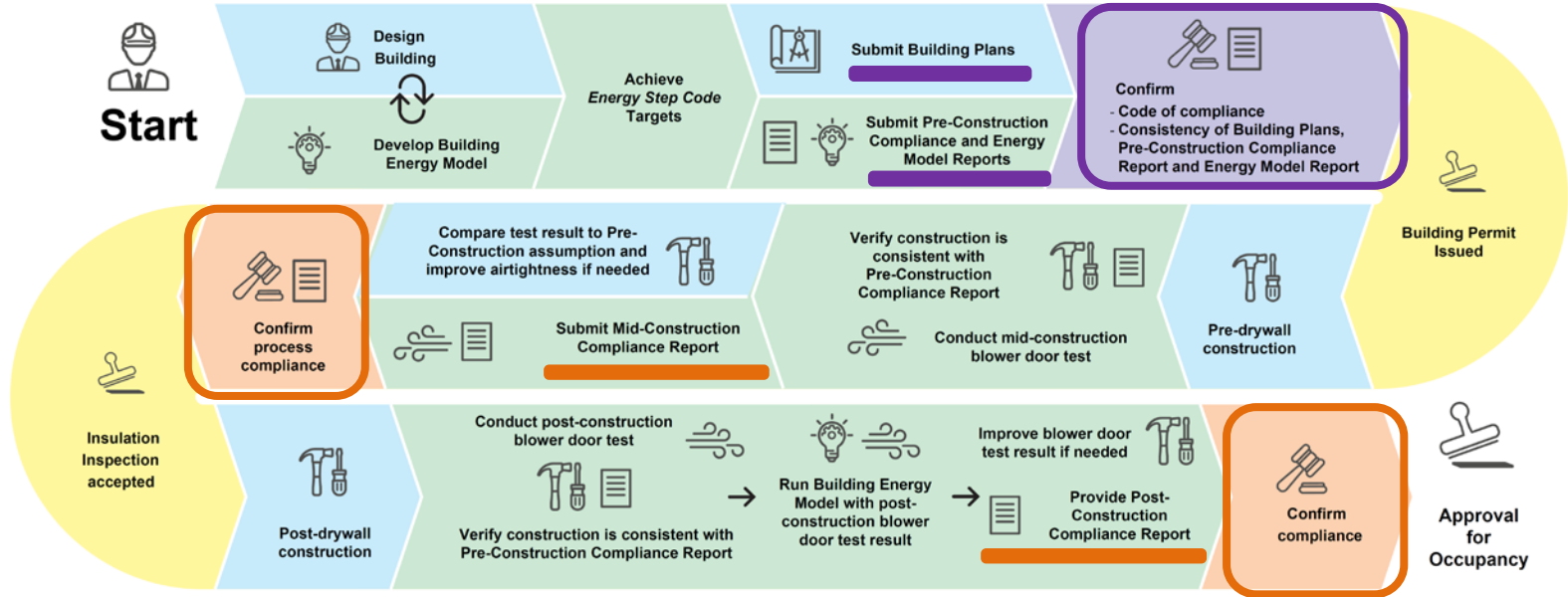


**OWNER**

**SURREY BUILDING APPROVALS**



# From Application to Occupancy: Part 9 Residential

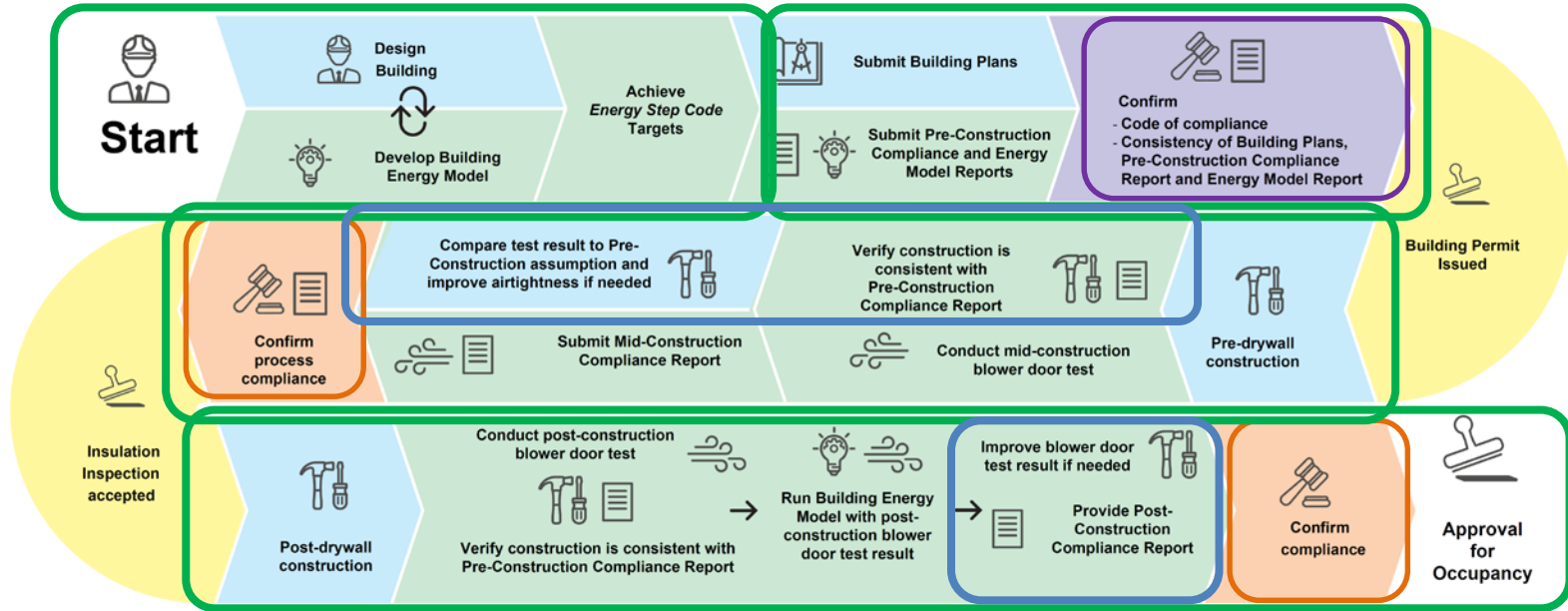


**Regulatory checkpoints:**

**Plan check review**

**Mid-Construction review**  
**Post-construction review**

# From Application to Occupancy: Part 9 Residential

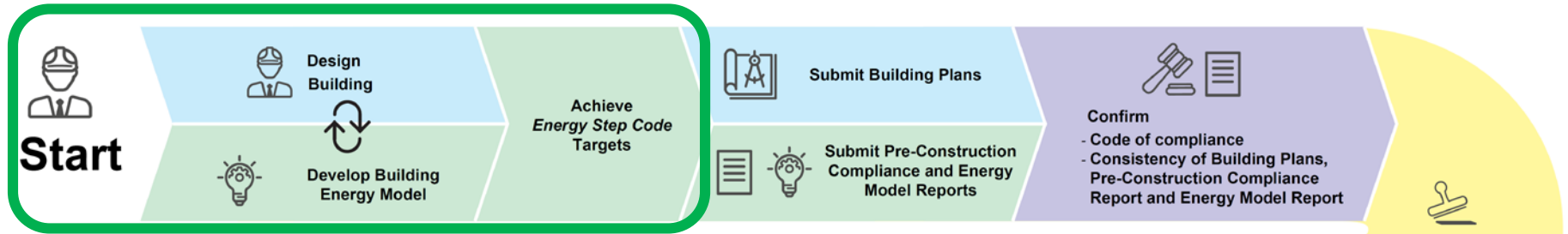


**Energy Advisors play some critical roles  
(or Registered Professionals)**

# From Application to Occupancy: Design and Modelling

## Necessary:

- ✓ **Create energy model(s)** of proposed building(s)
  - Advise about ACH assumption



## Cost-effective:

- Advise re: **air barrier strategy and planning** → *reduce construction costs*
- Provide advice re: **energy efficiency / ECM options** → *reduce capital costs*

**Energy Advisors play some critical roles**  
(or Registered Professionals)

# From Application to Occupancy: Design and Modelling

## What level of airtightness will you assume for your Step 1 building?

### Option 1: Assume a less airtight building

(e.g. more than ~5 ACH for builders new to airtightness requirements)

**COST:** Your building will require more EE upgrades at the design stage to meet the Step 1 target → *increased capital costs*

**BENEFIT:** Reduced risk of not achieving airtightness target, especially if good air barrier installation practices are followed → *avoided process delays and construction costs*

Airtightness Guidance in BCBC Bulletins  
at <https://energystepcode.ca/>

# From Application to Occupancy: Design and Modelling

## What level of airtightness will you assume for your Step 1 building?

### Option 2: Assume you can build an airtight building

(e.g. less than ~5 ACH for builders new to airtightness requirements)

**BENEFIT:** You won't need to design in as many EE upgrades at the design stage to meet the Step 1 target → *reduced capital costs*

**RISK:** Increased risk of not achieving airtightness target, even if good air barrier installation practices are followed → *delayed timelines, increased capital costs, increased construction costs*

