



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

**INSTRUCTION MANUAL:**  
**BC ENERGY COMPLIANCE REPORT FOR (SOME)**  
**PART 9 BUILDINGS**

**FOR ENERGUIDE RATING SYSTEM**  
**ENERGY ADVISORS AND SERVICE ORGANIZATIONS**

**JANUARY 2018**

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## INTRODUCTION

The **BC Energy Step Code** is a voluntary provincial standard enacted in April 2017 that provides an incremental and consistent approach to achieving more energy-efficient buildings that go beyond the requirements of the base BC Building Code. It does so by establishing a series of measurable, performance-based energy efficiency requirements for construction that builders can choose to build to, and as of December 15, 2017, communities may voluntarily choose to adopt in bylaws and policies.

The **BC Energy Compliance Report - Performance Paths for Part 9 Buildings** provides a standardized report template for Part 9 buildings complying with Subsection 9.36.5. or 9.36.6. of the 2012 BC Building Code. The compliance report may be used by:

- EnerGuide Rating System (ERS) Registered Energy Advisors and other energy modellers to produce a standardized compliance report;
- Builders to translate an energy model into a BC Energy Step Code Report;
- Local governments to verify builders are complying with a bylaw or policy that references a level of the Step Code (for example Step 3); and
- Local governments and utilities to process incentives or rebates that may be aligned with BC Energy Step Code metrics.

The **BC Energy Compliance Report - Performance Paths for Part 9 Buildings - Instruction Manual** provides:

1. General guidelines for using the BC Energy Compliance Report
2. A table of instructions for completing the BC Energy Compliance Report
3. Details on how to use HOT2000 to calculate the BC ENERGY STEP CODE metrics (Section D) of the BC Energy Compliance Report.

## GUIDELINES FOR ENERGUIDE RATING SYSTEM IMPLEMENTATION

	GUIDELINES
<b>Online Access</b>	<p>The BC Energy Compliance Report can be found online at:</p> <ul style="list-style-type: none"> <li>• <a href="https://www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/energy-efficiency/energy-step-code/resources">https://www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/energy-efficiency/energy-step-code/resources</a></li> </ul>
<b>ERS Energy Modelling</b>	<p>Use EnerGuide Rating System Version 15.4, HOT2000 Version 11.4 (or most recent version). Follow energy modelling instructions in the most recent versions of the following EnerGuide Rating System documents:</p> <ul style="list-style-type: none"> <li>• ERS Administrative Procedures;</li> <li>• ERS HOT2000 User Guide;</li> <li>• ERS Technical Procedures; and</li> <li>• ERS Standard</li> </ul>
<b>Building Types</b>	<p>Version 1.0 of this manual only provided detailed instructions on how to generate the BC Energy Compliance Report for <b>single family detached homes</b>. More work is required to fully define and document guidelines for semi-detached homes, attached homes, MURBs and non-residential part 9 buildings.</p>
<b>Energy Step Code Regulation</b>	<p>Users of this Instruction Manual and the BC Energy Compliance Report should be familiar and have read within the 2012 BC Building Code:</p> <ul style="list-style-type: none"> <li>• Article 2.2.8.1. of Division C, Information Required on Drawings and Specifications;</li> <li>• Article 2.2.8.3. of Division C, House Performance Compliance Calculation Report;</li> <li>• Subsection 9.36.5. of Division B, Energy Performance Compliance; and</li> <li>• Subsection 9.36.6. of Division B, Energy Step Code.</li> </ul>
<b>Technical Resources</b>	<ul style="list-style-type: none"> <li>• Guidelines for Using HOT2000 v.11 to Demonstrate Compliance with Subsection 9.36.5 of the 2015 National Building Code, Natural Resources Canada</li> </ul>

## ENERGUIDE RATING SYSTEM

“Although not a requirement of the British Columbia Building Code, users of the EnerGuide Rating System (ERS) must be energy advisors registered and in good standing with Natural Resources Canada in accordance with the EnerGuide Rating System Administrative Procedures and must adhere to the technical standards and procedures of the ERS” (2012 BCBC A-9.36.6.4.(2)(b)). Therefore, when using the EnerGuide Rating System for compliance with Subsection 9.36.6. of Division B, Energy Step Code, energy advisors must adhere to the energy modelling, site verification, and data collection requirements outlined in the following documents:

- ERS Administrative Procedures;
- ERS HOT2000 User Guide;
- ERS Technical Procedures; and
- ERS Standard

## STEP CODE METRICS CALCULATOR

A Microsoft Excel **Step Code Metrics Calculator** is provided as a tool to assist EnerGuide Rating System energy advisors in calculating the BC Energy Step Code Metrics for Section D of the BC Energy Compliance Report. By entering data from the HOT2000 energy model and selecting the project’s climate zone and the required ‘Step’, this tool calculates the Mechanical Energy Use Intensity (MEUI), ERS Rating % Lower Than EnerGuide Reference House, Thermal Energy Demand Intensity (TEDI), Peak Thermal Load (PTL), and the Rated Greenhouse Gas Intensity. The calculator also compares the calculated Step Code Metrics to the selected required Step and determines which metric the home passed and the overall result.

The Step Code Metrics Calculator includes a macro to clear the user entered HOT2000 data. You may get a security warning depending on your MS Excel security settings.

**Important Note:** When using the calculator, or doing manual calculations, ensure that the HOT2000 file is set to metric units.

## TABLE OF INSTRUCTIONS

This table of instructions provides a description of what information should be included within each data entry point of the BC Energy Compliance report.

