

Low-Energy Buildings



The Heights

Vancouver, B.C.

The Largest Passive House Multi-Residential Building in Canada

Vancouver is at the forefront of passive housing in Canada, thanks in large part to initiatives like the City Council's "Greenest City Action Plan" and the inclusion of a passive house option in its rezoning policy. As a result, almost half of Canada's 129 certified Passive House professionals call Vancouver home.

In recent years, some of the city's most innovative developers, builders and architects have been joining forces to spearhead the move toward Passive House-compliant residential buildings that achieve a high level of energy performance while minimizing their ecological footprint.

One of the most ambitious of these new projects is **The Heights**: a six-storey, 85-unit, mixed-use rental building in the city's northeast corner, which is on track to become the largest Passive House-certified multi-residential building in the country.



Images courtesy of Cornerstone Architecture



Images courtesy of Cornerstone Architecture

The Heights: Quick Facts

- **Project:** Six-storey, mixed-use, Passive House rental apartment building (five wood-frame storeys over one concrete storey)
- **Location:** 388 Skeena Avenue, Vancouver, B.C.
- **Development cost:** \$25 million
- **Size:** 5,918 m² (63,700 sq. ft.)
- **Number of units:** 85 residential units, including 25 studios (35-45 m² [377-485 sq. ft.]), 36 one-bedroom apartments (45-60 m² [485-645 sq. ft.]), 23 two-bedroom apartments (62-84 m² [677-900 sq. ft.]) and one three-bedroom apartment (87 m² [936 sq. ft.]), plus (420 m² [4,520 sq. ft.]) of ground-floor commercial space
- **Target occupants:** Market-rate rental tenants
- **Development partners:** Eighth Avenue Development Group; Peak Construction Group; Cornerstone Architecture
- **Performance monitoring:** FPInnovations
- **Construction timeline:** August 2015 to June 2017

Source: Peak Construction; Eighth Avenue Development; Cornerstone Architecture

“We have seen sustainability and energy efficiency in other buildings in the past, but the Passive House concept is simple and doesn’t rely on expensive high-tech equipment. Instead, it focuses on things like creating a better building envelope, better fresh air intake and exhaust, and better design to avoid heat losses through direct transfer from inside to out. As a result, the building will have a continuous flow of fresh air but in a controlled fashion, which allows for a cleaner, fresher interior environment.”

- Doug Wilson, President,
Peak Construction Group

“As developers, we strive to develop better methods, better buildings and more efficient uses of land and energy. It’s our responsibility to create simpler, higher-quality and more energy-efficient buildings that consume less, last longer and are less expensive to operate. To do this, we need to continually look outside the box for better ways of doing things. Passive House does this.”

- Ed Kolic, President, Eighth Avenue
Development Group

“What’s interesting about Passive House is, once you see how good it is, you can’t un-see it. Passive house projects are built better and with so much more attention to detail, so there is typically no performance gap between the design and the as-constructed performance. They’re simply better buildings that are better constructed, perform better, and which will continue to operate more efficiently than almost any other buildings out there for their entire lifespan.”

- Scott Kennedy, Principal, Cornerstone Architecture

Passive House: Better Buildings. Affordable Performance.

Pioneered in Saskatchewan in the early 1970s and refined by the Passive House Institute in Germany, **Passive House** is a “better building” approach to design and construction that uses passive techniques, technologies and strategies to improve energy efficiency, reduce operating expenses and create a healthier and more comfortable living environment. Instead of relying on complex energy or mechanical systems, passive house focuses on simple and inexpensive ways to improve performance, like adding more or better insulation and high-efficiency windows, reducing or eliminating thermal bridges, creating an airtight building envelope and using Energy or Heat Recovery Ventilators (ERVs/HRVs).