If you do not achieve your modelled ACH value, you **will need to improve airtightness** post-construction, and **may need to make design upgrades** prior to occupancy

**Why you should deal with the air barrier at mid-construction**

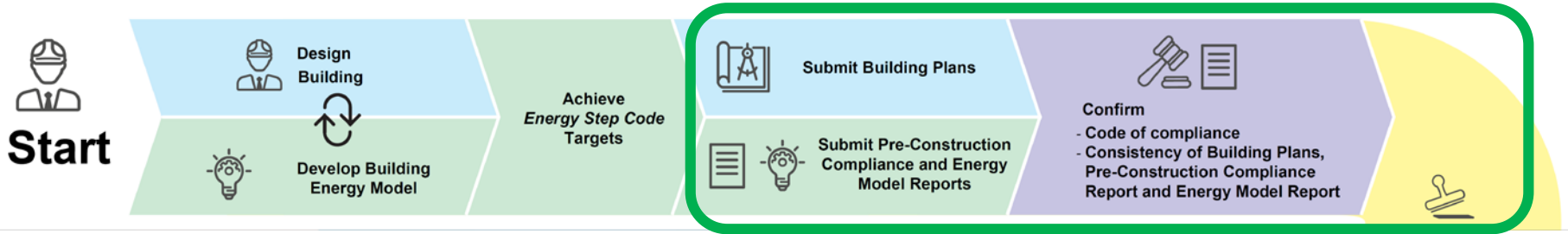




# From Application to Occupancy: BP Application

## Necessary:

- ✓ **Complete** *Pre-Construction Compliance Form*
- ✓ **Submit energy model report** (*must show compliance with Step Code targets*)



## Cost-effective:

- ☐ Ensure **consistency between model, compliance form, and building plans** before submitting the BP Application package  
→ *reduced regulatory timelines = reduced construction costs*

**Energy Advisors play some critical roles**  
**(or Registered Professionals)**

# From Application to Occupancy: BP Application

PROVINCE OF BRITISH COLUMBIA  
REGULATION OF THE MINISTER OF NATURAL GAS AND ENERGY AND THE  
MINISTER RESPONSIBLE FOR HOUSING AND COMMUNITY DEVELOPMENT  
Building Act  
Ministerial Order No. N-11-2011

**9.36.6.3. Compliance Requirements**  
1) Buildings conforming to the requirements of any of Steps 1 to 5 shall be designed and constructed to conform to the applicable energy performance requirements in Tables 9.36.6.3.A. to C.  
Table 9.36.6.3.A.  
Requirements for Buildings Located Where the Degree-Days Below 18°C Value is less than 3000<sup>1</sup> (Exempting Part of Sentence 9.36.6.3.1)

Step	Air-tightness (Air Changes per Hour at 50 Pa Pressure Differential)	Performance Requirement of Building Equipment and Systems	Performance Requirement of Building Envelope
1	N/A	EnerGuide Rating % lower than EnerGuide Reference House; not less than 0% lower energy consumption or confirms to Subsection 9.36.6.	thermal energy demand intensity $\leq 40 \text{ kWh}/(\text{m}^2 \cdot \text{year})$ or peak thermal load $\leq 35 \text{ W}/\text{m}^2$
2	$\leq 3.0$	EnerGuide Rating % lower than EnerGuide Reference House; not less than 10% lower energy consumption or mechanical energy use intensity $\leq 60 \text{ kWh}/(\text{m}^2 \cdot \text{year})$	thermal energy demand intensity $\leq 40 \text{ kWh}/(\text{m}^2 \cdot \text{year})$ or peak thermal load $\leq 30 \text{ W}/\text{m}^2$
3	$\leq 2.5$	EnerGuide Rating % lower than EnerGuide Reference House; not less than 20% lower energy consumption or mechanical energy use intensity $\leq 45 \text{ kWh}/(\text{m}^2 \cdot \text{year})$	thermal energy demand intensity $\leq 25 \text{ kWh}/(\text{m}^2 \cdot \text{year})$ or peak thermal load $\leq 25 \text{ W}/\text{m}^2$
4	$\leq 1.5$	EnerGuide Rating % lower than EnerGuide Reference House; not less than 40% lower energy consumption or mechanical energy use intensity $\leq 35 \text{ kWh}/(\text{m}^2 \cdot \text{year})$	thermal energy demand intensity $\leq 15 \text{ kWh}/(\text{m}^2 \cdot \text{year})$ or peak thermal load $\leq 10 \text{ W}/\text{m}^2$
5	$\leq 1.0$	mechanical energy use intensity $\leq 25 \text{ kWh}/(\text{m}^2 \cdot \text{year})$	thermal energy demand intensity $\leq 10 \text{ kWh}/(\text{m}^2 \cdot \text{year})$ or peak thermal load $\leq 10 \text{ W}/\text{m}^2$

**Notes to Table 9.36.6.3.A.:**  
<sup>1</sup> See Sentence 1.1.3.1(1) of the Division and Table C-2 in Appendix C.



**Building as designed meets Step Code requirements**

**PRE-CONSTRUCTION**  
**BC ENERGY COMPLIANCE REPORT - PERFORMANCE**  
For Buildings Complying with Subsection 9.36.5. or 9.36.6. of the 2012 BC Building Code (BCBC Article 2.2.8.3. of Division C)

**A: PROJECT INFORMATION**

Building Permit #: \_\_\_\_\_  
Builder: \_\_\_\_\_  
Project Address: \_\_\_\_\_  
Municipality / District: \_\_\_\_\_  
Postal Code: \_\_\_\_\_

Building Type: \_\_\_\_\_  
If Other, Please Specify: \_\_\_\_\_  
Number of Dwellings: \_\_\_\_\_  
Climate Zone: Please Specify: \_\_\_\_\_  
PID or Legal Description: \_\_\_\_\_

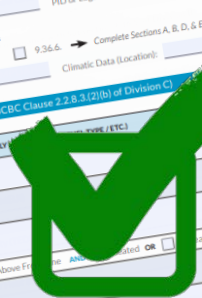
BC Building Code Performance Compliance Path (select one):  
 9.36.5. Complete Sections A, B, C, & E  
 9.36.6. Complete Sections A, B, D, & E  
Version: \_\_\_\_\_  
Climatic Data (Location): \_\_\_\_\_  
Software Name: \_\_\_\_\_

**B: BUILDING CHARACTERISTICS SUMMARY** (see BCBC Clause 2.2.8.3.(2)(b) of Division C)

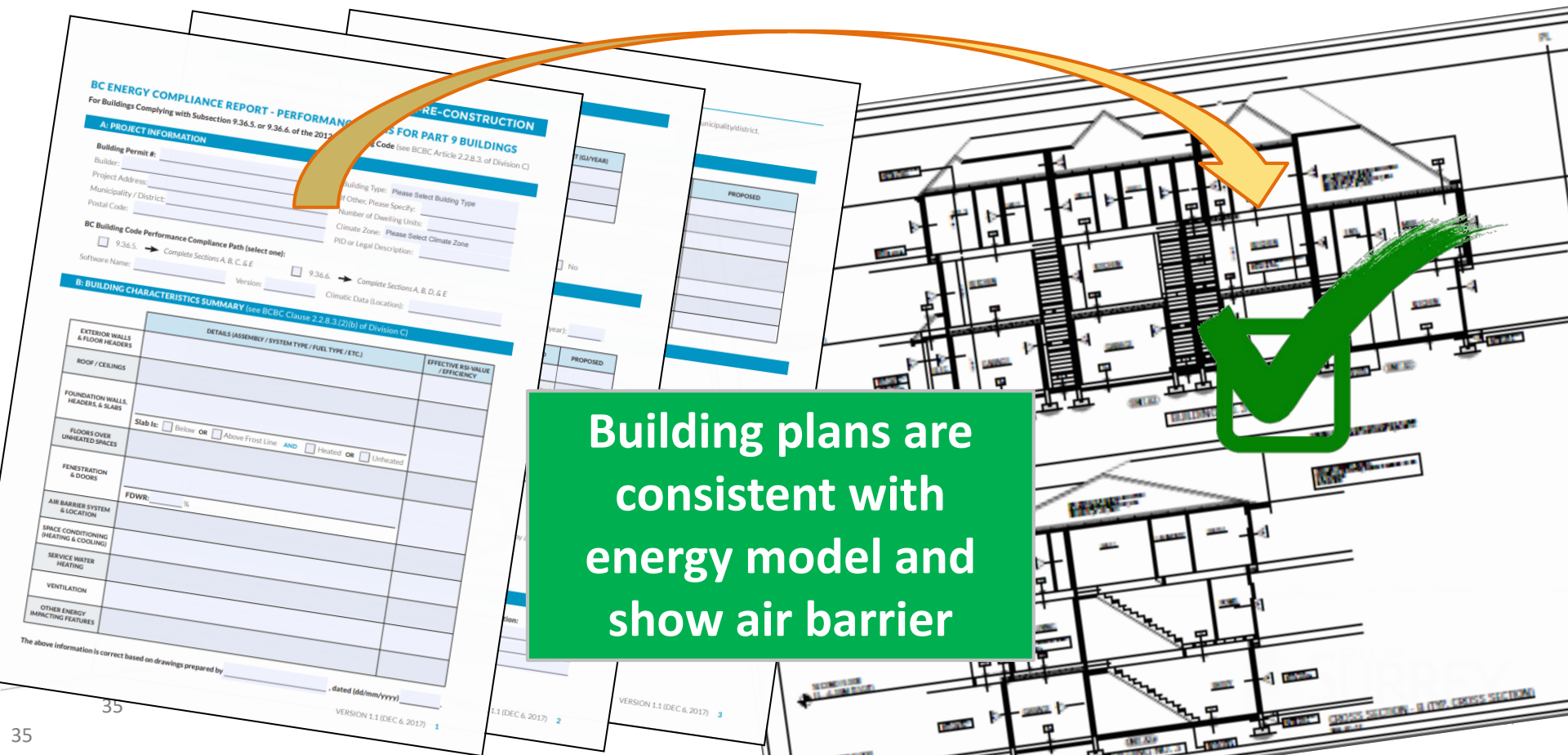
DETAILS (ASSEMBLY NAME AND FINISHES / ETC)	ENERGY EFFICIENCY
EXTERIOR WALLS & FLOOR HEADERS	
ROOF / CEILING	
FOUNDATION WALLS, HEADERS & SLABS	
DOORS	
WINDOWS	
MECHANICAL SYSTEM (HEATING & COOLING)	
PLUMBING & WATER HEATING	
VENTILATION	
OTHER ENERGY-SAVING FEATURES	

