NAIMA CANADA

REPRESENTING MINERAL FIBRE INSULATION MANUFACTURERS

Case Study: Sustainable Homes for Thriving Communities

NAIMA Canada, Fall 2023

WHAT IS A PASSIVE HOUSE?

According to the Passipedia, passive building is a set of design principles used to attain a quantifiable and rigorous level of energy efficiency within a specific, quantifiable comfort level.

Source: Tandem Archiitrcure

Passive House construction optimizes “gains and losses” based on the climate of the building and are built with five guiding principles:

01

Use of continuous insulation throughout the entire envelope with no thermal bridging.

02

Extremely airtight construction, preventing infiltration of outside air and loss of conditioned air.

03

High-performance windows (either double or triple-paned windows depending on climate and building type) and doors that use the sun’s energy for the heating season.

04

Use some form of balanced heat and moisture recovery ventilation.

05

Requires smaller HVAC systems due to higher levels of insulation.

THE BENEFITS OF A PASSIVE HOUSE

Future-Proofing

Passive Houses are designed with future challenges in mind, including escalating climate change and rising energy costs. By significantly reducing energy consumption and dependency on energy price fluctuations, these buildings offer a solution. Embracing Passive House design positions builders as leaders, setting them apart from their peers.

More Resilient Construction

The comprehensive approach to design and construction, with airtight, water-resistive construction, means you're going to get a home that is more resilient and better able to withstand the elements. These features create a stable and comfortable indoor environment regardless of external conditions.

Occupant Comfort

In a Passive House, the indoor climate is carefully controlled, ensuring that occupants experience comfort regardless of the external weather conditions. This level of comfort enhances the overall living experience and contributes to the well-being and satisfaction of the residents.

Energy Efficiency and Conservation

Passive House design focuses on energy efficiency by creating a highly effective building envelope through super insulation, airtight construction, and high-quality windows. This leads to minimal heat loss or gain, resulting in reduced energy consumption. The attention to detail in the building envelope could see a potential energy demand reduction of up to 90% compared to conventional structures, and long-term cost savings for occupants.

Source:
Passipedia.org

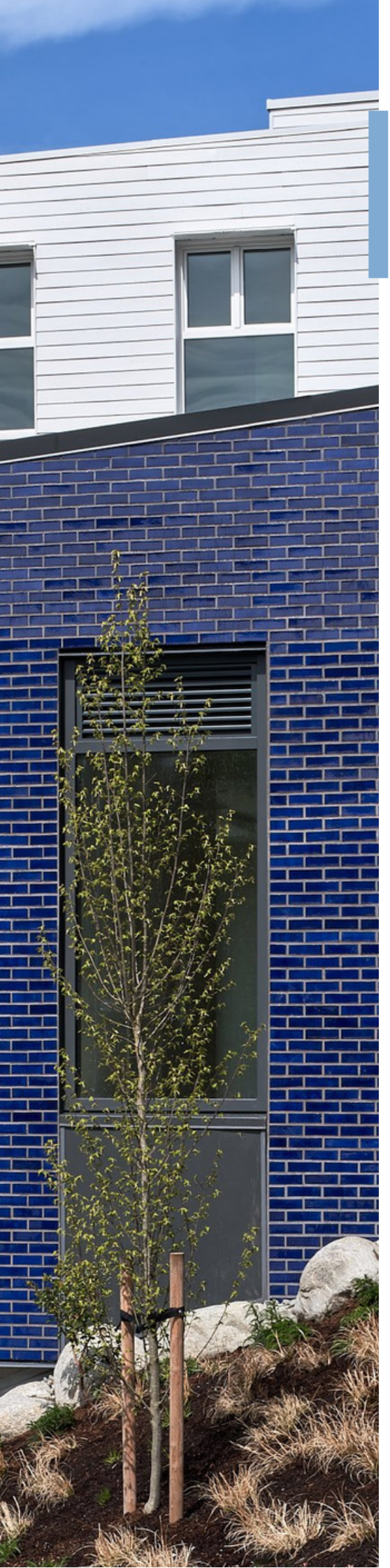
CASE STUDY: SIMON FRASER UNIVERSITY AFFORDABLE HOUSING

Simon Fraser University Affordable Housing, located in Burnaby, BC, is a high-performance, community-oriented housing project that strives to promote connection. Local Practice Architecture + Design collaborated on this project with Evelyne Bouchard from Tandem Architecture Écologique, who contributed as Passive House Consultant and Energy Modeller.

Their partnership was focused on creating a simple yet elegant building that would be durable, comfortable, and affordable, primarily targeting mature students with children - a demographic that is typically underserved by universities.

Energy modelling was integrated into the design process to optimize performance-cost ratio, but this project transcended the original blueprint – it's about sculpting a space that resonates with vibrant connections and community bonds.

Photos: Local Practice Architecture



Fostering Connection and Sustainability

ABOUT THE PROJECT AND COMMUNITY PAVILION

The Simon Fraser University Affordable Housing Project is made up of 100 units and a community pavilion in a courtyard flanked by two residential buildings to the east and west.

