ARCHITECTURAL INSTITUTE OF BRITISH COLUMBIA

CLIMATE ACTION
RESOURCES

July 2024

This document provides several resources on climate and sustainability, as they relate to the practice of architecture.

This list is not exhaustive, and readers are encouraged to send additional resources to climateaction@aibc.ca.

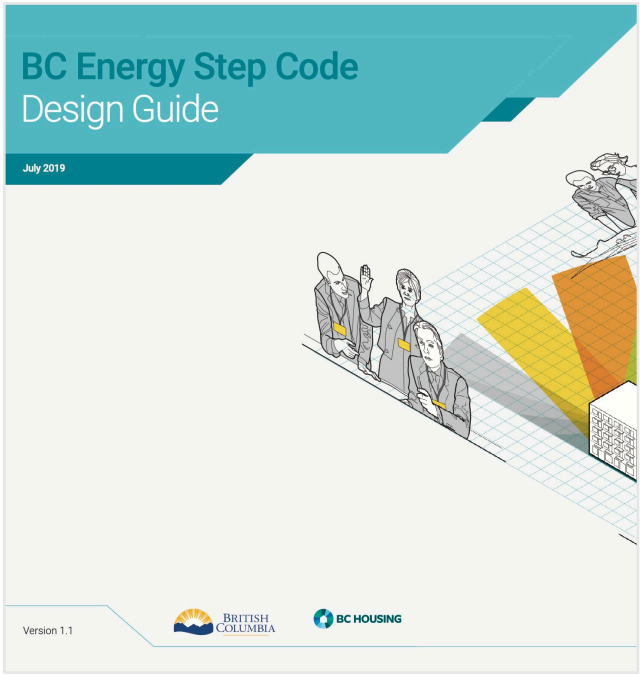
TABLE OF CONTENTS

Photo: Anja Slusarzick-Seibt

BC Energy Step Code

Additional Resources:

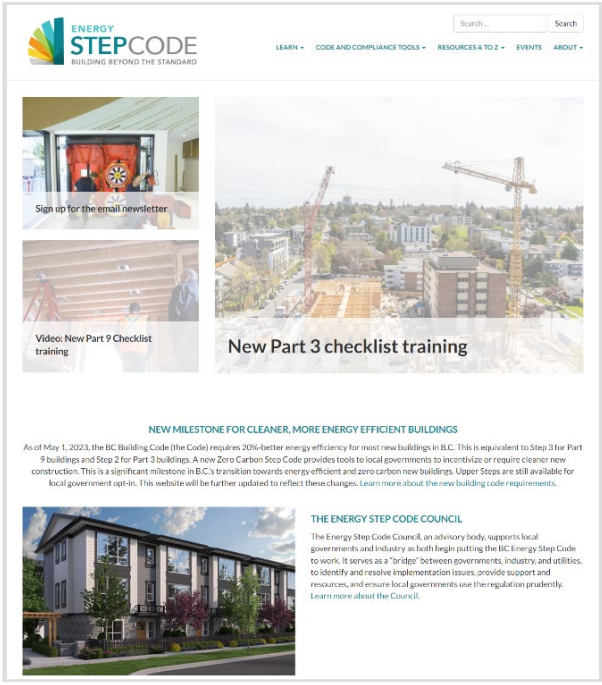
- Compliance Tools for Part 3 buildings
- Compliance Tools for Part 9 buildings
- AIBC Practice Guideline: BC Energy Step Codes – Application



BC Energy Step Code Builder Guide

This guide provides information on the key strategies and approaches to meeting the Energy Step Code in mid- and high-rise (Part 3) wood-frame and noncombustible residential buildings within British Columbia. It is also a good resource for larger or more complex low-rise (Part 9) wood-frame residential buildings. It is also useful for buildings of other major occupancies.

Resource: BC Housing – Step Code



BC Energy Step Code Website

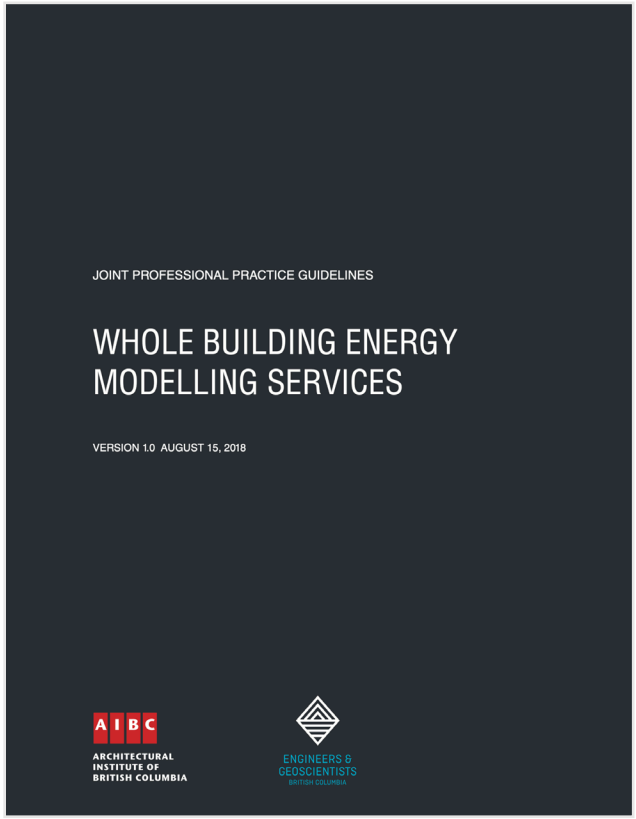
The BC Energy Step Code Website contains learning resources, code and compliance tools, events, and more.

