

## **2018 British Columbia Building Code Public Review of Proposed Changes**



**PROPOSED CHANGE:** Referenced Standards for Energy Efficiency

**CHANGE NUMBER:** 2018-BCBC-04-Energy Standards

**CODE REFERENCE:** 2012 British Columbia Building Code - Division B - Article 1.3.1.2.

**RELATED CODE REFERENCE(S):** Sentence 9.36.1.3.(1), Sentence 10.2.1.1.(1)

### **DESCRIPTION OF THE PROPOSED AMENDMENT:**

It is proposed to require conformance with either the 2016 edition of ASHRAE 90.1 or the 2015 edition of the National Energy Code of Canada for Buildings (NECB).

### **PROBLEM/GENERAL BACKGROUND:**

The British Columbia Building Code (BCBC) is based substantially on the model National Building Code of Canada (NBC). The NBC is updated about every five years and British Columbia adopts most of the NBC requirements into the next edition of the BCBC. However, the referenced standards for energy efficiency in the BCBC are unique variations to British Columbia.

As the current editions of referenced standards for energy efficiency in the BCBC do not represent the latest standards, the Province is proposing to update the BCBC's unique variations. Further improvements in energy efficiency are required to align with the goal of net-zero energy ready buildings by 2030.

The code wording shown below is the proposed final code language that will appear in the 2018 BCBC.

### **2018 PROPOSED BRITISH COLUMBIA CODE LANGUAGE (Deleted text / Added text):**

#### **1.3.1.2. Applicable Editions**

- 1) Where documents are referenced in this Code, they shall be the editions designated in Table 1.3.1.2.

<b>Table 1.3.1.2.(1)</b> <b>Documents Referenced in the Book I (General) of the British Columbia Building Code 2012</b> Forming part of Sentence 1.3.1.2.(1)		
<b>Issuing Agency</b>	<b>Document Number</b>	<b>Title of Document</b>
ASHRAE	ANSI/ASHRAE 90.1-201 <del>06</del> <ins>16</ins>	Energy Standard for Buildings Except Low-Rise Residential Buildings
CCBFC	NRCC <del>54435-2011</del> <ins>56191</ins>	National Energy Code of Canada for Buildings 201 <del>14</del> <ins>15</ins>

## **RATIONALE FOR CHANGE:**

The Province of British Columbia is committed to improving energy performance in buildings by aligning with the federal government's goal of requiring net-zero energy ready buildings in the NBC by 2030. Increasing the energy efficiency of buildings in the 2018 BCBC by updating the code to reference newer editions of ASHRAE 90.1 and the NECB is an integral step to meeting this goal and to preparing British Columbia's building industry for the adoption of the NBC 2030.

## **JUSTIFICATION/EXPLANATION:**

The difference in energy performance between ASHRAE 90.1-2010 and the NECB-2011 has been assessed comparing the prescriptive paths in the two standards. An assessment in 2011<sup>1</sup> showed an average of 14% lower energy consumption for the NECB across British Columbia. A separate assessment in 2012<sup>2</sup> for Vancouver showed a reduction in energy consumption by following the NECB of between 1.2 and 15.2%. The next BCBC is proposed to address this inequity in required energy performance.

The incremental improvement in energy performance from the NECB 2011 to the NECB 2015 was assessed to be about 2.5%.<sup>3</sup> Assessments by the Pacific Northwest National Laboratory concluded that, on average across the United States, buildings constructed to the prescriptive requirements of ASHRAE 90.1-2016 consume 6.7% less site energy than those constructed to ASHRAE 90.1-2013,<sup>4</sup> and buildings constructed to the prescriptive requirements of ASHRAE 90.1-2013 consume 7.6% less site energy than those constructed to ASHRAE 90.1-2010.<sup>5</sup> Taking these two analyses together, the relative savings between the 2016 and 2010 editions of Standard 90.1 is projected to be approximately 14%. Given the roughly 14% gap in average energy performance of buildings between the NECB 2011 and the ASHRAE 90.1-2010 standard, adopting ASHRAE 90.1-2016 and the NECB 2015 as the reference documents for energy performance would significantly close the performance gap between these two standards.