REPORT ITEM	INSTRUCTIONS														
<b>A: PROJECT INFORMATION</b>															
<b>Building Permit #</b>	Building Permit Number from Municipality / District. To be completed by Authority Having Jurisdiction (AHJ).														
<b>Builder</b>	Full Builder Company Name. In the case of Homeowner Builder, enter Homeowner's Name.														
<b>Project Address</b>	The address for the project. If no address is available write PENDING.														
<b>Municipality / District</b>	Full name of Municipality / District of where the home is being built, e.g. City of North Vancouver or District of North Vancouver. Confirm with the AHJ or use a census map to ensure that the municipality/district is identified correctly.														
<b>Postal Code</b>	Canada Post Postal Code, if available. If no postal code is available write PENDING.														
<b>Building Type</b>	Select appropriate type of building from the drop down menu, e.g. Single-Detached House.														
<b>If Other, Please Specify</b>	If the building type is not listed in the drop down menu, specify what building type it is in the Other field.														
<b>Number of Dwelling Units</b>	Indicate the number of dwelling units in the building. As defined in BCBC, a "dwelling unit means a suite operated as a housekeeping unit, used or intended to be used by one or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities" (BCBC Article 1.4.1. of Division A)														
<b>Climate Zone</b>	BCBC Climate Zone as defined by the Heating Degree-Days of the building's location or by the AHJ. <table border="1"> <thead> <tr> <th>Climate Zone</th><th>Heating Degree-Days</th></tr> </thead> <tbody> <tr> <td>4</td><td>&lt; 3000</td></tr> <tr> <td>5</td><td>3000 to 3999</td></tr> <tr> <td>6</td><td>4000 to 4999</td></tr> <tr> <td>7A</td><td>5000 to 5999</td></tr> <tr> <td>7B</td><td>6000 to 6999</td></tr> <tr> <td>8</td><td>≥ 7000</td></tr> </tbody> </table>	Climate Zone	Heating Degree-Days	4	< 3000	5	3000 to 3999	6	4000 to 4999	7A	5000 to 5999	7B	6000 to 6999	8	≥ 7000
Climate Zone	Heating Degree-Days														
4	< 3000														
5	3000 to 3999														
6	4000 to 4999														
7A	5000 to 5999														
7B	6000 to 6999														
8	≥ 7000														
<b>PID or Legal Description</b>	The Parcel Identifier (PID) is a nine-digit number that uniquely identifies a parcel in the land title register in BC. Check the <a href="#">BC Land Title and Survey website</a> to find the PID or Legal Description for the property.														

<b>BC Building Code Performance Compliance Path</b>	<p>Select the BC Energy Compliance path the project is going under:</p> <ul style="list-style-type: none"> <li>• If using the <b>9.36.5. Energy Performance Compliance Path</b>, check the box and complete Sections A, B, <b>C</b>, &amp; E of the BC Energy Compliance Report.</li> <li>• If using the <b>9.36.6. Energy Step Code Compliance Path</b>, check the box and complete Sections A, B, <b>D</b>, &amp; E of the BC Energy Compliance Report.</li> </ul>
<b>Software Name</b>	List Full Name of Software (i.e. HOT2000) used for energy performance modelling.
<b>Version</b>	List Version of Software (e.g. v11.4 of HOT2000).
<b>Climatic Data (Location)</b>	Indicate the Weather location used by the Software. In HOT2000, this can be found in the Weather tab under the Location selection.
<b>B: BUILDING CHARACTERISTICS SUMMARY</b>	
<b>Details (Assembly / System Type / Fuel Type / Etc.)</b>	<p>Provide a summary of the building characteristics details:</p> <ul style="list-style-type: none"> <li>• Provide a summary list as per example in Appendix I. When listing building envelope assemblies, it's a good practice to list the components from outside to inside for walls and top to bottom for ceilings and floors; or</li> <li>• Indicate information as requested by AHJ.</li> </ul>
<b>Effective RSI-Value / Efficiency</b>	<p>Indicate the energy performance of each building characteristic.</p> <ul style="list-style-type: none"> <li>• <b>Building Envelope:</b> Indicate the effective RSI-value of the building envelope components from the HOT2000 TSV data. Look for the following TSV variables <ul style="list-style-type: none"> <li>○ Ceillns – weighted average ceiling effective RSI-value</li> <li>○ MainWallns – weighted average wall effective RSI-value</li> <li>○ FndWallns – weighted average effective foundation wall RSI-value</li> <li>○ EGHnExposedFlr – weighted average effective exposed floor RSI-value</li> </ul> </li> </ul> <p>Note: the RSI-values from HOT2000 may be different from RSI-values on the architectural drawings.</p> <ul style="list-style-type: none"> <li>• <b>Fenestration and Doors:</b> Indicate the range of U-values and SHGC for the windows, skylights, and doors from the energy performance labels.</li> <li>• <b>HVAC:</b> Indicate the efficiency of the HAVC systems.</li> <li>• See examples in Appendix I</li> </ul>
<b>Exterior Walls &amp; Floor Headers</b>	Describe assembly/construction details of the above grade exterior walls and headers.

<b>Roof / Ceilings</b>	Describe assembly/construction details of the ceilings (attics, cathedral ceilings, etc.).
<b>Foundation Walls, Headers, &amp; Slabs</b>	Describe assembly/construction details of the foundation walls, header and slab. Also indicate whether the slab is below or above the frost line and whether it's heated (e.g. in-floor heating) or not.
<b>Floors over Unheated Spaces</b>	Describe assembly/construction details of the exposed floor(s).
<b>Fenestration and Doors</b>	Describe the type and efficiency characteristics of the fenestration and doors.
<b>FDWR</b>	<p>Enter the ratio of total <u>vertical</u> fenestration and door area to gross wall area as a percentage. This information should be available on the architectural drawings. Note: the FDWR found in the EnerGuide Rating System Results screen includes the area of skylights which <b>should not</b> to be included in the FDWR for BCBC compliance.</p> <p>For the manual calculation (summarized below), refer to NRCAN's "Guidelines for Using HOT2000 v.11 to Demonstrate Compliance with Subsection 9.36.5 of the 2015 National Building Code."</p> <ul style="list-style-type: none"> <li>• FD: Fenestration and Door Area</li> <li>• W: Above Grade Gross Wall Area, including headers, above-ground foundation walls and pony walls.</li> <li>• <math>FDWR (\%) = FD/W * 100\%</math></li> </ul>
<b>Air Barrier System &amp; Location</b>	Describe the type(s) and location(s) of the air barrier system(s).
<b>Space Conditioning (Heating and Cooling)</b>	Describe the type(s) of heating and cooling system(s) used.
<b>Service Water Heating</b>	Describe the type(s) of domestic hot water heating system(s) used.
<b>Ventilation</b>	Describe the type(s) of ventilation system(s) used.
<b>Other Energy Impacting Features</b>	Describe and indicate other features that may impact the energy performance of the building (e.g. drain water heat recovery unit).
<b>Pre-Construction Confirmation Statement: The above information is correct based on drawings...</b>	Indicate the company that completed the architectural drawings and the date it was completed. This information is found on the drawings.
<b>As-Built Confirmation Statement: The above information is correct based on a site evaluation completed on...</b>	Indicates that the site verification was completed according to NRCAN ERS procedures. Include the date of the site visit.