The above information is correct based on drawings prepared by \_\_\_\_\_, dated (dd/mm/yyyy)

VERSION 1.1 (DEC 6, 2017)

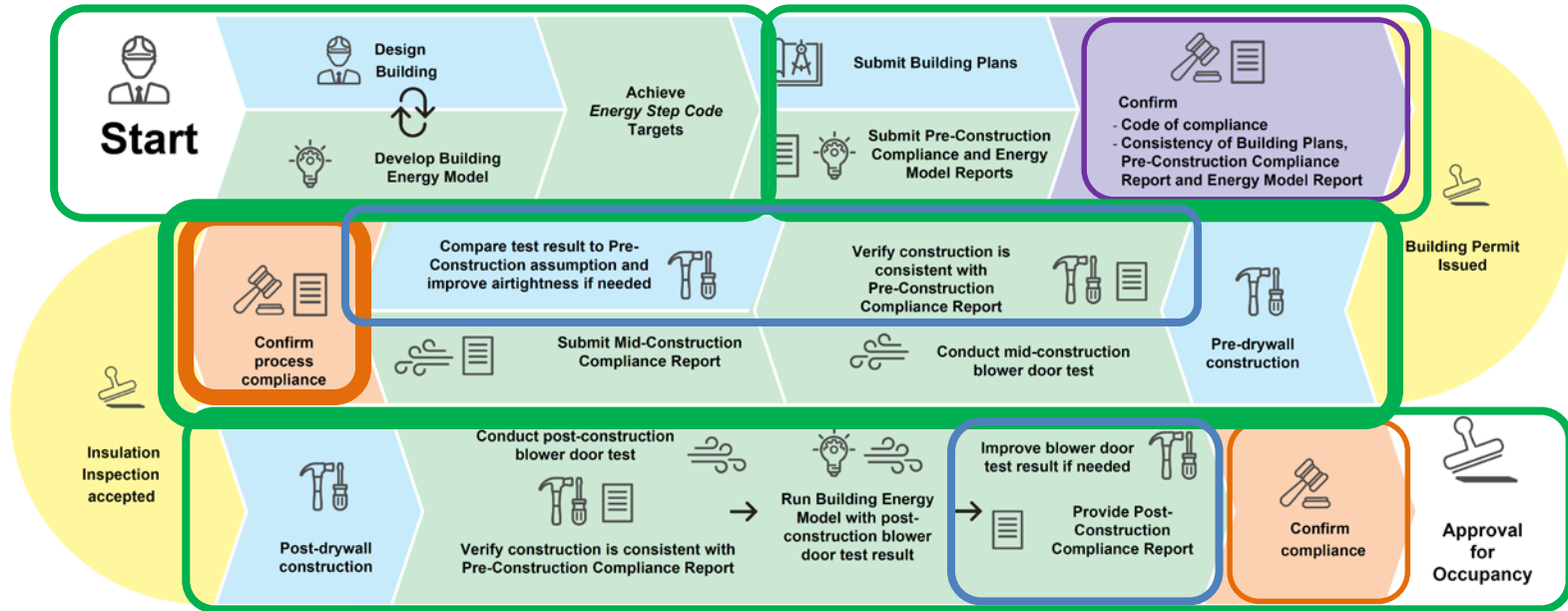


# From Application to Occupancy: BP Application



**Building plans are consistent with energy model and show air barrier**

# From Application to Occupancy: Mid-Construction



**OWNER**

**SURREY BUILDING APPROVALS**

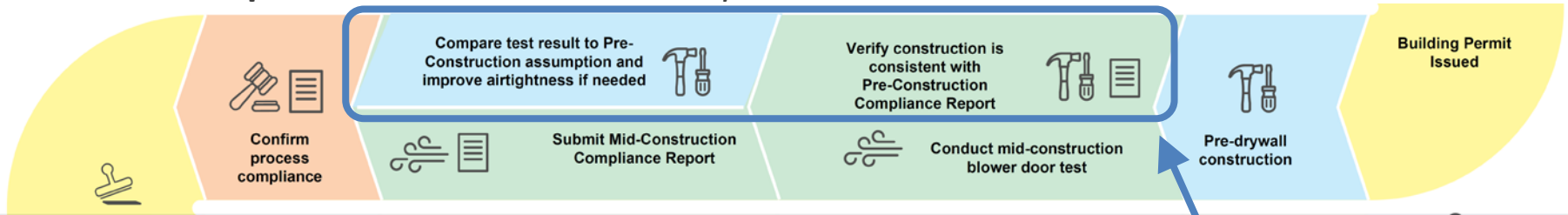


# From Application to Occupancy: Mid-Construction

## Necessary:

- ✓ **Verify proper installation of EE upgrades on-site**
- ✓ **Perform mid-construction **blower door test****
- ✓ **Complete *Mid-Construction Compliance Form***

← Administrative requirements in Surrey



## Cost-effective:

- ❑ Provide on-site **coaching re: air barrier installation**  
→ *reduce delay and construction costs*

Ensure air barrier performing as modelled  
**Improve as needed**

**Energy Advisors play some critical roles**  
(or Registered Professionals)

# From Application to Occupancy: Mid-Construction



**PRE-DRYWALL**

**ENERGY COMPLIANCE REPORT - PERFORMANCE PATHS FOR PART 9 BUILDINGS**  
For Buildings Complying with Subsection 9.36.5. or 9.36.6. of the 2012 BC Building Code (see BCBC Article 2.2.8.3. of Division C)

**A: PROJECT INFORMATION**

Building Permit #: \_\_\_\_\_ Building Type: Please Select Building Type  
Builder: \_\_\_\_\_ If Other, Please Specify: \_\_\_\_\_  
Project Address: \_\_\_\_\_ Number of Dwelling Units: \_\_\_\_\_  
Municipality / District: \_\_\_\_\_ Climate Zone: Please Select Climate Zone  
Postal Code: \_\_\_\_\_ PID of Legal Description: \_\_\_\_\_

BC Building Code Performance Compliance Path (select one):  
 9.36.5. → Complete Sections A, B, C, & E     9.36.6. → Complete Sections A, B, D, & E

Software Name: \_\_\_\_\_ Version: \_\_\_\_\_ Climatic Data (Location): \_\_\_\_\_