Resource: BC Energy Step Code Website

Energy Modelling

Additional Resources:

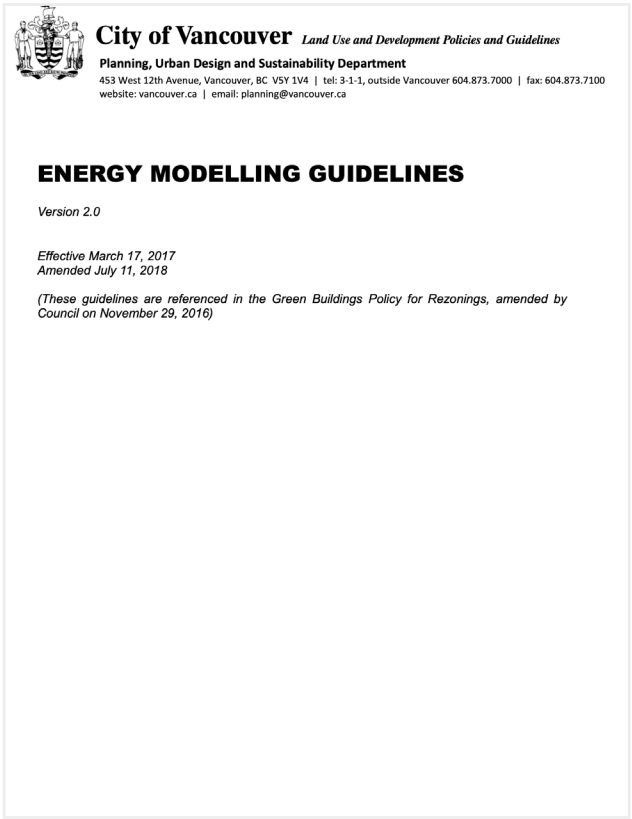
- Become an NRC Energy Advisor
- Pathway to Passive House Certification
- ASHRAE Standard 209: Energy Simulation Aided Design for Buildings
- (USA) American Institute of Architects: Integrating Energy Modeling in the Design Process



Energy Modelling Services
JOINT PROFESSIONAL PRACTICE GUIDELINES

These Guidelines apply to architects and engineers who are providing, procuring, contributing, and/or coordinating Building Energy Modelling services on buildings of all types and sizes.

Resource: AIBC/ EGBC


City of Vancouver *Land Use and Development Policies and Guidelines*
Planning, Urban Design and Sustainability Department
453 West 12th Avenue, Vancouver, BC V5Y 1V4 | tel: 3-1-1, outside Vancouver 604.873.7000 | fax: 604.873.7100
website: vancouver.ca | email: planning@vancouver.ca

ENERGY MODELLING GUIDELINES

Version 2.0

Effective March 17, 2017
Amended July 11, 2018

(These guidelines are referenced in the Green Buildings Policy for Rezonings, amended by Council on November 29, 2016)

City of Vancouver
MODELLING GUIDELINES

These guidelines are referenced in the Vancouver Building Bylaw and the BC Building Code.
Resource: City of Vancouver

Energy Modelling
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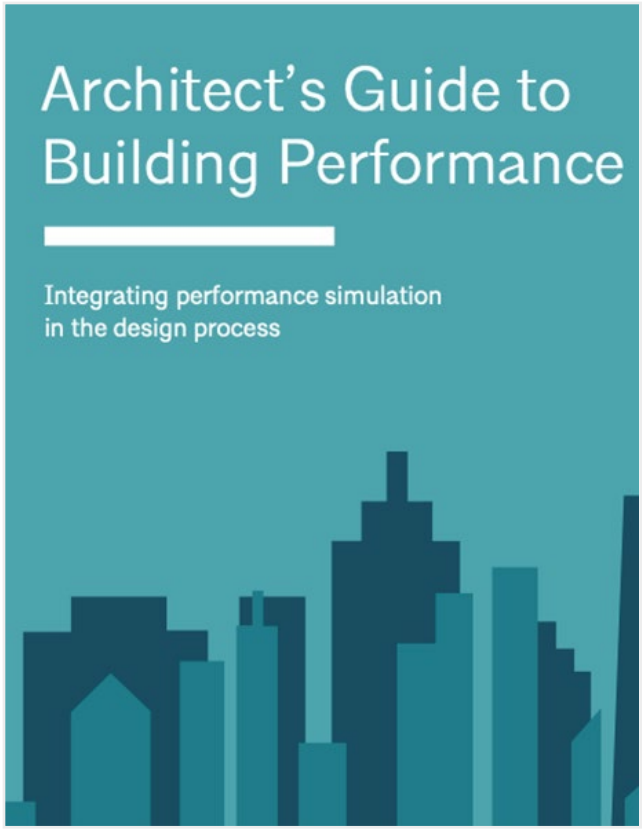
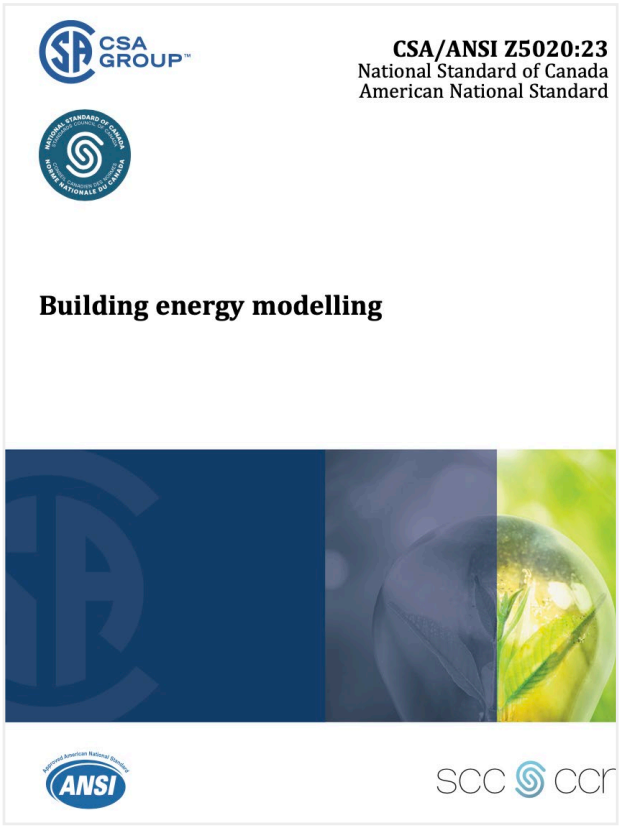