C: 9.36.5. ENERGY PERFORMANCE COMPLIANCE	
<b>Complete this section only if using the Energy Performance Compliance Path in Subsection 9.36.5.</b>	
<b>Proposed / As-Built House Energy Rated Consumption (GJ/year)</b>	Follow NRCan's instructions as outlined in the "Guidelines for Using HOT2000 v.11 to Demonstrate Compliance with Subsection 9.36.5 of the 2015 National Building Code" document to obtain the HVAC and Hot Water Heating energy consumption for the Proposed / As-Built House.
<b>Reference House Rated Target (GJ/year)</b>	Follow NRCan's instructions as outlined in the "Guidelines for Using HOT2000 v.11 to Demonstrate Compliance with Subsection 9.36.5 of the 2015 National Building Code" document to obtain the HVAC and Hot Water Heating energy consumption for the Reference House.
<b>The airtightness value used in the energy model calculations for the Proposed / As-Built House is:</b>	<p>Indicate the airtightness value used in the energy model for the Proposed / As-Built House by selecting the appropriate option:</p> <ul style="list-style-type: none"> <li>• 4.5 ACH @ 50 Pa, where the construction complies with Section 9.25.,</li> <li>• 3.5 ACH @ 50 Pa, where it can be shown that the air barrier system is constructed in accordance with Subsection 9.25.3 and Articles 9.36.2.9. and 9.36.2.10., or</li> <li>• Tested in accordance with Sentence (11) (see 9.36.5.10. (11) of Division B).</li> </ul> <p>For more details, see BCBC Sentence 9.36.5.10.(9) of Division B.</p>
<b>Confirmation Statement: The above calculation was performed in compliance with Subsection 9.36.5. of Division B</b>	Check to confirm this is completed in compliance with Subsection 9.36.5. of Division B.
D: 9.36.6. ENERGY STEP CODE COMPLIANCE	
<b>Complete this section only if using the Energy Performance Compliance Path in Subsection 9.36.6.</b>	
<b>Proposed House / As-Built House Rated Energy Consumption (GJ/year)</b>	Annual energy consumption of the Proposed / As-Built House <b>without baseloads</b> . Equivalent to 'Total AEC' minus 'Baseloads' from the HOT2000 calculation results, rounded to the nearest whole number. See Appendix III for calculation details.
<b>Reference House Rated Energy Target (GJ/year)</b>	Annual energy consumption of the Reference House <b>without baseloads</b> . Equivalent to 'ERS reference house-Base Case' minus 'Baseloads' from the HOT2000 calculation results, rounded to the nearest whole number. See Appendix III for calculation details.
<b>Step Code Level</b>	Indicate the Step Code level the project is required to meet, as set by the AHJ.
<b>Mechanical Energy Use Intensity (MEUI)</b>	<b>Required:</b> Enter compliance requirement per BCBC Article 9.36.6.3. of Division B

	<p><b>Proposed:</b> Use the Proposed House energy model, see instructions in Appendix IV</p> <p><b>As-Built:</b> Use the As-Built energy model, see instructions in Appendix IV</p>
<b>ERS Rating % Lower Than EnerGuide Reference House, where applicable</b>	<p><b>Required:</b> Enter compliance requirement per BCBC Article 9.36.6.3. of Division B</p> <p><b>Proposed:</b> Use the Proposed House energy model, see instructions in Appendix V</p> <p><b>As-Built:</b> Use the As-Built energy model, see instructions in Appendix V</p>
<b>Thermal Energy Demand Intensity (TEDI)</b>	<p><b>Required:</b> Enter compliance requirement per BCBC Article 9.36.6.3. of Division B</p> <p><b>Proposed:</b> Use the Proposed House energy model, see instructions in Appendix VI</p> <p><b>As-Built:</b> Use the As-Built energy model, see instructions in Appendix VI</p>
<b>Peak Thermal Load (PTL)</b>	<p><b>Required:</b> Enter compliance requirement per BCBC Article 9.36.6.3. of Division B</p> <p><b>Proposed:</b> use the Proposed House energy model, see instructions in Appendix VII</p> <p><b>As-Built:</b> Use the As-Built energy model, see instructions in Appendix VII</p>
<b>Airtightness in Air Changes per Hour at 50 Pa differential</b>	<p><b>Required:</b> Enter compliance requirement per BCBC Article 9.36.6.3. of Division B.</p> <p><b>Proposed:</b> Enter compliance requirement per BCBC Article 9.36.6.3. of Division B OR other lower airtightness target as identified by the Energy Advisor.</p> <p><b>As-Built:</b> Enter actual blower door test results from the final site evaluation.</p>
<b>Step Code [Design] Requirements Met</b>	Check Yes or No if the home met, or did not meet, the requirement for the prescribed Step Code level.
<b>Confirmation Statement: The above calculation was performed in compliance with (see Clause 2.2.8.3.(2)(e) of Division C)</b>	Check the appropriate compliance calculation method used.
<b>E: COMPLETED BY</b>	
<b>Full Name (Print)</b>	Print first and last name of Registered Energy Advisor (EA).
<b>Company Name</b>	Enter EA's full company name.
<b>Phone</b>	Enter EA's business phone number.
<b>Address</b>	Enter EA's business company address.
<b>Email</b>	Enter EA's business email address.