**B: BUILDING CHARACTERISTICS SUMMARY (see BCBC Clause 2.2.8.3.(2)(b) of Division C)**

**Report result of pre-drywall airtightness test: \_\_\_\_\_ ACH<sub>50</sub>**

**Verify correct installation of beyond-minimum-code building upgrades as appropriate**

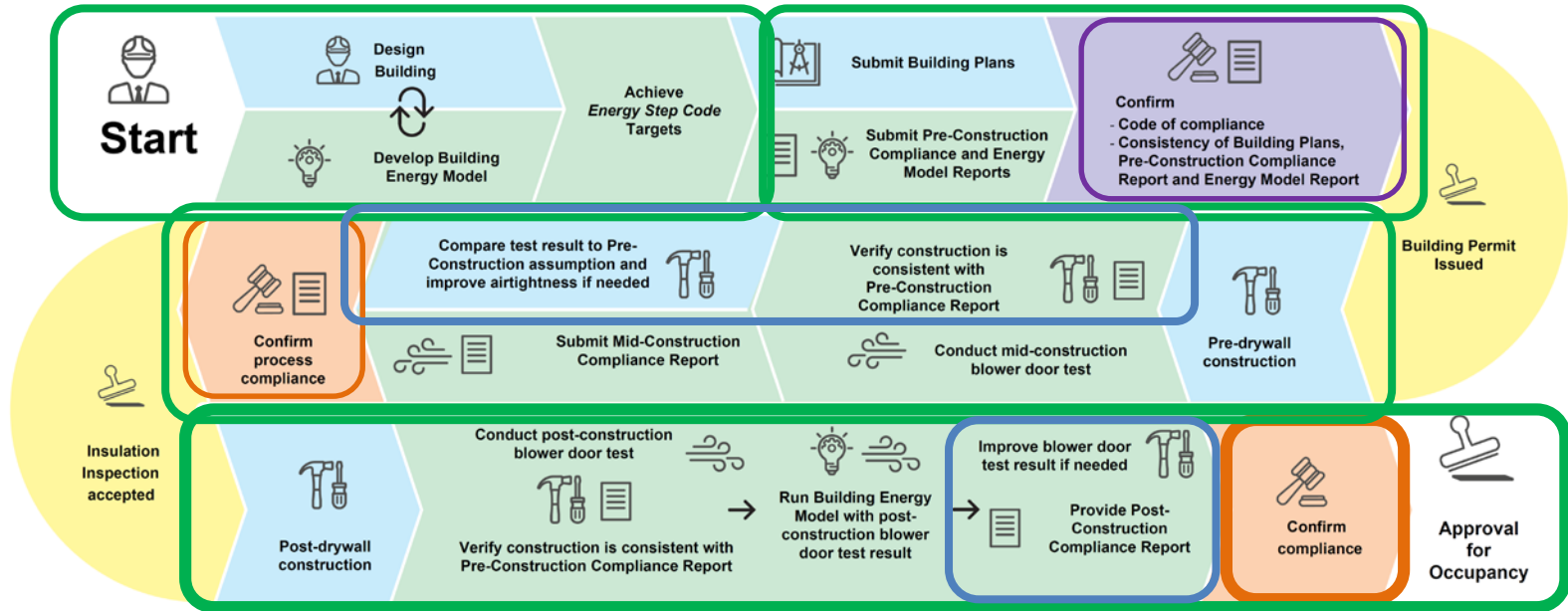
**E: COMPLETED BY**

Full Name (Print): _____	If applicable, enter ERS information:
Company Name: _____	Advisor ID Number: _____
Phone: _____	Service Organization: _____
Address: _____	EnerGuide P.P. _____
Email: _____	EnerGuide N.P. _____
Date (dd/mm/yyyy): _____	





# From Application to Occupancy: Post-Construction



**OWNER**

**SURREY BUILDING APPROVALS**

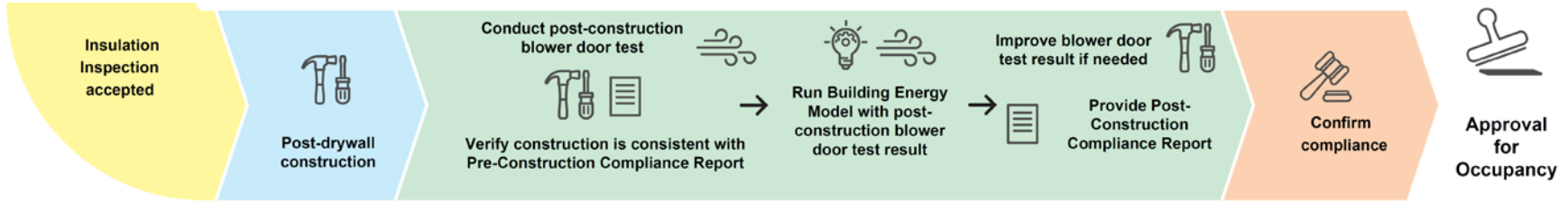




# From Application to Occupancy: Post-Construction

## Necessary:

- ✓ **Verify** proper **installation of EE upgrades** on site
- ✓ **Perform** post-construction **blower door test**
- ✓ **Revise energy model** to conform to completed building
- ✓ **Complete** *As-built Compliance Form*



## Cost-effective:

- Provide on-site **coaching re: air barrier installation**  
→ *reduce delay and construction costs*

**Energy Advisors play some critical roles**  
**(or Registered Professionals)**

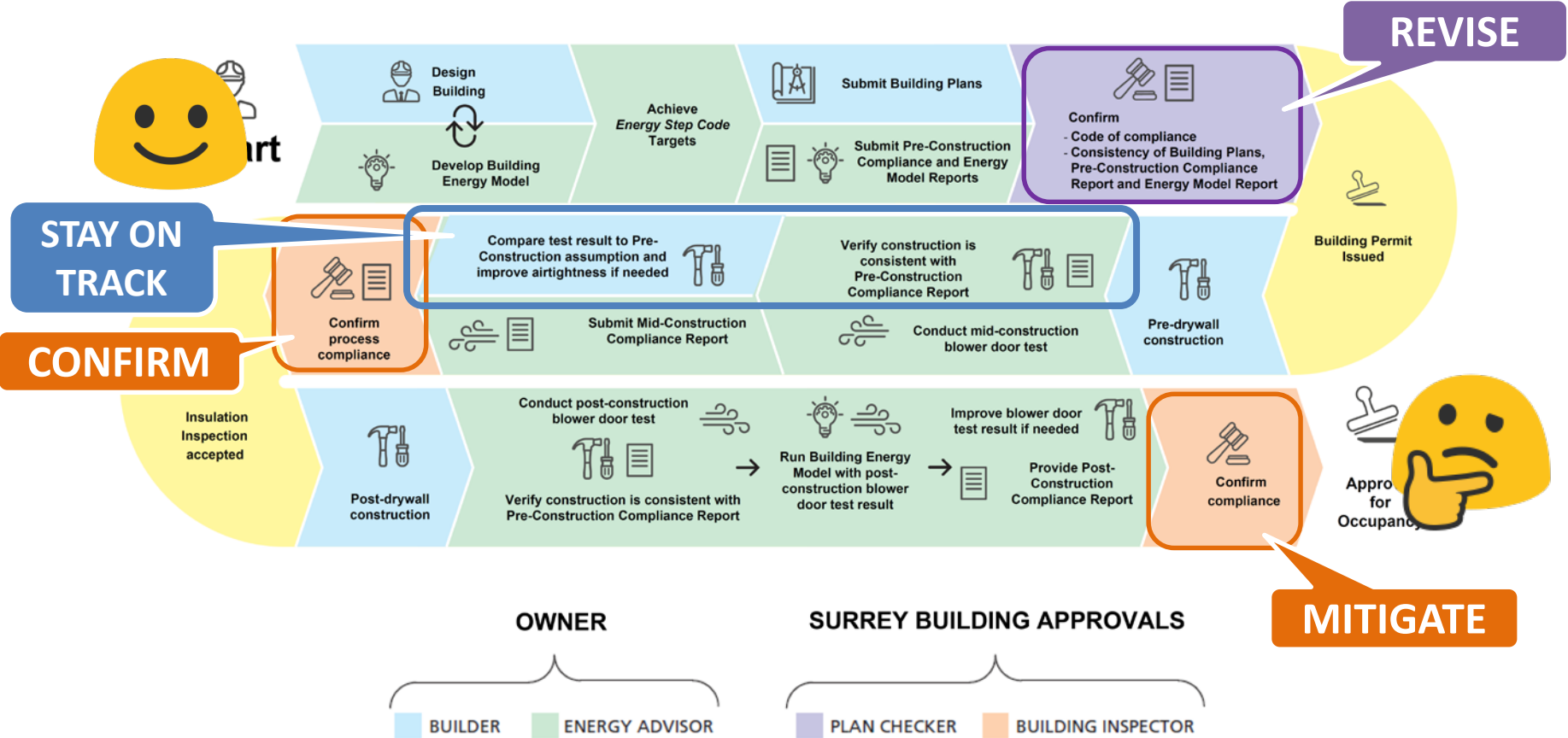


# From Application to Occupancy: Post-Construction

## Requirement for post-construction blower door test

*Buildings with a post-construction blower door test result **resulting in non-compliance** will need to mitigate and re-test to become compliant*

# From Application to Occupancy: Part 9 Residential



# From Application to Occupancy: Details in Bulletins

[www.surrey.ca/stepcode](http://www.surrey.ca/stepcode) ← “Changes to the Building Process”

## Residential Building Permits

Read the [BCBC 2018 Bulletin](#) regarding the upcoming changes to the Building Code and the [Energy Step Code Bulletin](#) regarding the upcoming implementation of the BCBC 2018 Energy Step Code.

## Commercial Building Permits

The British Columbia Energy Step Code for applicable [Part 3](#) and [Part 9](#).



Subscribe to Step Code Alerts

BCBC Bulletins at <https://energystepcode.ca/>

The image shows three overlapping screenshots of official bulletins from the City of Surrey Planning and Development department. The top bulletin is dated March 20, 2019, and is titled "BC Energy Step Code Requirements: Part 3 Buildings". The middle bulletin is dated March 27, 2019, and is titled "BC Energy Step Code Requirements: Part 9 Multi-Family Residential Buildings". The bottom bulletin is dated March 28, 2019, and is titled "BC Energy Step Code Requirements: Part 9 Single- and Two-Family Dwellings". Each bulletin includes a disclaimer, purpose, and implementation details. A sidebar on the left contains a "Part 3 Buildings" section and a "Part 9 Buildings" section. At the bottom, there is a "Rezoning" section and a "Implementation" section.

