

Methods & Resources to Reach Upper BC Step Code

In September 2025, Focal Engineering delivered a *RMOW Energy Advisor Builder Breakfast Series* presentation on **Part 3 Methods and Resources for Higher Step Code**. This memo summarizes some of the tools and methods that were discussed.

Methods for Higher Steps

Figure 1 outlines strategies to achieve higher ESC targets throughout the project design and construction phases. These strategies are described individually below.



Figure 1: Applicable Methods at different stages of construction

Design Phase

Early-Stage Analysis

- Establishing clear building targets early with a model reduces long-term errors and costs
- Simplified tools are available to support early decision-making when a full model is not feasible

Realistic Key Design Targets

Keep track of “key compliance metrics” and consider reasonable targets for the values below:

- Wall/ Roof/ Floor R-values
- Windows Areas, layout, U-value, SHGC, Operability and Shading
- Airtightness
- Lighting and Plug Loads
- Ventilation Heating
- Space Heating & Cooling
- Domestic Hot Water

Passive First Design

Minimize building energy loads by considering different architectural and envelope design approaches such as:

- Simpler building forms
- Continuous air barrier & exterior insulation
- Optimizing window placement and properties
- Shading

Efficient/Low-Carbon Systems

Consider mechanical/electrical equipment upgrades to optimize efficiency and reduce carbon emissions:

- Higher ventilation heat recovery performance
- Higher equipment efficiency or COP
- Low lighting power density systems
- Consider electric systems that can efficiently provide both heating and cooling, such as heat pumps
- If dual fuel systems are necessary, consider a primary heating/cooling load supplied by heat pumps, with a natural gas system for peak load use only

Future-Thinking

Consider impacts on future building performance and resilience:

- model overheating and cooling energy simulations under future climate projections
- consider sizing mechanical equipment for future needs to avoid more costly retrofits and improve overall building resilience

Construction Phase

Construction Monitoring

Drive consistent communication between design and construction teams:

- Ask the energy modeler to review shop drawings related to the model
- Include a key design measures checklist during site visits
- Complete a mid-construction airtightness test to identify deficiencies in air barrier design
- Include air barrier training and discuss proper handling during site safety meetings

Occupancy

Commissioning, Measurement & Verification (M&V)

Explore post-construction measures:

- Consider commissioning and M&V to verify pre-design energy targets over the building's lifespan
- Explore owner and occupant education to optimally use of heating and cooling systems

Resources and Tools for Higher Steps

Energy modelling professional practice standards for part 3 buildings:

- EGBC, *Joint Professional Practice Guidelines – Whole Building Energy Modelling Services* (2018), url: https://www.egbc.ca/getmedia/8f8f0579-ca25-4cfd-a92c-e3c75900d1b6/EnergyModellingGuidelines_FINAL.pdf.aspx

Simple tool for early-stage analysis, and assessment of key Part 3 & 9 step code inputs:

- *Building Pathfinder* (2025), url: <https://buildingpathfinder.com/pathfinders/operational-energy/vancouver/high-rise-multifamily>

High-performance envelope design tools and guides:

- BC Housing, *Building Enclosure Design Guide – Wood-Frame Multi-Unit Residential Buildings* (2019), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/2001>
- BC Housing, *Energy Performance of Awnings in Residential Buildings* (2022), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/8838> - Part 9
- CWC, *Thermal Envelope Effective R-Value Calculator* (2025), url: <https://cwc.ca/design-tool/effectiver>
- BC Housing, *Building Envelope Guide for Houses: Part 9 Residential Construction 2nd edition* (2020), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/1668> - Part 9
- City of Vancouver, *Passive Design Toolkit, Best Practices* (2008), url: <https://council.vancouver.ca/20090507/documents/csbu2-PassiveDesignToolKit.pdf> - Part 9

Thermal bridging references:

- BC Hydro, *BC Building Envelope Thermal Bridging Guide* (2021), url: <https://www.bchousing.org/publications/Building-Envelope-Thermal-Bridging-Guide-v1.6.pdf>
- ZEBx, *Thermal Bridging in Net-Zero Energy-Ready Building Design* (2021), url: <https://www.zebx.org/wp-content/uploads/2021/09/Revised-ZEBx-Thermal-Bridging-playbook-July-2021-V3.pdf>
- BC Housing, *Thermal Bridging at Balconies and Doors Guide* (2024), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/8852>
- BC Housing, *Guide to Mitigating Thermal Bridging at Roofs and Decks* (2025), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/8759>

Planning and designing with airtightness in mind:

- ZEBx, *Planning Airtight Buildings* (2021), url: <https://www.zebx.org/wp-content/uploads/2021/05/2021-04-22-ZEBx-Playbook-Planning-Airtight-Buildings.pdf>
- BC Housing, *Illustrated Guide – Achieving Airtight Building* (2017), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/1765>
- City of Vancouver, *Airtightness Requirements – Process and Requirements for New Buildings* (2023), url: <https://vancouver.ca/files/cov/cbo-bulletin-2023-004-ad-bu-airtightness-testing-2023-sept-12.pdf>

Guides and strategies for efficient/ low-carbon mechanical systems:

- BC Housing, *Detailing Guide for Heat Pump Penetrations in Existing Buildings* (2025), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/8837>

- ZEBx, *Ventilation Strategies for High Performance Multi-Unit Residential Buildings* (2021), url: <https://www.zebx.org/wp-content/uploads/2021/04/Ventilation-Playbook-for-High-Performance-MURBs.pdf>
- BC Housing, *Design Guide for Domestic Hot Water Heat Pumps in New Multi-Unit Residential Buildings* (2024), url: https://www.bchousing.org/sites/default/files/media/documents/Design_Guide_for_Domestic_Hot_Water_Heat_Pumps_in_New_Multi_Unit_Residential_Buildings.pdf
- BC Housing, *Low Carbon Solutions for Multi-Unit Residential Buildings* (2024), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/8851>

Future-thinking design recommendations:

- BC Housing, *BC Energy Step Code Design Guide* (2019), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/742>
- BC Housing, *BC Energy Step Code - Design Guide Supplement S3 on Overheating and Air Quality* (2019), url: <https://www.bchousing.org/publications/BC-Energy-Step-Code-Guide-Supplemental.pdf>
- BC Housing, *Builder Insight 19-Modelling the Future Climate in Passively Cooled Buildings* (2020), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/1746>

Planning for airtightness testing during construction and occupancy:

- ZEBx, *Planning Airtight Buildings* (2021), url: <https://www.zebx.org/wp-content/uploads/2021/05/2021-04-22-ZEBx-Playbook-Planning-Airtight-Buildings.pdf>
- BC Housing, *Illustrated Guide – Achieving Airtight Building* (2017), url: <https://research-library.bchousing.org/Home/ResearchItemDetails/1765> - Part 9

Commissioning and M&V commentary:

- BC Housing, *Building Commissioning Guidelines* (2025), url: <https://www.bchousing.org/publications/BCH-Building-Commissioning-Guidelines.pdf>