<b>Date (dd/mm/yyyy)</b>	Enter the date the BC Energy Compliance Report was completed.
<b>Advisor ID Number</b>	Enter EA's identification number issued by the Service Organization.
<b>Service Organization</b>	Enter the name of the Service Organization where the file was submitted.
<b>EnerGuide P / N #</b>	Enter the full EnerGuide Rating System P and/or N file number.
<b>F: OTHER ENERGY MODELLING METRICS</b>	
<b>Airtightness NLA@10Pa</b>	Taken from the Full House Report's "Air Leakage and Mechanical Ventilation" section or from the Homeowner Information Sheet.
<b>EnerGuide Rating</b>	The 'Rating' from the HOT2000 calculation results, including baseloads.
<b>EnerGuide Reference House</b>	The 'Reference House' from the HOT2000 calculation results, including baseloads.
<b>EnerGuide Rating % Lower than EnerGuide Reference House, House with baseloads</b>	The '% Lower (Higher) Than Ref Hse' from the HOT2000 calculation results.
<b>Rated Energy Use Intensity</b>	The 'Energy Use Intensity' from the HOT2000 calculation results.
<b>Rated Greenhouse Gas Emissions</b>	The 'Estimated Greenhouse Gas Emissions' from the Full House Report from the "House with standard operating conditions" run, multiplied by 1000kg/t to get kg/year.
<b>Rated Greenhouse Gas Intensity</b>	The 'Greenhouse Gas Intensity' is calculated by dividing the Rated Greenhouse Gas Emissions by the total heated floor area and multiplied by 1000kg/t to get kg/m <sup>2</sup> /year.
<b>G: OPTIONAL CERTIFICATIONS</b>	
<b>Pending</b>	If there is a pending energy labelling certification check the appropriate box and, if relevant, write in the appropriate level of the certification (e.g BUILT GREEN, Level: Gold)

## APPENDIX I – Sample Step Code Compliance Report

**AS-BUILT**

### BC 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 #: <input type="text"/>	Building Type: <input type="text" value="Single Detached"/>
Builder: <input type="text" value="Tom Builderman"/>	If Other, Please Specify: <input type="text"/>
Project Address: <input type="text" value="123 Main Street"/>	Number of Dwelling Units: <input type="text" value="1"/>
Municipality / District: <input type="text" value="Vancouver, BC"/>	Climate Zone: <input type="text" value="4"/>
Postal Code: <input type="text" value="V6Z 1K7"/>	PID or Legal Description: <input type="text" value="012-3456-789"/>

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)

	DETAILS (ASSEMBLY / SYSTEM TYPE / FUEL TYPE / ETC.)	EFFECTIVE RSI-VALUE / EFFICIENCY
EXTERIOR WALLS & FLOOR HEADERS	2x6, 16" OC, R22; Headers w/ R22	RSI 2.85
ROOF / CEILINGS	Attic Truss, 24" OC, R40	RSI 6.93
FOUNDATION WALLS, HEADERS, & SLABS	8" Concrete, 2x4, 16" OC, R14; Headers w/ R22 Uninsulated Slab Slab Is: <input checked="" type="checkbox"/> Below OR <input type="checkbox"/> Above Frost Line AND <input type="checkbox"/> Heated OR <input checked="" type="checkbox"/> Unheated	RSI 2.02
FLOORS OVER UNHEATED SPACES	2x11 7/8 TJI, R40	RSI 7.44
FENESTRATION & DOORS	Doors: Steel Insulated Windows: Vinyl, Double Glazed, Argon, Low-E, Insulated Spacer FDWR: <input type="text" value="21"/> %	Doors: U1.4 Win: U1.31 to 1.36 SGHG=0.25 to 0.30
AIR BARRIER SYSTEM & LOCATION	Interior Polyethylene Membrane Barrier	UV-stab 6mil polyethylene
SPACE CONDITIONING (HEATING & COOLING)	Natural Gas Furnace, no cooling Gas fireplace, direct-vented with no standing pilot	Furnace = 95% AFUE Fireplace = 76%
SERVICE WATER HEATING	On-demand Hot Water Heater	0.97 EF
VENTILATION	HRV	SRE at OC=61%, -25C=58%
OTHER ENERGY IMPACTING FEATURES	N/A	

The above information is correct based on a site evaluation completed on (dd/mm/yyyy):

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**C: 9.36.5. ENERGY PERFORMANCE COMPLIANCE** (see Clause 2.2.8.3.(2)(c) of Division C)

Complete this section only if using the Energy Performance Compliance Path in Subsection 9.36.5.

AS-BUILT HOUSE RATED ENERGY CONSUMPTION (GJ/YEAR)		REFERENCE HOUSE RATED ENERGY TARGET (GJ/YEAR)	
HVAC		HVAC	
Hot Water Heating		Hot Water Heating	
<b>SUM</b>		<b>SUM</b>	

The airtightness value used in the energy model calculations for the As-Built House is:

☐ 4.5 ACH @ 50Pa    ☐ 3.5 ACH @ 50Pa    OR    Tested At  ACH @ 50Pa

The above calculation was performed in compliance with Subsection 9.36.5. of Division B: ☐ Yes ☐ No

**D: 9.36.6. ENERGY STEP CODE COMPLIANCE** (see Sentence 2.2.8.3(3) of Division C)

Complete this section only if using the Energy Step Code Compliance Path in Subsection 9.36.6.