**CITY OF SURREY PLANNING AND DEVELOPMENT** 13400 104 Avenue Surrey, BC V2T 1V9 604.591.4411 **INFORMATION**

March 20, 2019  
BUILDING DIVISION

**BC Energy Step Code Requirements: Part 3 Buildings**

**DISCLAIMER:** The information presented below is subject to addition and revision in future versions of this Building Division Bulletin. Notes below indicate some, but not all, items that may be revised. To be notified whenever this Bulletin is updated, sign up for small alerts at [bit.ly/SurreyStepCodeAlerts](http://bit.ly/SurreyStepCodeAlerts).

**Purpose**  
On July 23 construction is provided to Step Code

- Re-int
- BC-Cri
- B-

**Implement Effective:** A demonstration Energy Step Code applicable encourage Profession

**Part 3 Buildings**

**CITY OF SURREY PLANNING AND DEVELOPMENT** 13400 104 Avenue Surrey, BC V2T 1V9 604.591.4411 **INFORMATION**

March 27, 2019  
BUILDING DIVISION

**BC Energy Step Code Requirements: Part 9 Multi-Family Residential Buildings**

**DISCLAIMER:** The information presented below is subject to addition and revision in future versions of this Building Division Bulletin. Notes below indicate some, but not all, items that may be revised. To be notified whenever this Bulletin is updated, sign up for small alerts at [bit.ly/SurreyStepCodeAlerts](http://bit.ly/SurreyStepCodeAlerts).

**Purpose**  
On July 23 construction is provided to BC Energy

- R-int
- B-C
- T-V
- a

**Implement Effective:** for new P work with and admin All Reg and Geot

**Part 9 Buildings**

**CITY OF SURREY PLANNING AND DEVELOPMENT** 13400 104 Avenue Surrey, BC V2T 1V9 604.591.4411 **INFORMATION**

March 28, 2019  
BUILDING DIVISION

**BC Energy Step Code Requirements: Part 9 Single- and Two-Family Dwellings**

**DISCLAIMER:** The information presented below is subject to addition and revision in future versions of this Building Division Bulletin. Notes below indicate some, but not all, items that may be revised. To be notified whenever this Bulletin is updated, sign up for small alerts at [bit.ly/SurreyStepCodeAlerts](http://bit.ly/SurreyStepCodeAlerts).

**Purpose and Background:**  
On July 23, 2018, Surrey City Council approved Corporate Report R171<sup>1</sup> that requires new buildings to be constructed to the energy efficiency requirements set under the BC Energy Step Code. This bulletin is provided to inform applicants and designers of new single- and two-family dwellings about the City of Surrey's BC Energy Step Code and building energy labelling requirements.

- Refer to the **Additional Information** section at the bottom of this bulletin for additional Step Code information and resources.
- Refer to **Appendix 1** for details on the City's building energy labelling requirements.
- BC Energy Step Code and associated requirements for other building types can be found in similar City bulletins for **Part 9 Multi-Family Residential Buildings** and **Part 3 Buildings**.

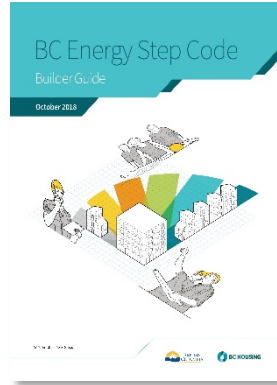
**Implementation:**  
Effective April 1, 2019, Step 1 of the BC Energy Step Code will apply to all new building permit applications

<sup>1</sup> The July 2018 bulletins show "Download it <https://surrey.ca>

www.surrey.ca

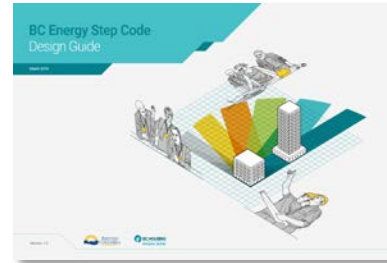
# Resources and Supports

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



## Builder Guide

Key strategies builders can use for houses and low-rise (Part 3 and Part 9) wood-frame residential buildings.



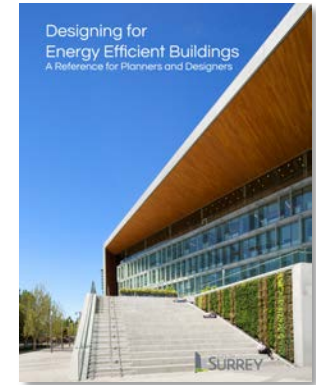
## Design Guide

Key strategies to for mid- and high-rise (Part 3) wood-frame and non-combustible residential buildings



## Low Thermal Demand Guide

How large buildings can meet Passive House and other high levels of performance.



## Surrey's Designing for Energy Efficient Buildings

For Planners and Designers, mostly Part 3.

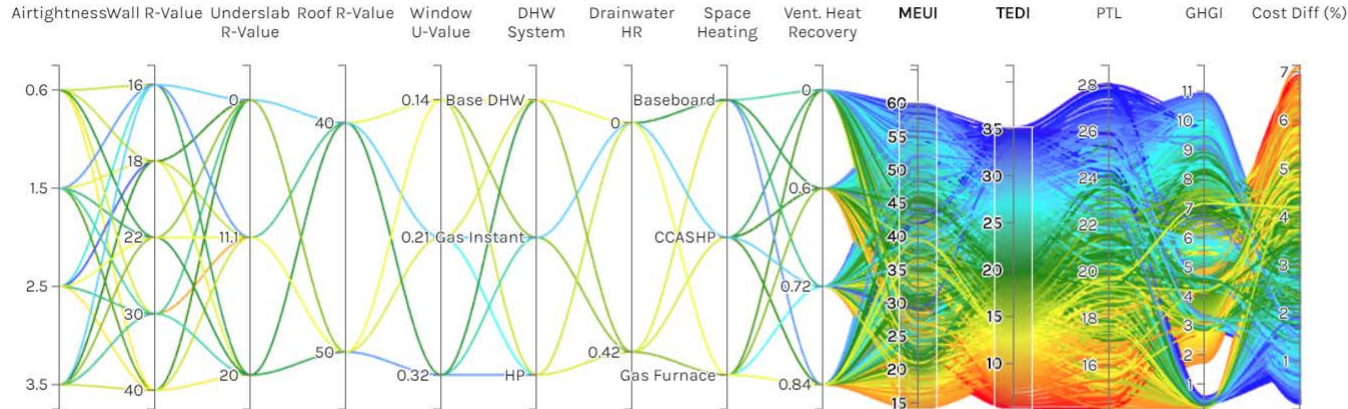


# Resources and Supports

<http://www.buildingpathfinder.com>



[Launch](#) [Tutorial](#) [About](#) [Contact](#)



Airtightn...	Wall R-Value	Underslab R-Value	Roof R-Value	Window U-Value	DHW System	Drainwat... HR	Space Heating	Vent. Heat Recovery	MEUI	TEDI	PTL	GHGI	Cost Diff (%)
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0	41.32	16.87	21.53	4.47	3.01
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0.6	38.92	14.47	19.73	4.5	3.24
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0.72	38.44	14	19.34	4.5	3.37
0.6	16	0	40	0.14	Base DHW	0	Baseboa...	0.84	37.97	13.52	18.96	4.49	3.59
0.6	16	0	40	0.14	Base DHW	0	CCASHP	0	36.09	16.89	21.55	4.45	3.01
0.6	16	0	40	0.14	Base DHW	0	CCASHP	0.6	34.62	14.48	19.77	4.46	3.24
0.6	16	0	40	0.14	Base DHW	0	CCASHP	0.72	34.22	14	19.34	4.45	3.27

**Start Here!**

**Building Info**

Climate Region:  
Vancouver

Building Type:  
Med Single Fam

Choose Energy Saving Measures

High-Rise Multi-Unit

**Controls**

- Keep Selection
- Exclude Selection
- Show Pinned
- Unpin All
- Reset Brushes
- Reset Filters
- Reset All

Medium Single-Family

Row House

Colour by Axis:  
TEDI

Colour Scheme:  
Rainbow 1

Font Size:



# Resources and Supports

## Apr 25 Builder Breakfast

### Building Step 1 for Part 9 Homes & Succeeding with Airtightness

with the Township of Langley

[www.surrey.ca/stepcode](http://www.surrey.ca/stepcode)

Township of  
Langley



Est. 1873



SHOP BARRIERS INSULATION MECHANICAL LOCATIONS WORKSHOPS NETWORK ABOUT US CAREERS SPS BLOG

BCIT



Step Code Airtightness Training

Learn how to detail an air barrier now and prepare for the BC Energy Step Code airtightness standards with hands-on training held near you.