Architect's Guide to Building Performance

Energy modeling early and often can improve building performance. The Architect's Guide to Building Performance helps architects better integrate building performance simulation into their design process.

Resource (USA): AIA.org



CSA/ANSI Z5020:23 Building Energy Modelling

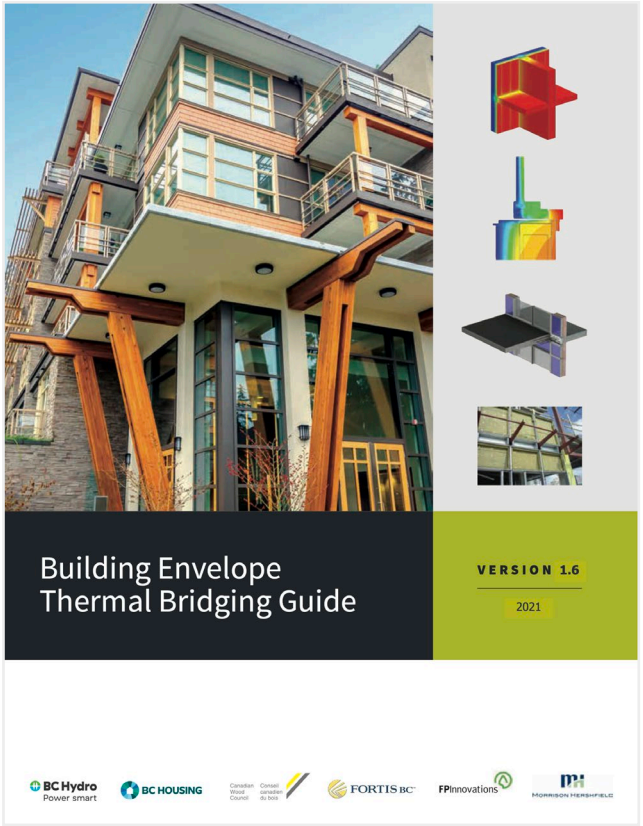
This Standard describes energy model procedures to help standardize modelling requirement in order to improve confidence in and consistency of modelling results.

Resource: CSAgroup.org

Building Performance

Additional Resources:

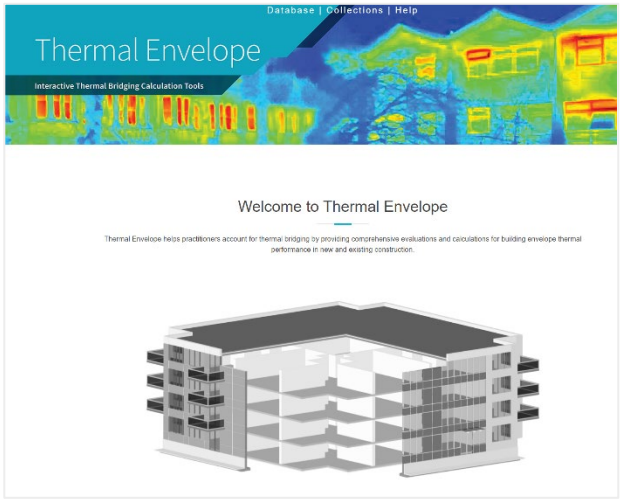
- BC Energy Step Code – Energy Design Checklist for Part 3 Buildings
- BC Housing – Guide to Mitigating Thermal Bridging at Roofs and Decks
- BC Housing – Climate-ready Housing Design Guide V.01
- National Energy Code of Canada for Buildings 2020
- Perkins + Will Canada Architects Co. – Thermally Broken Balconies: Alternative Strategies for Low Carbon Buildings
- Building Science.com Corporation – US Building Science Database
- CSA Z5000:18 - Building Commissioning for Energy using Systems
- CSA Z5001:20 - Existing Building Commissioning for Energy using Systems



Thermal Bridging Guide

Building envelope thermal performance is a critical consideration for reducing space heating loads and will be an increasingly important factor as authorities strive for lower energy consumption in buildings.

Resource: BC Hydro



Interactive Thermal Bridging Calculation Tools

This web-based thermal calculator helps users determine thermal envelope performance quickly and easily when designing and building homes.

Resource: Thermal Envelope

Building Performance
(CONTINUED)

UBC – Future Climate Design for Multi-Family Buildings

This report includes multiple recommendations related to defining thermal comfort and overheating risk; modeling of thermal comfort and overheating risk; design strategies to mitigate overheating, and potential changes to BC Codes and related requirements to address overheating risk in multi-family buildings.

Resource: UBC.ca

Multi-Unit Residential Building (MURB) Design Guide
ENHANCING LIVEABILITY AND RESILIENCE

This publication is intended to serve as a framework guiding the design of multi-unit residential buildings in a Canadian climate, specifically mid-rise and high-rise housing typologies.