As-Built House Rated Energy Consumption (GJ/year):     Reference House Rated Energy Target (GJ/year):

METRIC	UNITS	REQUIRED	PROPOSED	AS-BUILT
Step Code Level	Step 1, 2, 3, 4, or 5	3		3
Mechanical Energy Use Intensity (MEUI)	kWh/(m <sup>2</sup> -year)	45 (max)		38
ERS Rating % Lower Than EnerGuide Reference House, where applicable	%	20 (min)		17.1
Thermal Energy Demand Intensity (TEDI)	kWh/(m <sup>2</sup> -year)	40 (max)		26
Peak Thermal Load (PTL)	W/m <sup>2</sup>	30 (max)		21
Airtightness in Air Changes per Hour at 50 Pa differential	ACH @ 50 Pa	2.5 (max)		1.8
Step Code Requirements Met: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				

The above calculation was performed in compliance with (see Clause 2.2.8.3.(2)(e) of Division C)

Select One:

- ☐ Subsection 9.36.5.,
- ☐ The Passive House Planning Package (PHPP), version 9 or newer, and the energy model was prepared by a Certified Passive House Designer or Certified Passive House Consultant,
- ☒ The EnerGuide Rating System (ERS), version 15 or newer, or
- ☐ The applicable requirements of NECB Part 8 and the City of Vancouver Energy Modelling Guidelines.

**E: COMPLETED BY**

Full Name (Print): <input type="text" value="Jim Advisorman"/>	<b>If applicable, enter ERS information:</b>
Company Name: <input type="text" value="Advisorman Building Tech"/>	Advisor ID Number: <input type="text" value="AAXX"/>
Phone: <input type="text" value="804-777-999"/>	Service Organization: <input type="text" value="Best SO Ltd"/>
Address: <input type="text" value="123 Cross Road, Vancouver BC"/>	EnerGuide P #: <input type="text" value="AAXXP00184"/>
Email: <input type="text" value="jim@jimsso.ca"/>	EnerGuide N #: <input type="text" value="AAXXN00184"/>
Date (dd/mm/yyyy): <input type="text" value="01/01/2018"/>	

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## SUPPLEMENTARY INFORMATION

Supplementary information is not required for Code Compliance but may be requested by the local municipality/district.

If required, complete the applicable sections below.

### F: OTHER ENERGY MODELLING METRICS

METRIC	UNITS	PROPOSED	AS-BUILT
Airtightness NLA@10Pa	cm <sup>3</sup> /m <sup>3</sup>		0.97
EnerGuide Rating	GJ/year		70
EnerGuide Reference House	GJ/year		79
EnerGuide Rating % Lower Than EnerGuide Reference House House with baseloads	%		11.4
Rated Energy Intensity	GJ/m <sup>2</sup> /year		0.21
Rated Greenhouse Gas Emissions	kg/year		2395
Rated Greenhouse Gas Intensity	kg/m <sup>2</sup> /year		7.4

### G: OPTIONAL CERTIFICATIONS

PENDING:

- ☐ BUILTGREEN®, Level:
- ☐ Certified Passive House
- ☐ CHBA Net Zero House

- ☐ ENERGY STAR® for New Homes
- ☐ LEED® Canada for Homes, Level:
- ☐ R2000
- ☐ Other:

## APPENDIX II – Rounding Calculations

To ensure consistency among Energy Advisors, below are guidelines for rounding when performing calculations to obtain the Step Code Metrics:

1. When pulling information from HOT2000 and making calculations (through the Energy Step Code Compliance Calculator or by hand) enter all values to the **hundredth** decimal place (2 numbers after the decimal).
2. When entering **Proposed or As-Built House Rated Energy Consumption, Reference House Rated Energy Target, TEDI, MEUI and PTL** calculation results into Section D of the BC Energy Compliance Report, round the results to the nearest whole number (i.e. no decimal places). This means that:
  - If the tenth decimal is less than 5, round down (e.g. 26.49 is rounded down to 26).
  - If the tenth decimal is equal to or greater than 5, round up (e.g. 26.51 is rounded up to 27).
3. When entering **ERS % Lower Than Reference House** and **Airtightness in Air Changes Per Hour at 50Pa** into Section D of the BC Energy Compliance Report, round the results to the tenth decimal place (i.e. one decimal place). This means that:
  - If the hundredth decimal is less than 5, round down (e.g. 26.51 is rounded down to 26.5).
  - If the hundredth decimal is equal to or greater than 5, round up (e.g. 26.49 is rounded up to 26.5). Similarly, 26.95 is rounded up to 27.0).

## APPENDIX III – Calculating Proposed and As-Built House Rated Energy Consumption and Reference House Rated Energy Target

**Proposed and As-Built House Rated Energy Consumption without baseloads in GJ/year**  
**Reference House Rated Energy Target without baseloads in GJ/year**

### 1. Definition:

- The Proposed or As-Built House Rated Energy Consumption describes the energy use over a year without baseloads, expressed in GJ/year.
- The Reference House Rated Energy Target describes the energy use over a year without baseloads if the home was built to the National Building Code, expressed in GJ/year.

### 2. Formula:

- Proposed or As-Built House Rated Energy Consumption (GJ) = Total Annual Energy Consumption of the House (GJ) – Baseloads (GJ)
- Reference House Rated Energy Target (GJ) = Total Annual Energy Consumption of the Reference House (GJ) – Baseloads (GJ)

### 3. HOT2000 Screenshot:

**EnerGuide Rating System Results**

Rating	70	GJ/a	Reference House	79	GJ/a	Nat. ACH	0.0
Energy Use Intensity	0.21	GJ/m²/a	% Lower Than Ref Hse	11.4	%	Q <sub>Tot</sub>	51.1
Greenhouse Gases	2.4	t/a				Q <sub>Warm</sub>	31.7

Rated Annual Energy Consumption (AEC)		Rated Annual Energy Production (AEP)		
Space Heating	31.60	GJ	Electricity Generation	0.0
Space Cooling	0.0	GJ	Solar DHW	0.0
DHW	11.80	GJ	Total AEP	0.0
Ventilation, Electric	0.70	GJ		
Baseloads	25.62	GJ		
Total AEC	69.72	GJ	Net AEC - AEP	69.72

House Name	AEC (GJ/a)	AEP (GJ/a)	Net (GJ/a)
ERS reference house-----Base Case			78.79
General mode-----Base Case			71.26
House with standard operating conditions-----Base Case			69.72

- (1) **Total AEC (GJ)** = Total Annual Energy Consumption of the House.
- (2) **Baseloads (GJ)** = Annual Baseload consumption based on ERS Standard Operating Conditions.
- (3) **ERS reference house--Base Case (GJ)** = Total Annual Energy Consumption of the Reference House.