Mid-Construction Blower Door Test

\$400 Rebate – *more info soon*



# Resources and Supports

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Have questions? Get in touch with an Energy Coach at 1.844.881.9292 or email

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**FORTIS BC™**

## Available Incentives

BC Energy Step Code	Whole-home performance	
	Rebate	Energy Advisor Rebate*
Step 1	n/a	\$400
Step 2	\$1,000	\$400
Step 3	\$2,000	
Step 4	\$4,000	\$0 or \$400**
Step 5	\$8,000	

<https://efficiencybc.ca/>

# Today's Agenda

- 7:30 - 8:00** Registration, Get Breakfast,  
and Get Settled
- 8:00 - 9:00** Step Code in Surrey,  
Maxwell Sykes, City of Surrey
- 9:00 - 9:50** Working with Energy Advisors,  
Einar Halbig, E3 EcoGroup
- 9:50 - 10:15** Energy Advisor Meet & Greet  
and Available for Questions



# **Step Code for Part 9 Buildings**

## **Working with an Energy Advisor**

Einar Halbig, E3 EcoGroup



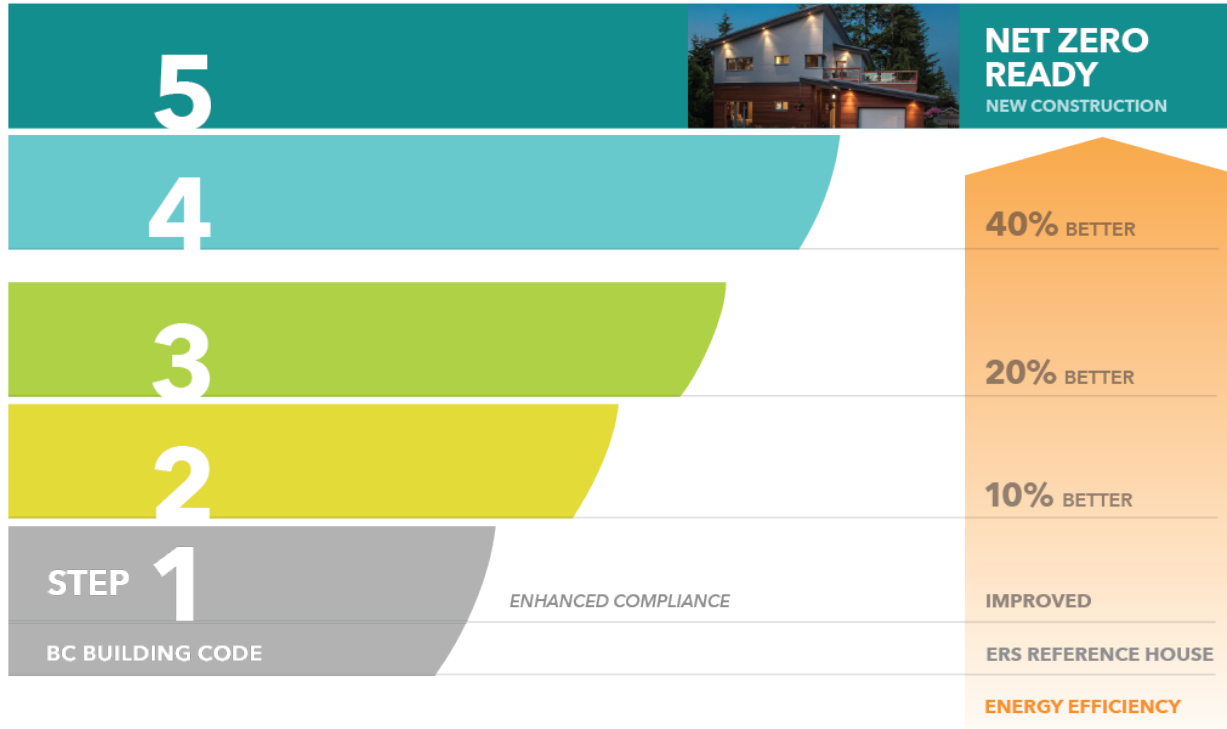
# Agenda:

- 1) Step Code review
- 2) Working with Energy Advisors
- 3) Getting your house airtight enough
- 4) Finding an Energy Advisor
- 5) Wrap up and questions.

# BC Energy Step Code

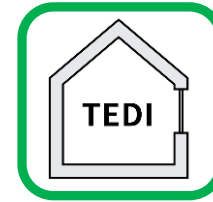
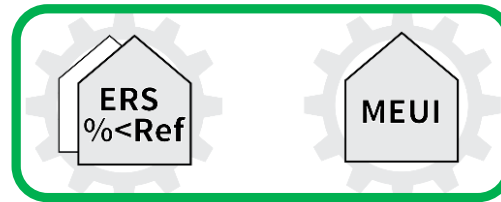
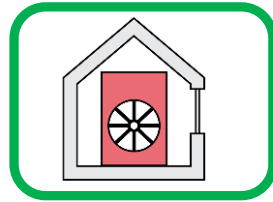
2017

2032



# Performance Compliance: Lower Mainland

(except City of Vancouver)



ENERGY STEP CODE BUILDING BEYOND THE STANDARD		Climate Zone 4 (Lower Mainland, Southern Vancouver Island and Sunshine Coast) Proposed MEUI and TEDI targets				
Step	Energy Model	Airtightness		Systems and Equipment		Building Envelope
		Blower Door Test	ACH <sub>50</sub>	% better than ERS reference house	MEUI <sup>(1)(2)</sup>	TEDI (kWh/m <sup>2</sup> -year)
1	✓	✓	Report Score	0%	Report Score	Report Score
2	✓	✓	≤ 3.0	10%	OR See Below	35
3	✓	✓	≤ 2.5	20%	OR See Below	30
4	✓	✓	≤ 1.5	40%	OR See Below	20
5	✓	✓	≤ 1.0	n/a	See Below	15

# Equipment & Systems

## “% Better than Reference House”

(excluding lighting and appliance loads)

Reference house:  
Code minimum



vs.



Proposed  
house: Builder  
specs

- 2.5ACH@50Pa
- maximum 22% FDWR
- Equal orientation of glazing

- Airtightness?
- FDWR?
- Orientation?

# City of Surrey Requirements

**CITY OF SURREY  
PLANNING AND DEVELOPMENT**

13450 104 Avenue  
Surrey, BC V3T 1V8  
604-591-4441

INFORMATION

March 28, 2019  
BUILDING DIVISION

## BC Energy Step Code Requirements: Part 9 Single- and Two-Family Dwellings

**DISCLAIMER:** The information presented below is subject to addition and revision in future versions of this Building Division Bulletin. Notes below indicate some, but not all, items that may be revised. To be notified whenever this Bulletin is updated, sign up for email alerts at [ps@cityofsurrey.ca](mailto:ps@cityofsurrey.ca).

**Purpose and Background:**

On July 23, 2018, Surrey City Council approved Corporate Report R179<sup>1</sup> that requires new buildings to be constructed to the energy efficiency requirements set under the BC Energy Step Code. This bulletin is provided to inform applicants and designers of new single- and two-family dwellings about the City of Surrey's BC Energy Step Code and building energy labelling requirements.

- Refer to the **Additional Information** section at the bottom of this bulletin for additional Step Code information and resources.
- Refer to **Appendix 1** for details on the City's building energy labelling requirements.
- BC Energy Step Code and associated requirements for other building types can be found in similar City bulletins for **Part 9 Multi-Family Residential Buildings** and **Part 3 Buildings**.

**Implementation:**

Effective April 1, 2019, Step 1 of the BC Energy Step Code will apply to all new building permit applications for single- and two-family buildings. To comply with the BC Energy Step Code, builders must work with a Licensed Energy Advisor and/or a Registered Professional to ensure building designs meet all applicable energy performance and administrative requirements.

All Registered Professionals are encouraged to follow the Joint Architectural Institute of BC and Engineers and Geoscientists BC Professional Practice Guidelines – Whole Building Energy Modelling Services.<sup>2</sup>

**Rezoning and Development Permit Applications and Approvals:**

As part of rezoning and development permit applications, applicants are expected to conduct energy modelling and provide a statement to the City that their proposed design will meet the City's Energy Step Code requirements in place at the time of the associated building permit application. This statement must be submitted prior to the City considering the rezoning and/or development permit application. It is incumbent on applicants to ensure their proposed building design will meet the City's Energy Step Code requirements. Any revisions to building design may require applicants to reapply for updated rezoning and/or development permit approvals.

<sup>1</sup> The July 2018 Council Report is available online. Any information in the Council Report that is inconsistent with City bylaws or bulletins should be considered out-of-date: <https://www.surrey.ca/businessandcommunity/city-council/2018-R179.pdf>  
<sup>2</sup> Download AIRC and EGBC's Joint Professional Practice Guidelines for Whole Building Energy Modelling Services here: [https://www.eptic.ca/Practice\\_Resources/Professional\\_Practice\\_Guidelines](https://www.eptic.ca/Practice_Resources/Professional_Practice_Guidelines)

www.surrey.ca

**CITY OF SURREY**  
the future lives here.



# City of Surrey Requirements

## City's Preferred Path

### **EnerGuide Rating System: *Licensed Energy Advisor***

1. *BC Energy Compliance Report – Performance Paths for Part 9 Buildings: Pre-Construction form<sup>3</sup>* completed by a Licensed Energy Advisor. Section F must be completed. Complete Section G if seeking any Certification.
2. Printed copy of HOT2000 Full House report.\*
3. For each Licensed Energy Advisor, a copy of a valid certificate of insurance showing general liability insurance and errors and omissions insurance.
4. Plan drawings clearly showing all energy efficiency upgrades and type of air barrier.