Resource: MURB Design Guide

Building Performance
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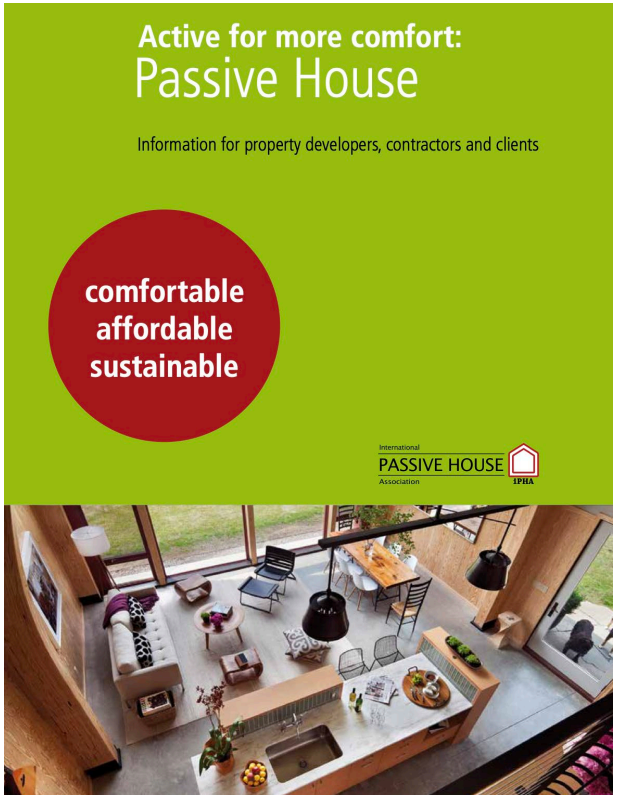
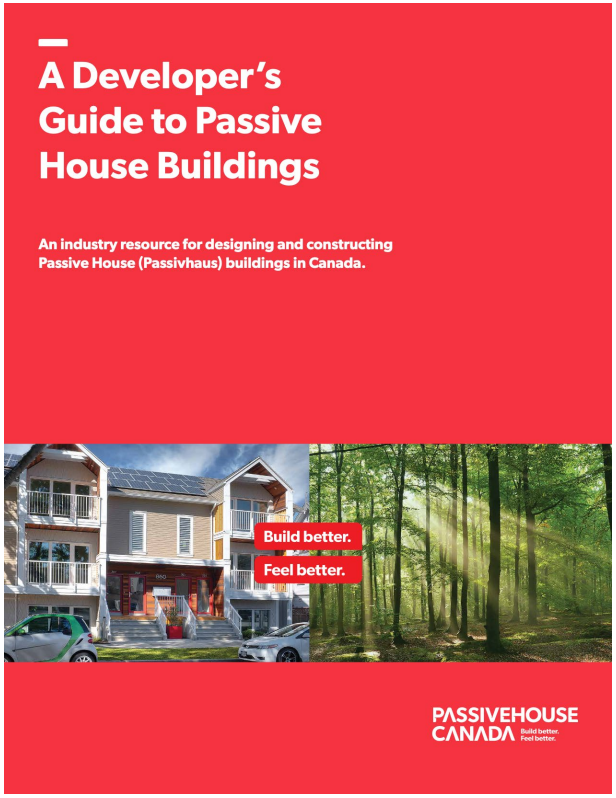


IPHA Passive House

Passive House describes a performance standard and not a specific construction method: while Passive House buildings must meet specific energy demand targets, building designers are free to choose how best to meet them.

Resource (Germany): Passivehouse International.org



Passivehouse Canada
DEVELOPER'S GUIDE

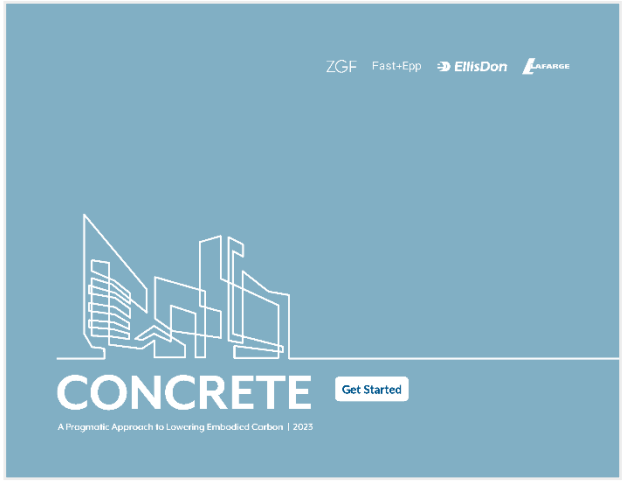
Passive House is considered the most rigorous voluntary, energy-based standard in the design and construction industry today, resulting in buildings that consume as much as 90 percent less heating and cooling energy than conventional buildings do. Applicable to almost any building type or design, the Passive House (Passivhaus) high- performance building standard is referenced in the BC Building Code as a compliance pathway.