Key Passive House Features

The primary objective for The Heights was to create a building that would be unique in Vancouver’s highly competitive rental market, by taking full advantage of the latest sustainability techniques and technologies. Some of the project’s most significant passive house features include:

- **high-performance insulation**—including an RSI-10.5 (R-60) roof assembly and double RSI-7 (R-40) exterior walls separated by 5 cm (2 in.) of polystyrene insulation;
- **locally manufactured, Passive House-certified windows**—with super-insulated frames and triple glazing;
- **ultra-efficient exterior envelope**—including a continuous layer of locally sourced polystyrene insulation to separate indoor walls, floor lines and surfaces from the outside climate, eliminate thermal bridges and create an airtight building envelope with just 0.6 air changes per hour;
- **high-efficiency Heat Recovery Ventilators (HRVs)**—with one HRV for every five apartments instead of multiple in-unit ventilators, to filter fresh air throughout the building and recover up to 85% of the heat energy while minimizing maintenance tasks and responsibilities;



- **energy-efficient-in-unit space heating**—powered by electric-resistance heaters that use only a fraction of the energy of a typical furnace heating system;
- **an exceptionally healthy and comfortable living environment**—with no drafts or cold surfaces, fewer instances of overheating, a continuous supply of fresh air and no wall, floor or window condensation where mould can grow; and
- **a simple yet appealing visual design**—including different coloured cladding and exterior finishes, to make the building attractive to tenants without compromising the building envelope or energy performance.

By using HRVs and in-unit space heaters instead of installing hot-water baseboard heaters and more extensive mechanical systems, the developers saved close to \$450,000 in upfront capital costs and an estimated \$150,000 in maintenance, gas bills and repairs over the lifetime of the building, which covered the cost of nearly all the Passive House features.

Going forward, the building is expected to use 80% less heating energy than a comparable conventional apartment building, and generate virtually no greenhouse gas emissions. Residents of The Heights will also be able to light, heat, cool and power their apartments for as little as \$10 a month.

Further Information

Eighth Avenue Development Group:

www.eighthavenue.ca/en/

Peak Construction Group: peakgrp.com

Cornerstone Architecture: www.cornerarch.com

Passive House Canada:

www.passivehousecanada.com/

Passive Buildings Canada: www.passivebuildings.ca

Canadian Passive House Institute:

www.passivehouse.ca

Passive Approaches to Low-energy Affordable Housing Projects – Literature Review and Annotated Bibliography:

[ftp://ftp.cmhc-schl.gc.ca/chic-ccd/](ftp://ftp.cmhc-schl.gc.ca/chic-ccd/Research_Reports-Rapports_de_recherche/2017/RR_Passive_Approaches_to_Low_energy_Affordable_Housing_Projects.pdf)

[Research_Reports-Rapports_de_recherche/2017/RR_](ftp://ftp.cmhc-schl.gc.ca/chic-ccd/Research_Reports-Rapports_de_recherche/2017/RR_Passive_Approaches_to_Low_energy_Affordable_Housing_Projects.pdf)

[Passive_Approaches_to_Low_energy_Affordable_](ftp://ftp.cmhc-schl.gc.ca/chic-ccd/Research_Reports-Rapports_de_recherche/2017/RR_Passive_Approaches_to_Low_energy_Affordable_Housing_Projects.pdf)

[Housing_Projects.pdf](ftp://ftp.cmhc-schl.gc.ca/chic-ccd/Research_Reports-Rapports_de_recherche/2017/RR_Passive_Approaches_to_Low_energy_Affordable_Housing_Projects.pdf)

CMHC Researcher and Analyst: Thomas Green, Senior Researcher,
Sandra Baynes, Senior Analyst

Writer: David A.V. Elver Communications Inc.



cmhc.ca



69235

©2018, Canada Mortgage and Housing Corporation
Printed in Canada
Produced by CMHC

08-03-18

Although this information product reflects housing experts' current knowledge, it is provided for general information purposes only. Any reliance or action taken based on the information, materials and techniques described is the responsibility of the user. Readers are advised to consult appropriate professional resources to determine what is safe and suitable in their particular case. Canada Mortgage and Housing Corporation assumes no responsibility for any consequence arising from use of the information, materials and techniques described.