# 1: Engage An Energy Advisor

Energy Advisors:

- ✓ Licenced by NRCan
- ✓ Construction knowledge
- ✓ Trained to use HOT2000 software
- ✓ Standard modeling and testing procedures through EnerGuide Rating System
- ✓ QA by Service Organization and NRCan.

# BC Energy Step Code = Performance Compliance



Energy modeling

Air-Tightness  
Testing

No More  
Prescriptive  
Requirements



Energy Advisor

# Engage An Energy Advisor



# Engage An Energy Advisor



# Where to find an Energy Advisor

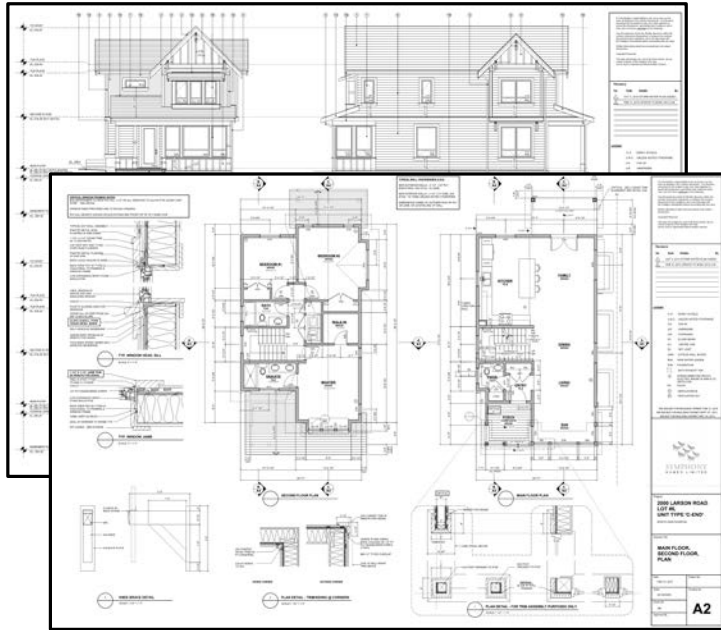
- ✓ NRCan website
- ✓ CHBA BC is a Service Organization
- ✓ CACEA.ca is Energy Advisor association.







## 2: Energy Advisor Models the Building



# Info needed for Energy Modeling:

Drawings are just the start...

Also need:

- ✓ space heating specifications (type and AFUE)
- ✓ domestic hot water heating specs (type and EF)
- ✓ window specs (USI and SHGC)
- ✓ ventilation specs (equipment and SRE if HRV)
- ✓ space cooling specifications.

# HOT2000 Software

The screenshot displays the HOT2000 software interface. At the top, the title bar reads "HOT2000 - [5111P99510 - EnerGuide Rating System]". Below it is a menu bar with "File", "Edit", "Editors", "Reports", "View", "Window", and "Help". A toolbar with various icons is positioned below the menu bar. On the left side, a tree view shows the project structure under "House", with "Main floor" selected. The main workspace is titled "Main Wall" and contains the following configuration fields:

- Wall Label:** Main floor
- Facing Direction:** N/A
- Construction:**
  - Wall Type:** 1223501561
  - Lintel Type:** 101
  - Location:** House
- Measurements:**
  - Height:** 8 ft
  - Perimeter:** 99.6299 ft
  - Area:** 797.039 ft<sup>2</sup>
- Comers:** 6
- Intersections:** 2
- R-Value:** 21.52 R
- Adjacent to Enclosed Unconditioned Space

# HOT2000 Software

HOT2000 outputs used to calculate Step Code Metrics:

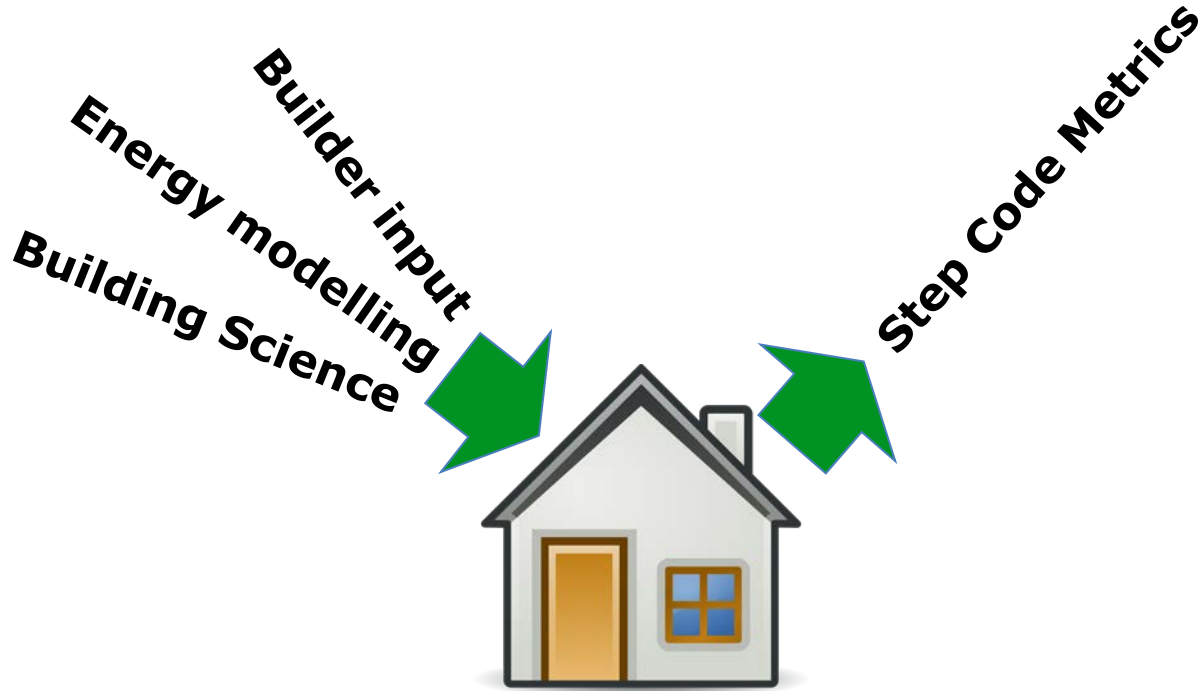
- ✓ % lower energy than reference house
- ✓ MEUI
- ✓ TEDI

EnerGuide Rating System Results			
Rating	<input type="text" value="52"/>	GJ/a	Reference House <input type="text" value="63"/> GJ/a
Energy Use Intensity	<input type="text" value="1.23"/>	GJ/m <sup>2</sup> /a	% Lower Than Ref Hse <input type="text" value="17.5"/> %
Greenhouse Gases	<input type="text" value="1.5"/>	t/a	

Rated Annual Energy Consumption (AEC)		Rated Annual Energy Production (AEP)	
Space Heating	<input type="text" value="11.49"/> GJ	Electricity Generation	<input type="text" value="0.0"/> GJ
Space Cooling	<input type="text" value="0.0"/> GJ	Solar DHW	<input type="text" value="0.0"/> GJ
DHW	<input type="text" value="14.51"/> GJ	Total AEP	<input type="text" value="0.0"/> GJ
Ventilation, Electric	<input type="text" value="0.0"/> GJ		
Baseloads	<input type="text" value="25.62"/> GJ		

# What's the recipe?



# City of Surrey Requirements

“All building permit applications for new single- and two-family buildings must demonstrate compliance with either the EnerGuide Rating System or 9.36.5 pathways listed in the Compliance Pathway Requirements”

“Applicants are expected to use conservative airtightness assumptions in energy models for Step 1.”

“Applicants that do not use a conservative airtightness assumption risk designing and constructing homes that will not meet the Step 1 performance requirements and delaying occupancy at Final Building Inspection.”

## 3: Energy Advisor & Builder Develop Plan of Action

HOT2000 iterations evaluate potential upgrades:

- ✓ Envelope upgrades (insulation, fenestration, air tightness, thermal bridging, etc)
- ✓ Mechanical system upgrades
- ✓ Heat recovery
- ✓ Lighting and appliances.