Resource: Passivehouse Canada

Embodied Carbon

Additional Resources:

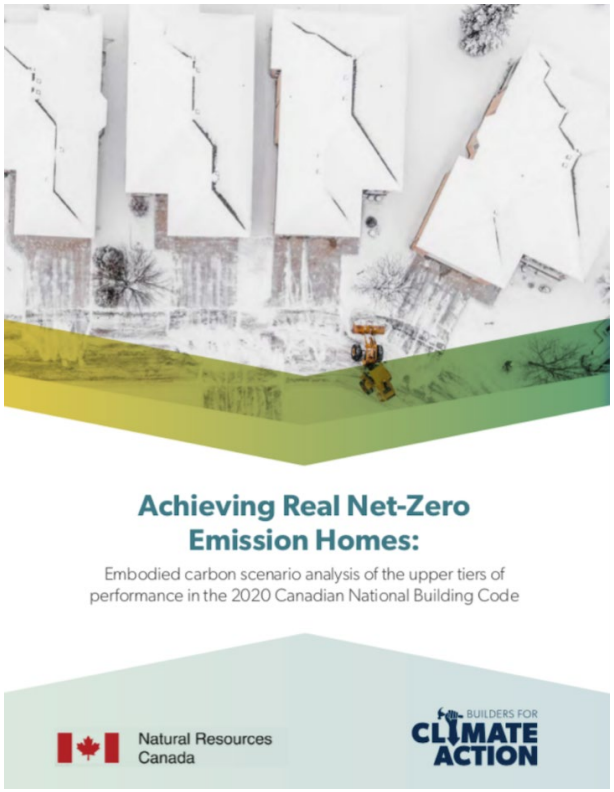
- Building Emissions Accounting for Materials (BEAM) Tool – BEAM Training
- City of Vancouver – Embodied Carbon Guidelines
- City of Vancouver – Material Emissions Benchmark Report for Homes
- City of Vancouver – Embodied Carbon Design Report
- Emissions of Materials Benchmark Assessment for Residential Construction (EMBARC) Report



ZGF Architects – Concrete: A Pragmatic Approach to Lowering Embodied Carbon

Concrete: A Pragmatic Approach to Lowering Embodied Carbon is an easy-to-use interactive guide that provides cost effective and efficient strategies for reducing embodied carbon of concrete in the built environment. Co-authored by ZGF Architects, Fast+Epp, EllisDon, and Lafarge, the technical guide has been developed for owners, architects, engineers, contractors, concrete suppliers, and other stakeholders in the Lower Mainland of British Columbia, Canada.

Resource: Concrete: A Pragmatic Approach to Lowering Embodied Carbon



NRCan Study: Achieving Real Net-Zero Emission Homes

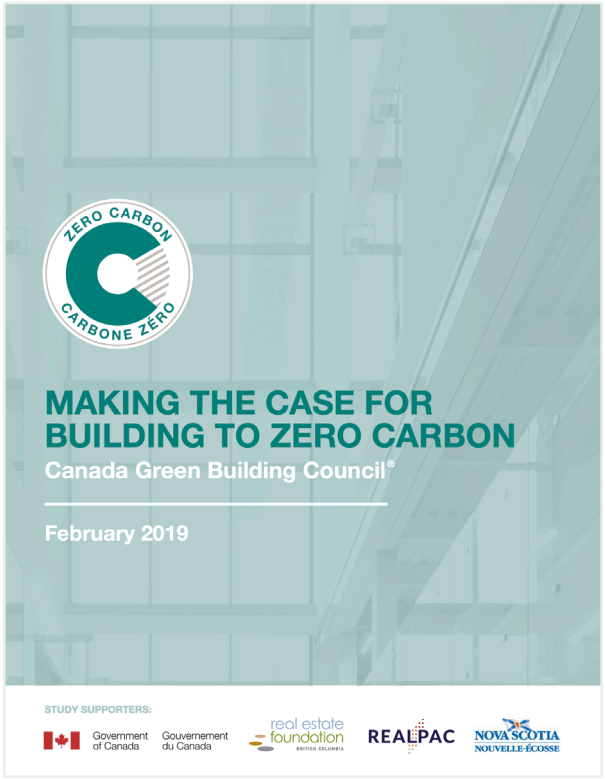
The relationship between material emissions and operational emissions.

Resource: Builders for Climate Action

Embodied Carbon
(CONTINUED)

Additional Resources:

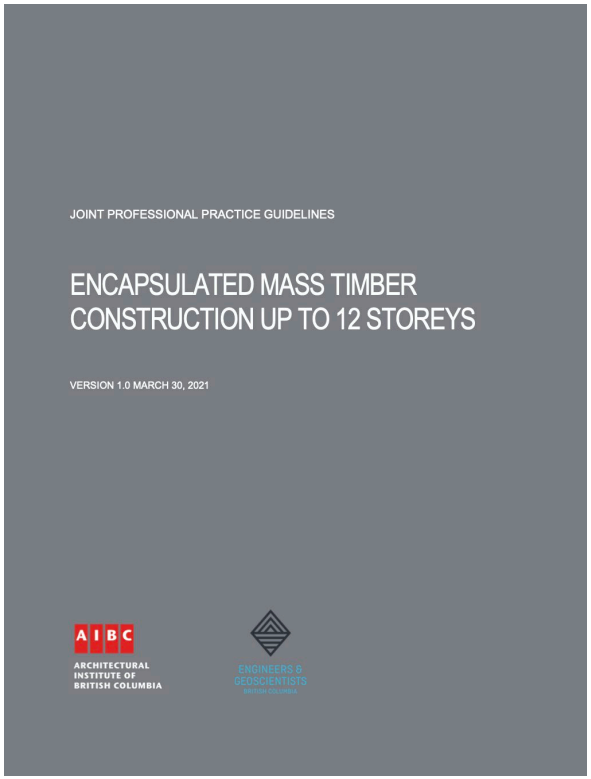
- BC Housing – Feasibility Study for Encapsulated Mass Timber Construction
- World Business Council for Sustainable Development – Energy Efficiency in Buildings
- Review on the Economics of Green Buildings
- Canada Green Building Council – Making the Case for Building to Zero Carbon Report Appendix



CAGBC Report – Making the Case for Building to Zero Carbon

The report makes a strong business case for making every new building zero-carbon. With just a modest capital cost premium, zero-carbon buildings can produce a financial return over 25-years. A separate Appendix to the Report is available, which contains information on the study methodology, detailed results, and the elemental cost breakdowns.