The process to develop the NECB and ASHRAE 90.1 are conservative processes that seek to minimize capital and life cycle costs to owners and building users. While the lifecycle costing studies for the entirety of both documents are not available, each proposed change in the NECB was assessed for cost-effectiveness, and a study comparing the cost-effectiveness of ASHRAE 90.1-2010 to ASHRAE 90.1-2013 for the state of Washington demonstrated capital cost savings for Climate Zone 4 on average, and no more than \$3/ft<sup>2</sup> increase in capital costs for any of six archetypes for Climate Zones 4 through 6, with lifecycle cost savings for all but two of 18 archetype and climate zone combinations.<sup>6</sup>

The objectives of the above proposal are as follows:

- To align the BCBC with current energy performance codes and standards for North America, which represent a consensus based appropriate level of building performance;
- To support the federal government's goal of requiring net-zero energy ready buildings in the National Building Code of Canada by 2030;

- To support the objectives of the code to “limit the probability that, as a result of design, construction or renovation of a building, the use of energy or water will be inefficient or the production of greenhouse gases will be excessive.”; and
- To more closely align the level of energy efficiency required by the two compliance options in the BCBC.

## OTHER SUPPORTING MATERIALS:

Further reading about changes to NECB and ASHRAE 90.1:

<http://www.nrcan.gc.ca/energy/efficiency/buildings/eenb/codes/4037>

[https://www.energycodes.gov/sites/default/files/becu/90.1-2013\\_Change\\_Highlights\\_BECU.pdf](https://www.energycodes.gov/sites/default/files/becu/90.1-2013_Change_Highlights_BECU.pdf)

<https://www.ashrae.org/news/2016/ashrae-ies-publish-2016-energy-efficiency-standard>

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<sup>1</sup> Hepting, C., December 2011; “Summary Review Assessment of Energy Performance Codes ASHRAE 90.1-2004, 90.1-2010 and NECB for British Columbia”, EnerSys Analytics Inc. Available at:  
<http://www3.telus.net/enersys/reports/ASHRAE%20vs%20NECB%20Summary-FINAL.pdf>

<sup>2</sup> Caneta Research Inc., February 2012; “ASHRAE 90.1 2010 and NECB 2011 Cross Canada Comparison”, Prepared for Natural Resources Canada. Available at:  
<http://www.housing.gov.bc.ca/building/green/energy/ASHRAE%2090.1%202010%20and%20NECB%202011%20Cross%20Canada%20Comparison.pdf>

<sup>3</sup> Performance Simulation of Proposed Changes to the 2015 Edition of the National Energy Code for Buildings (NECB), Relative to the 2011 Edition of NECB, Produced by: Steve Cormick, Aziz Laoudi, and Iain Macdonald, pages 122-125. Available at:  
[https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/reports/performance\\_simulation\\_of\\_proposed\\_changes\\_to\\_2015\\_nebc\\_report.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/reports/performance_simulation_of_proposed_changes_to_2015_nebc_report.pdf)

<sup>4</sup> US Department of Energy, Office of Energy Efficiency and Renewable Energy, June 2017; “Preliminary Energy Savings Analysis ANSI/ASHRAE/IES Standard 90.1-2016”. Available at: [https://energy.gov/sites/prod/files/2017/07/f35/Preliminary\\_90.1-2016\\_Energy\\_Savings\\_Analysis.pdf](https://energy.gov/sites/prod/files/2017/07/f35/Preliminary_90.1-2016_Energy_Savings_Analysis.pdf)

<sup>5</sup> Pacific Northwest National Laboratory, August 2014, “ANSI/ASHRAE/IES Standard 90.1-2013 Determination of Energy Savings: Quantitative Analysis”. Prepared for the U.S. Department of Energy. Available at:  
[https://www.energycodes.gov/sites/default/files/documents/901-2013\\_finalCommercialDeterminationQuantitativeAnalysis\\_TSD.pdf](https://www.energycodes.gov/sites/default/files/documents/901-2013_finalCommercialDeterminationQuantitativeAnalysis_TSD.pdf)

<sup>6</sup> Pacific Northwest National Laboratory, December 2015, “Cost-Effectiveness of ASHRAE Standard 90.1-2013 for the State of Washington”. Prepared for the U.S. Department of Energy. Available at:  
[http://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-25047.pdf](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-25047.pdf)