# Which upgrades make sense?

- ✓ Effect on Step Code metrics?
- ✓ Cost?
- ✓ Availability?
- ✓ Constructability?
- ✓ Synergies?
- ✓ Builder preference

Upgrade Description:	% Better than the Reference House, NOT including EnerGuide assume electric base loads	ACH @50 Pa	MEUI (kWh/m2/yr)	TEDI (kWh/sq m/year)	PTL (W/m2)
Built to BC Building Code Section 9.36 minimums	-4.9%	3.5	65.7	44.5	31.7
Upgrade above grade walls to R22 batts, add R4 expanded polystyrene to base case foundation walls	0.0%	3.5	62.6	41.6	30.6
Upgrade above grade walls to R22 batts, add R4 expanded polystyrene to base case foundation walls, 3.0ACH@50Pa	3.3%	3.0	60.7	39.8	29.4
Upgrade above grade walls to R22 batts, add R4 expanded polystyrene to base case foundation walls, 3.0ACH@50Pa, upgrade furnace to 97% AFUE	4.9%	3.0	59.2	39.8	29.4
Upgrade above grade walls to R24 batts, add R4 expanded polystyrene to base case foundation walls, 2.5ACH@50Pa, upgrade furnace to 97% AFUE, upgrade windows to US1 1.40, add 60" drain water heat recovery system, add R12 under entire slab area	21.2%	2.5	49.5	32.9	26.3



# Energy Advisor & Builder Develop Plan of Action

Step Code form is completed by the Energy Advisor:

PRE-CONSTRUCTION

BC ENERGY COMPLIANCE REPORT - PERFORMANCE PATHS FOR PART 9 BUILDINGS

For Buildings Complying with Subsection 9.36.5. or 9.36.6. of the 2018 BC Building Code (see BCBC Article 2.2.8.3. of Division C)

A: PROJECT INFORMATION

**Building Permit #:** \_\_\_\_\_ **Building Type:** Please Select Building Type

**Builder:** \_\_\_\_\_ **If Other, Please Specify:** \_\_\_\_\_

**Project Address:** \_\_\_\_\_ **Number of Dwelling Units:** \_\_\_\_\_

**Municipality / District:** \_\_\_\_\_ **Climate Zone:** Please Select Climate Zone

**Postal Code:** \_\_\_\_\_ **Floor Area of Conditioned Space (m<sup>2</sup>):** \_\_\_\_\_

**PID or Legal Description:** \_\_\_\_\_

**BC Building Code Performance Compliance Path (select one):**  
 9.36.5. → Complete Sections A, B, C, & E      9.36.6. → Complete Sections A, B, D, & F

**Software Name:** \_\_\_\_\_ **Version:** \_\_\_\_\_ **Climatic Data (Location):** \_\_\_\_\_

B: BUILDING CHARACTERISTICS SUMMARY (see BCBC Clause 2.2.8.3.(2)(b) of Division C)

	DETAILS (ASSEMBLY / SYSTEM TYPE / FUEL TYPE / ETC)	EFFECTIVE RSI-VALUE / EFFICIENCY
EXTERIOR WALLS & FLOOR HEADERS		
ROOF / CEILINGS		
FOUNDATION WALLS, HEADERS, & SLABS	Slab Is: <input type="checkbox"/> Below OR <input type="checkbox"/> Above Frost Line AND <input type="checkbox"/> Heated OR <input type="checkbox"/> Unheated	
FLOORS OVER UNHEATED SPACES		
FENESTRATION & DOORS	FDWR: _____ %	
AIR BARRIER SYSTEM & LOCATION		
SPACE CONDITIONING (HEATING & COOLING)		
SERVICE WATER HEATING		
VENTILATION		
OTHER ENERGY IMPACTING FEATURES		

Based on information provided by the builder and drawings prepared by \_\_\_\_\_, dated \_\_\_\_\_.

BCBC 2018 REVISION 1 - EFFECTIVE 2018-12-10 1

## 4: Builder completes house, Energy Advisor confirms construction details

Make sure you build what you agreed on!

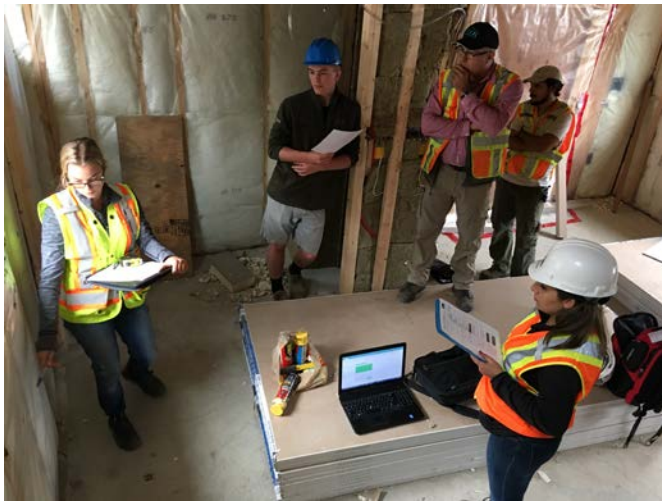
- ✓ If changes, notify your Energy Advisor
- ✓ The energy model will need to be updated.

## 4: Builder completes house, Energy Advisor confirms construction details

Mid-Construction blower fan testing can help assure you are on track:

- ✓ Check airtightness during construction
- ✓ Changes/fixes can still be made
- ✓ Energy Advisor will want to verify your construction details anyways.









# 4: Builder completes house, Energy Advisor confirms construction details

Energy Advisor completes Step Code compliance forms and submits to the Municipality.

POST CONSTRUCTION

**BC ENERGY COMPLIANCE REPORT - PERFORMANCE PATHS FOR PART 9 BUILDINGS**  
 For Buildings Complying with Subsection 9.36.5. or 9.36.6. of the 2018 BC Building Code (see BCBC Article 2.2.8.3. of Division C)

**A: PROJECT INFORMATION**

Building Permit #: \_\_\_\_\_ Building Type: **Please Select Building Type**

Builder: \_\_\_\_\_ If Other, Please Specify: \_\_\_\_\_

Project Address: \_\_\_\_\_ Number of Dwelling Units: \_\_\_\_\_

Municipality / District: \_\_\_\_\_ Climate Zone: **Please Select Climate Zone**

Postal Code: \_\_\_\_\_ Floor Area of Conditioned Space (m<sup>2</sup>): \_\_\_\_\_

PID or Legal Description: \_\_\_\_\_

**BC Building Code Performance Compliance Path (select one):**

9.36.5. → Complete Sections A, B, C, & E  9.36.6. → Complete Sections A, B, D, & F

Software Name: \_\_\_\_\_ Version: \_\_\_\_\_ Climatic Data (Location): \_\_\_\_\_

**B: BUILDING CHARACTERISTICS SUMMARY** (see BCBC Clause 2.2.8.3.(2)(b) of Division C)

	DETAILS (ASSEMBLY / SYSTEM TYPE / FUEL TYPE / ETC)	EFFECTIVE RSI-VALUE / EFFICIENCY
EXTERIOR WALLS & FLOOR HEADERS		
ROOF / CEILINGS		
FOUNDATION WALLS, HEADERS, & SLABS	Slab Is: <input type="checkbox"/> Below OR <input type="checkbox"/> Above Frost Line AND <input type="checkbox"/> Heated OR <input type="checkbox"/> Unheated	
FLOORS OVER UNHEATED SPACES		
FENESTRATION & DOORS	FDWR: _____ %	
AIR BARRIER SYSTEM & LOCATION		
SPACE CONDITIONING (HEATING & COOLING)		
SERVICE WATER HEATING		
VENTILATION		
OTHER ENERGY IMPACTING FEATURES		

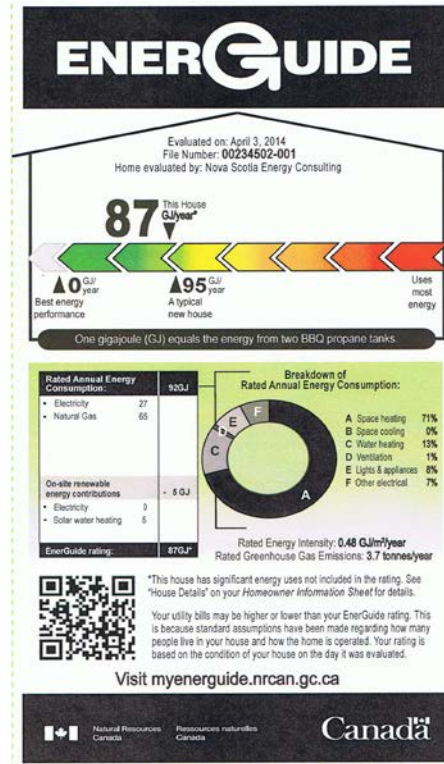
Based on information provided by the builder and drawings prepared by \_\_\_\_\_, dated \_\_\_\_\_.

BCBC 2018 REVISION 1 - EFFECTIVE 2018-12-10 1



# 4: Builder completes house, Energy Advisor confirms construction details

EnerGuide label is issued for the house:



# Working with an Energy Advisor Recap

- ✓ Engage your Energy Advisor
- ✓ Model your house and check performance against Step Code targets
- ✓ Run iterations and develop your plan of action
- ✓ Stick to the plan.

Questions?

Thank you!

# Today's Agenda

- 7:30 - 8:00** Registration, Get Breakfast,  
and Get Settled
- 8:00 - 9:00** Step Code in Surrey,  
Maxwell Sykes, City of Surrey
- 9:00 - 9:50** Working with Energy Advisors,  
Einar Halbig, E3 EcoGroup
- 9:50 - 10:15** Energy Advisor Meet & Greet  
and Available for Questions

Albert Mui  
Aqua-Coast Engineering  
Cantech  
Capital Home Energy  
DW Energy Advisors  
E3 ECO GROUP  
EnerSaver Solutions  
Exland Construction MGMT  
HomeStep.ca  
Vantage Energy Solutions

# Next Builder Breakfast

## Building Step 1 for Part 9 Homes & Succeeding with Airtightness with the Township of Langley

Thurs Apr 25, 2019

Langley Events Centre

7888 200 St, Langley

[www.surrey.ca/stepcode](http://www.surrey.ca/stepcode)

Township of  
Langley



Est. 1873