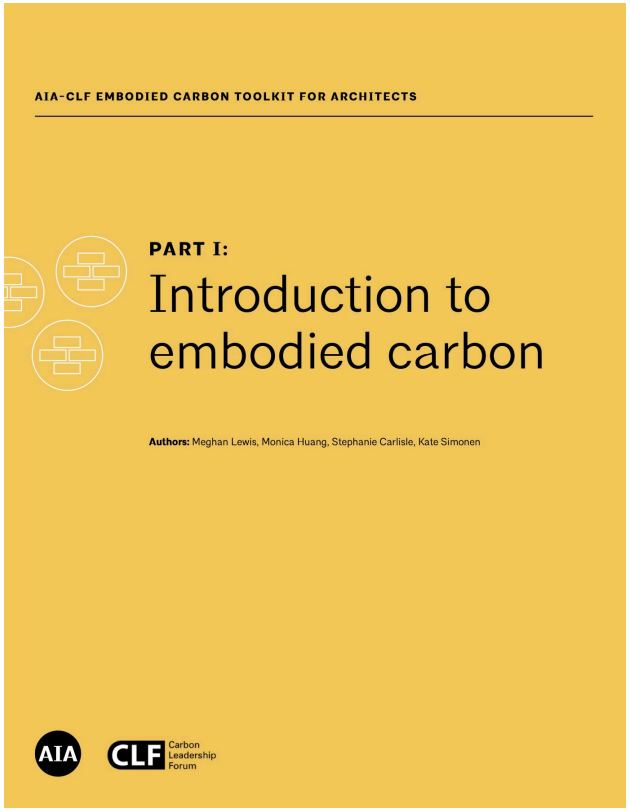
Resource: CAGBC.org



Encapsulated Mass Timber Construction
JOINT PROFESSIONAL PRACTICE GUIDELINES

These guidelines provide important information and identify issues to be considered when providing architectural services for EMTC buildings.

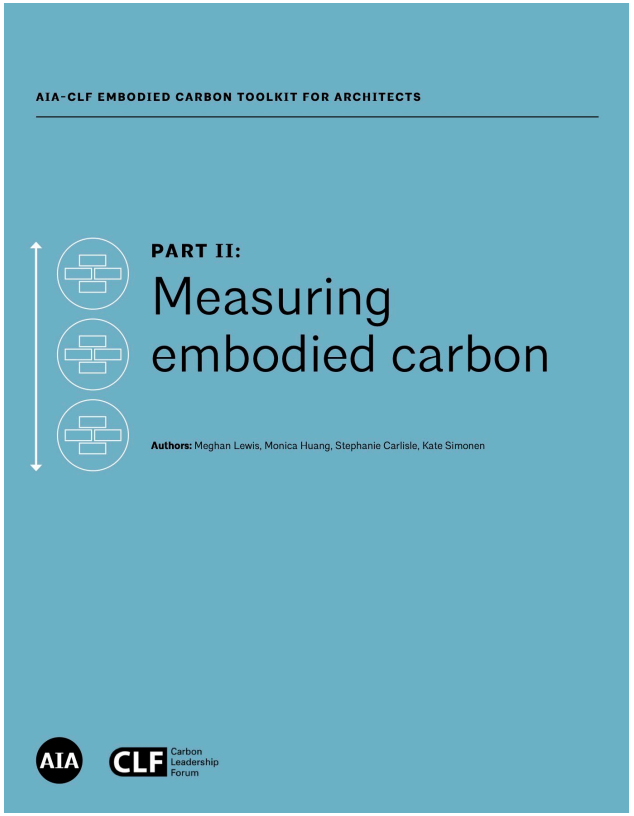
Resource: AIBC/ EGBC



Part I
INTRODUCTION

Embodied carbon encompasses the greenhouse gas emissions associated with materials over the full life cycle of buildings.

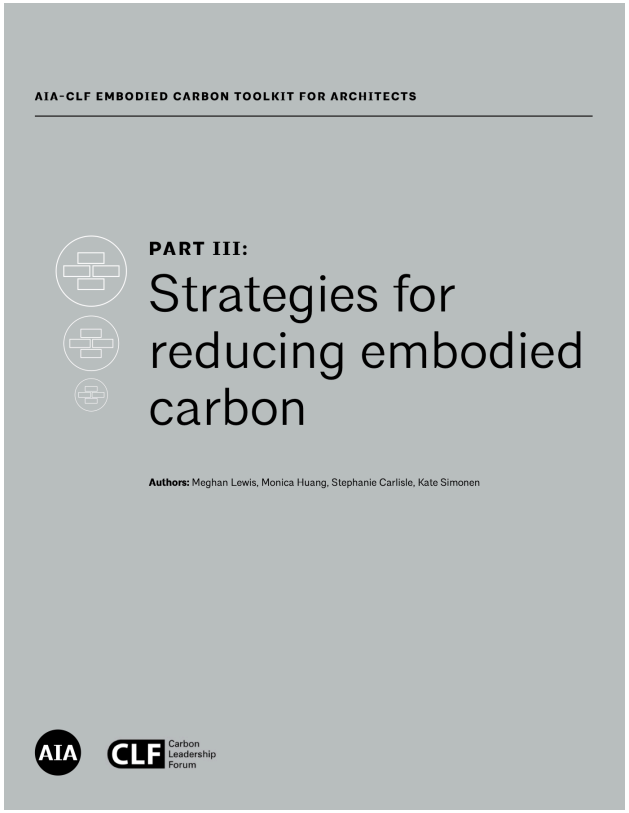
Resource (USA): AIA.org – Part 1



Part II
MEASURING

Measuring embodied carbon is key to evaluating the highest-impact, most cost-effective solutions to reducing embodied carbon on your project. Measuring embodied carbon requires a methodology called life cycle assessment (LCA).