**Important Note:** Do not take the values from the Advanced tab as those have already been rounded to the tenth decimal, which may give a higher or lower result if it's rounder further.

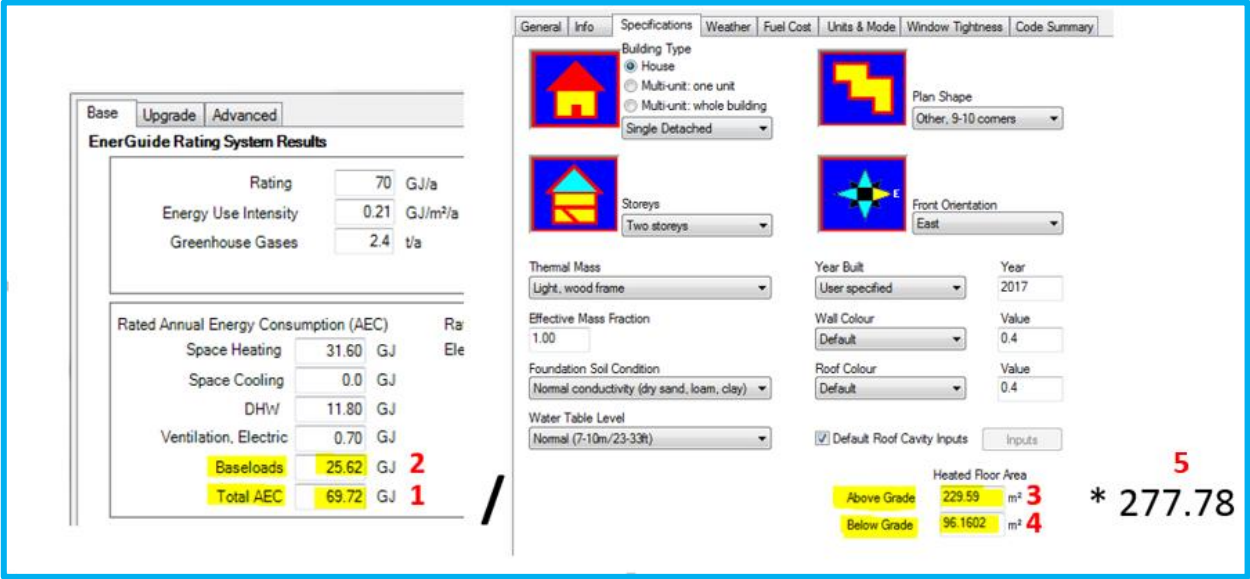
**4. Example Calculation:**

- a. Proposed or As-Built House Rated Energy Consumption =  $1 - 2$ 
  - Proposed or As-Built House Rated Energy Consumption = 69.72GJ *minus* 25.62GJ = 44.10GJ; and rounded down to 44GJ/year.
- b. Reference House Rated Energy Target =  $3 - 2$ 
  - Reference House Rated Energy Target = 78.79GJ *minus* 25.62GJ = 53.17GJ; and rounded down to 53GJ/year.

## APPENDIX IV – Calculating Mechanical Energy Use Intensity (MEUI)

### Mechanical Energy Use Intensity (MEUI) in kWh/(m<sup>2</sup>·year)

- Definition:** MEUI describes the mechanical energy use over a year, estimated by using an energy model in accordance with BCBC Article 9.36.6.4., normalized per square metre of area of conditioned space and expressed in kWh/(m<sup>2</sup>·year). Mechanical equipment included in the MEUI are space-heating, space-cooling, fans, service water heating equipment, pumps, and auxiliary HVAC equipment.
- Formula:** MEUI (kWh/(m<sup>2</sup>·year)) = (Total Annual Energy Consumption (kWh/year) – Baseloads (kWh/year)) / Heated Floor Area (m<sup>2</sup>)
- HOT2000 Screenshots:**

4. 

- Total AEC (GJ)** = Total Annual Energy Consumption of the House.
- Baseloads (GJ)** = Annual Baseload consumption based on ERS Standard Operating Conditions.
- Above Grade Heated Floor Area (m<sup>2</sup>)** = The sum of all floor areas that are located on a floor level that is entirely above grade.
- Below Grade Heated Floor Area (m<sup>2</sup>)** = The sum of all basement floor areas that are located on a floor level that is wholly or partially below grade.
- Energy conversion where **277.78kWh = 1GJ**

### 5. Example Calculation:

- MEUI = [(1 minus 2) / (3 + 4)] \* 5
- MEUI = [(69.72GJ minus 25.62GJ) divided by (229.59m<sup>2</sup> plus 96.16m<sup>2</sup>)] multiplied by 277.78kWh/GJ = 37.61kWh/(m<sup>2</sup>·year); rounded up to 38kWh/(m<sup>2</sup>·year)

## APPENDIX V – Calculating ERS Rating % Lower Than EnerGuide Reference House

**EnerGuide Rating System (ERS) Rating Compared to ERS Reference House without baseloads (%LTRH w/o BL) in percentage (%).**

- 1. Definition:** %LTRH without baseloads (w/o BL) is a result of comparing the energy consumption of the proposed building to an automatically-generated ERS reference house from HOT2000 version 11.3, ERS Version 15. The metric does not include the ERS assumed electric base loads.
- 2. Formula:**  $\%LTRH\ w/o\ BL\ (\%) = 100 - ((\text{Total Energy Consumption Proposed House (kWh/year)} - \text{Baseloads (kWh/year)}) \cdot 100 / (\text{Total Energy Consumption Reference House (kWh/year)} - \text{Baseloads (kWh/year)}))$
- 3. HOT2000 Screenshots:**

Space Conditioning and DHW Analysis			
Space Conditioning and DHW Consumption (GJ/a)			
	SOC House	Reference House	
Net AEC - AEP	69.7	78.8	
Baseloads	- 25.6	- 25.6	
Space and DHW Consumption	= 44.1	= 53.2	

Space conditioning and DHW consumption  
% Lower Than Ref Hse **17.1** %

After modelling the house run the calculations by pressing Alt + C. The %LTRH w/o BL can be found on the right hand side of the third tab labelled “Advanced”.