The semi-public courtyard acts as a community hub, with its heart at the community pavilion. A wide variety of unique gathering spaces, from an outdoor natural playground to an indoor multi-purpose space, allow for all kinds of activities and reinforce connection between residents.

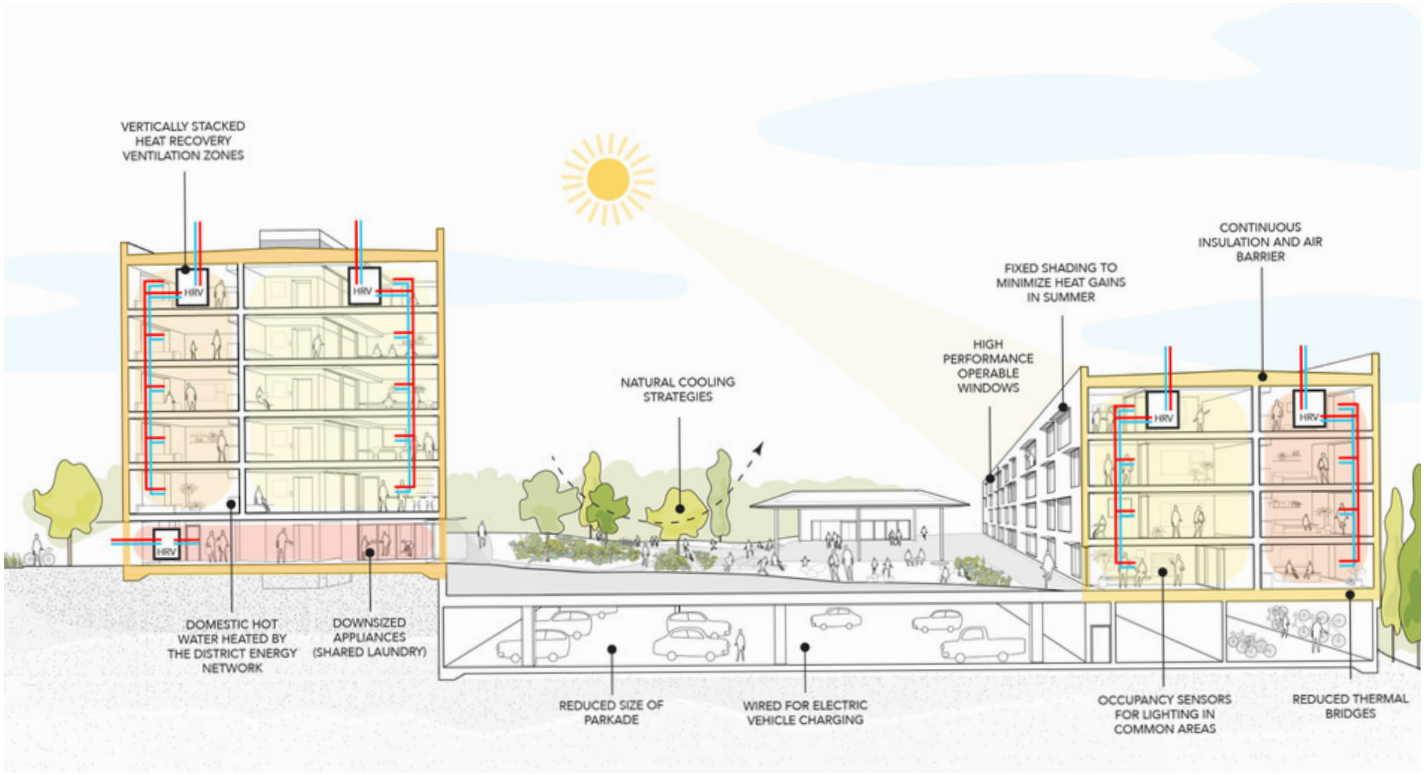
HIGH PERFORMANCE AND COST EFFECTIVE

This project achieves high-performance buildings at no cost premium over a conventional design. Shading provides passive cooling and a very thick façade requires little energy usage for heating and cooling.

The cost of these thicker walls was offset by the simple building forms, no traditional air conditioning, reduced parking, and smaller suites. As with all high-performance buildings, the building envelope required considerable insulation. This project primarily used mineral wool insulation in its application.

2019 SAB Magazine Building of the Year

The SFU project recently (2019) won the SAB Magazine Building of the Year for large residential projects. Although it didn't pursue certification, it came close in terms of performance. SFU decided to target the highest level of the BC Energy Step Code, while maintaining many of the strategies typically associated with Passive House buildings.



Case Study Details and Resources

Architect

Local Practice Architecture + Design

Passive House Consulting & Energy Modelling

Evelyne Bouchard, Tandem Architecture Écologique

Location

Burnaby, BC

Type

Graduate student housing, MURB

Size

4408m2, 90 rental units

ERV

Zehnder ComfoAir 550 HRVs

Insulation Type

Mineral wool for stud wall cavity insulation & external semi-rigid insulation

Air Tightness

Entirely exterior air barrier system, protected by exterior insulation

R-Value of Walls

Typical walls R41, Roof R81

Modelled Performance

Space heating demand (TEDI: 19 kWh/m2a (77% reduction from national average)

Final energy demand (TEUI): 84 kWh/m2a (48% reduction from national average)