Resource (USA): AIA.org – Part 2



Part III
STRATEGIES

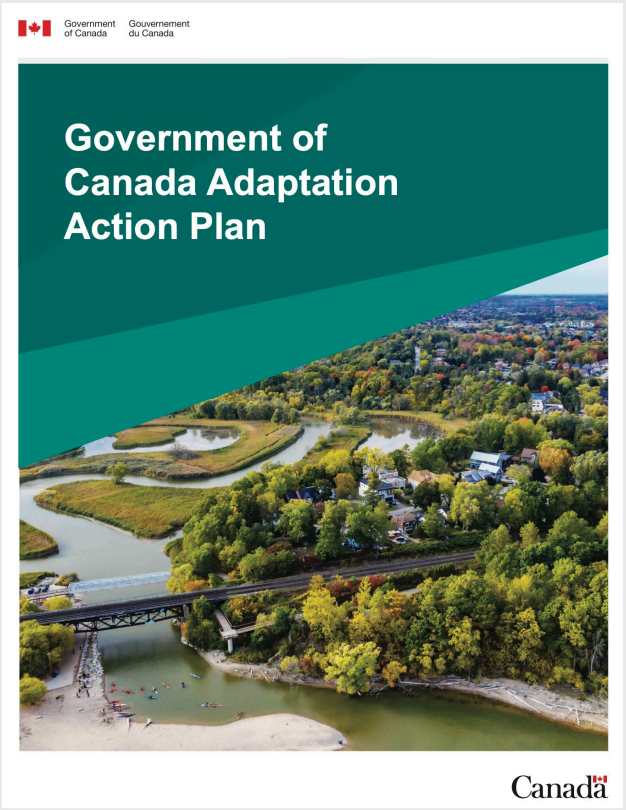
A comprehensive benchmark study of the carbon footprint of over 500 residential buildings.

Resource (USA): AIA.org – Part 3

Adaptation

Additional Resources:

- BC Housing – Mobilizing Building Adaptation and Resilience (MBAR)
- Library of Climate Resources
- Climate Risk Institute – Canada
- Adaptation Resource Pathway for Planners (ARPP)



Canada Adaptation Action Plan

Climate change is a reality for Canada. The National Adaptation Strategy (NAS) provides a roadmap for whole-of-society action on adaptation that will help prepare communities for the impacts of climate change. The Strategy lays out a vision for a resilient society and identifies goals, objectives and targets in five key systems that affect the daily lives of Canadians: 1) Disaster Resilience, 2) Health and Wellbeing, 3) Nature and Biodiversity, 4) Infrastructure, and 5) Economy and Workers.

Resource: Canada.ca

AIA Design for Adaptability

Good architecture accommodates change, withstands wear and tear, and serves as a flexible community asset in times of crisis. This guide explores how to design adaptable buildings that last in challenging times.

Resource (USA): AIA.org

Circular Strategies

Additional Resources:

- The Athena Institute – Life Cycle Assessment
- inHABITAT – Sustainability Portal for Architecture
- Public Architecture – 15 Reuse Projects

Circular Strategies to Extend the Life of Existing Buildings

RETROFIT VERSUS DEMOLITION AND NEW CONSTRUCTION

The building sector contributes significantly to greenhouse gas (GHG) emissions. Reducing GHG emissions (also referred to as carbon emissions) from this sector is critical for Canada to achieve its climate targets.

Resource: CSA-Group Research

Circular Economy Strategies for Adaptive Reuse of Residential Building

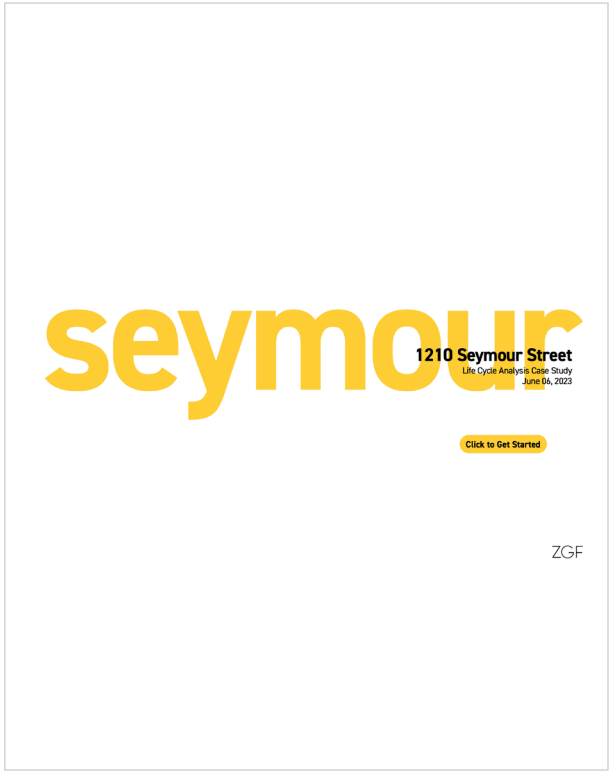
Circular economy strategies seek to reduce the total resources extracted from the environment and reduce the wastes that human activities generate in pursuit of human wellbeing. Circular Economy concepts are well suited to the building and construction sector in cities, in particular, to the adaptively reusing underutilized or abandoned buildings.