- 4. For Manual Calculations:** The needed figures are taken from the first tab labelled “Base” instead of the space heating and DHW figures from the third “Advanced” tab for increased accuracy.

Base Upgrade Advanced									
<b>EnerGuide Rating System Results</b>									
Rating	70	GJ/a	Reference House	79	GJ/a	Nat. ACH	0.0		
Energy Use Intensity	0.21	GJ/m²/a	% Lower Than Ref Hse	11.4	%	Q <sub>Tot</sub>	51.0		
Greenhouse Gases	2.4	t/a				Q <sub>Warm</sub>	31.7		
Rated Annual Energy Consumption (AEC)					Rated Annual Energy Production (AEP)				
Space Heating	31.60	GJ	Electricity Generation	0.0	GJ	$A_{\text{windows \& doors}} / A_{\text{wt}}$			
Space Cooling	0.0	GJ	Solar DHW	0.0	GJ	Ref Hse $A_{\text{windows \& doors}} / A_{\text{wt}}$			
DHW	11.80	GJ	Total AEP	0.0	GJ	Design Heat Lo			
Ventilation, Electric	0.70	GJ				Design Heat G			
Baseloads	25.62	GJ							
Total AEC	69.72	GJ							
			Net AEC - AEP	69.72	GJ				
House Name		AEC (GJ/a)		AEP (GJ/a)					
ERS reference house---Base Case								78.79	3
General mode---Base Case								71.26	
House with standard operating conditions---Base Case								69.72	

- (1) **Total AEC (GJ)** = Total Annual Energy Consumption of the House.
- (2) **Baseloads (GJ)** = Annual Baseload consumption based on ERS Standard Operating Conditions.
- (3) **ERS reference house--Base Case (GJ)** = Total Annual Energy Consumption of the Reference House.

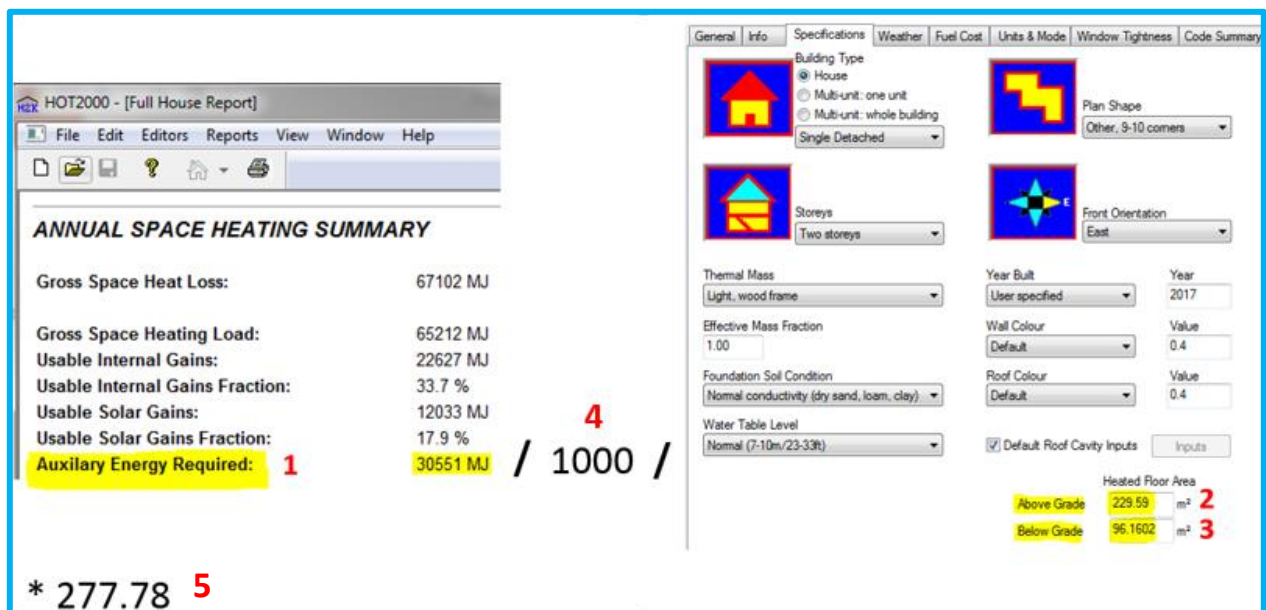
##### 5. Example Calculation:

- %LTRH w/o BL =  $100 - ((1 - 2) * 100 / (3 - 2))$
- %LTRH w/o BL =  $100 - ((69.72\text{GJ} \text{ minus } 25.6\text{GJ}) \text{ multiplied by } 100 \text{ divided by } (78.79\text{GJ} \text{ minus } 25.62\text{GJ})) = 17.05\%; \text{ rounded to } 17.1\%$

