



Case Study

Multi-Unit Residential Building

Pemberton, B.C.



Application

A Near-zero emissions multi-unit residential building

Location

Pemberton, British Columbia, Canada

Project Completion

March 2020

Overview

Orion is a 45-unit, 3-story residential building in Pemberton, British Columbia. The project is expected to exceed the energy efficiency requirements set for its region and meet Step 4, the highest level of the BC Energy Step Code, while maintaining the construction cost below the market rate for comparable buildings constructed to a lower Step standard. Among many other energy-efficiency features, a Heat Pump Hot Water system was designed with features to meet this project's specific needs.

Design Objective

Orion was designed to meet the energy efficiency requirements of Step 4 of the BC Energy Step Code, while keeping construction costs below that of a comparable development designed only to meet the requirements of Step 1. Energy usage and emissions performance are naturally expected to be significantly better than a Step 1 project.

In addition to minimizing energy use, the building was designed to have close to zero operational GHG emissions.

System Design

The system was designed with eight 15,000 BtuH Sanden Heat Pump Water Heaters (3rd Generation Models), together with 4 storage tanks, 2 swing tanks designed to recirculate hot water throughout the building to maximize the efficiency of the heat pumps, and a 27kW supplementary electric boiler for back-up purposes.



CO₂ as a refrigerant minimizes potential GHG emissions in the case of a leak or at disposal. The system incorporates highly insulated piping and an efficient monitoring and control system to prevent unintended heat losses. Heat pumps are installed in the underground garage.



Result

While it is too soon to provide measured energy usage results, the project is expected to meet its objective of BC Energy Code Step 4 equivalence. It also achieved its cost-effectiveness goal, with a per-Sq. Ft. cost 12-34% lower than similar buildings constructed to only Step 1 equivalence. The Heat Pump Water Heating System

designed for this project was one of several measures used to achieve the design objectives, supporting the conclusion that a HPWH System is a compelling choice for energy efficient, low-carbon-footprint, low-GHG projects.

Reference

See “[Orion: Near-Zero Emissions Multi-Unit Residential Building](#)” by zeb_x, The University of British Columbia and Vidorra Developments Ltd.

Disclaimer

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