Resource (Spain): VITRUVIO – International Journal of Architectural Technology and Sustainability

Case Studies

Additional Resources:

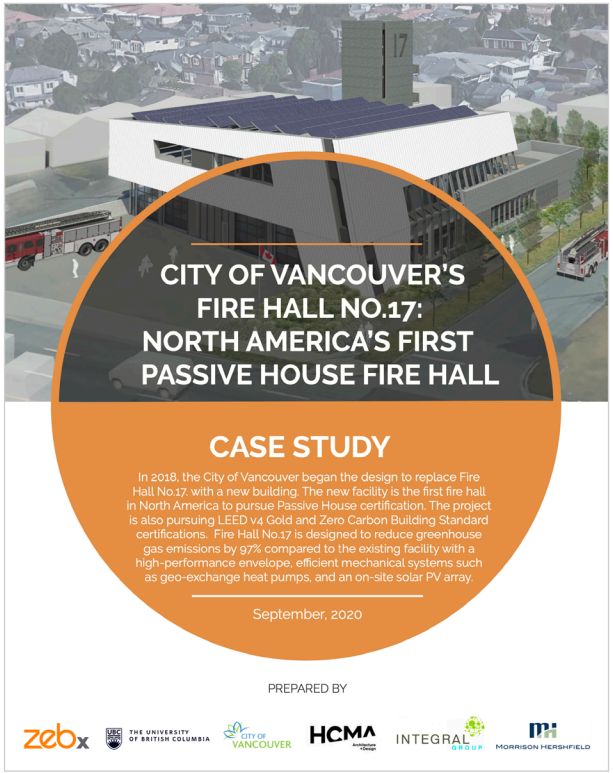
- Concrete High Rise Life Cycle Assessment Study
- Embodied Carbon Reduction Study
- A comparative analysis on Building Decarbonization Measures in BC and Denmark
- Feasibility Study: Passivhaus Standard on Tall Residential Buildings
- Map of Adaption Actions - Case Studies



Embodied Carbon Case Study
MIDRISE RESIDENTIAL BUILDING

Through this case study, ZGF demonstrates how to meet the 2025 Vancouver Building By-law (VBBL) Embodied Carbon Requirements on a live project, with no projected additional cost to the client, following the City of Vancouver Embodied Carbon Guidelines.

Resource: Embodied Carbon Case Study

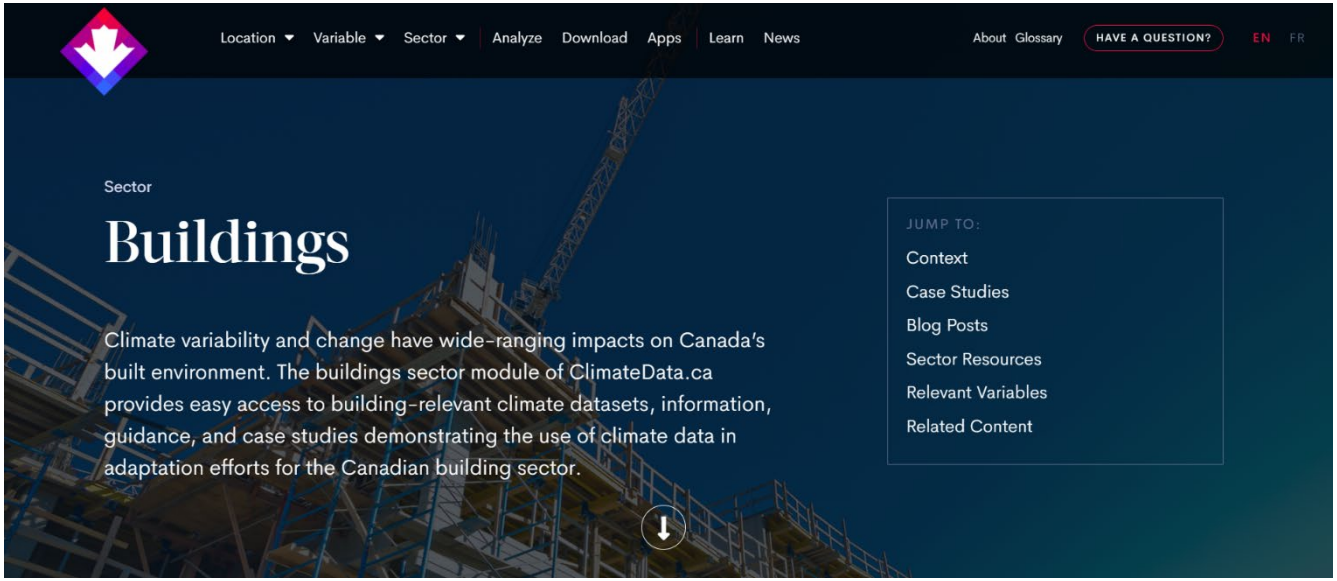


Canada Green Building Council's ZCB Standard

City of Vancouver Fire Hall No.17 is the first fire hall in North America to pursue Passive House certification. The project is also pursuing LEED v4 Gold and Zero Carbon Building Standard certifications.

Resource: ZEBx.org

General



Climatedata.ca
BUILDING SECTOR

Climatedata.ca is a collaboration between Environment and Climate Change Canada (ECCC), the Computer Research Institute of Montréal (CRIM), CLIMAtlantic, Ouranos, the Pacific Climate Impacts Consortium (PCIC), the Prairie Climate Centre (PCC), and HabitatSeven. The buildings sector module of ClimateData.ca provides easy access to building-relevant climate datasets, information, guidance, and case studies demonstrating the use of climate data in adaptation efforts for the Canadian building sector.

Resource: climatedata.ca/explore/sector/buildings/