## APPENDIX VI – Calculating Thermal Energy Demand Intensity (TEDI)

### Thermal Energy Demand Intensity (TEDI) in kWh/(m<sup>2</sup>·year)

- Definition:** TEDI describes the annual heating required by the building for space conditioning and for conditioning of ventilation air, estimated by using an energy model in accordance with BCBC Article 9.36.6.4., normalized per square metre of area of conditioned space and expressed in kWh/(m<sup>2</sup>·year). TEDI considers thermal transmittance of the building envelope components (including assemblies, windows, doors and skylights), air leakage through the air barrier system, internal heat gains from occupants and equipment, and heat recovery from exhaust ventilation.
- Formula:**  $\text{TEDI (kWh/(m}^2\text{·year))} = \text{Space Heating Demand (kWh/year)} / \text{Heated Floor Area (m}^2\text{)}$
- HOT2000 Screenshots:**



- (1) Auxiliary Energy Required (MJ)** = The amount of heat energy the space heating equipment must provide to maintain the house temperatures. Obtained from the Full House Report using data from the “House with standard operating conditions” run.
- (2) Above Grade Heated Floor Area (m<sup>2</sup>)** = The sum of all floor areas that are located on a floor level that is entirely above grade.
- (3) Below Grade Heated Floor Area (m<sup>2</sup>)** = The sum of all basement floor areas that are located on a floor level that is wholly or partially below grade.
- (4) Energy conversion where 1000MJ = 1GJ**
- (5) Energy conversion where 277.78kWh = 1GJ**

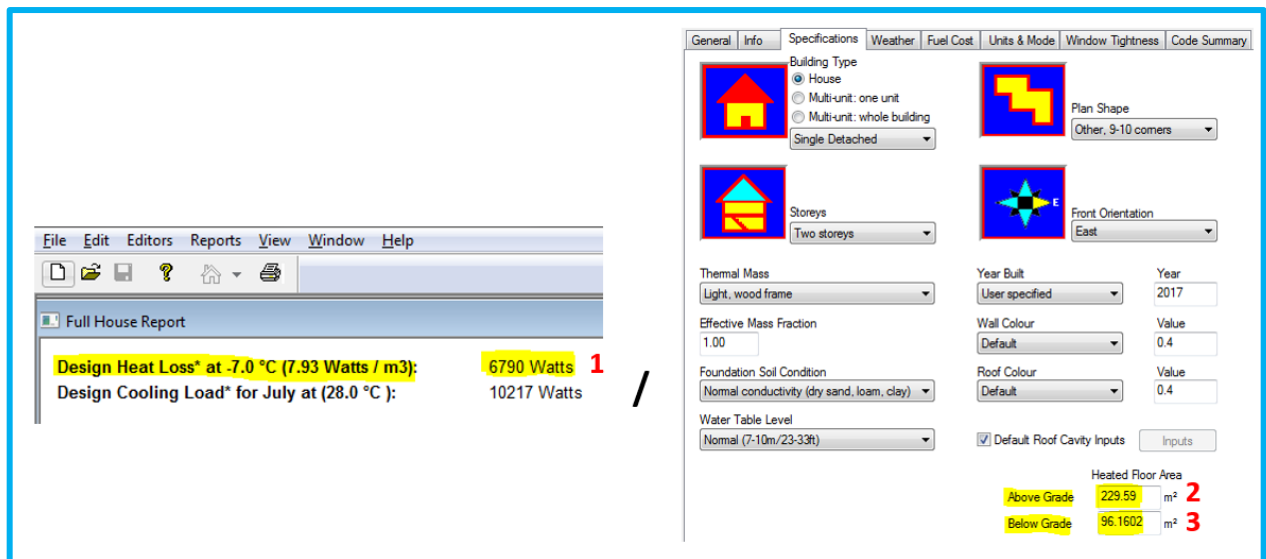
#### 4. Example Calculation:

- TEDI =  $1 / 4 / (2 + 3) * 5$
- TEDI = 30,551MJ *divided by* 1000MJ/GJ *divided by* (229.59m<sup>2</sup> *plus* 96.16m<sup>2</sup>) *multiplied by* 277.78kWh/GJ = 26.05kWh/(m<sup>2</sup>·year); rounded down to 26kWh/(m<sup>2</sup>·year)

## APPENDIX VII – Calculating Peak Thermal Load (PTL)

### Peak Thermal Load (PTL) in W/m<sup>2</sup>

- Definition:** PTL describes the maximum heating energy required by the building for space conditioning and for conditioning of ventilation air, estimated by using an energy model in accordance with BCBC Article 9.36.6.4., at a 2.5% January design temperature and expressed in watts per square metre of area (W/m<sup>2</sup>) of conditioned space. PTL considers the same factors as TEDI, which are thermal transmittance of the building envelope components (including assemblies, windows, doors and skylights), air leakage through the air barrier system, internal heat gains from occupants and equipment, and heat recovery from exhaust ventilation.
- Formula:**  $PTL (W/m^2) = \text{Design Heat Loss (W)} / \text{Heated Floor Area (m}^2\text{)}$
- Hot2000 Screenshots:**



- (1) Design Heat Loss (W)** = The maximum heating energy required by the building for space conditioning based on the outdoor winter design temperature. Obtained from the Full House Report using data from the “House with standard operating conditions” run.
  - (2) Above Grade Heated Floor Area (m<sup>2</sup>)** = The sum of all floor areas that are located on a floor level that is entirely above grade.
  - (3) Below Grade Heated Floor Area (m<sup>2</sup>)** = The sum of all basement floor areas that are located on a floor level that is wholly or partially below grade.
- 4. Example Calculation:**
- PTL = 1 / (2 + 3)
  - PTL = 6790W *divided by* (229.59m<sup>2</sup> *plus* 96.16m<sup>2</sup>) = 20.84W/m<sup>2</sup>; rounded up to 21W/m<sup>2</sup>;
- Note: For manual calculations, the design heat losses (1) must be taken from the full house report instead of the “Base” tab of the calculation screen for increased accuracy.

## CONTACT INFORMATION AND COMMENTS

To provide feedback and recommendations on the BC Energy Compliance Report and this Instruction Manual please contact Peter Sundberg at City Green Solutions via email: [manager@citygreen.ca](mailto:manager@citygreen.ca).