

CASE STUDY

A Step Toward Net Zero

Domestic Hot Water Electrification and Demand Response:
Third Space Properties - 577 E 8th Avenue, Vancouver

Watson Manor

Third Space Properties

LANDLORDBC

FRESCO
Building Efficiency

Retrofit Overview

To support their Net Zero Transition Plan, Third Space Properties replaced an at end-of-life gas-fired domestic hot water system (DHW) with a high-efficiency electric CO₂ heat pump system. The retrofit marks a significant milestone in the company's decarbonization efforts – it is the first 100% electric and Zero Carbon Performance Building in their portfolio and the first to integrate automated demand response (ADR) functionality.



CO₂ Heat Pumps



Hot Water Storage Tanks

Project Highlights

Heat Pump: Droplet 6 (six SANCO2 heat pump units).

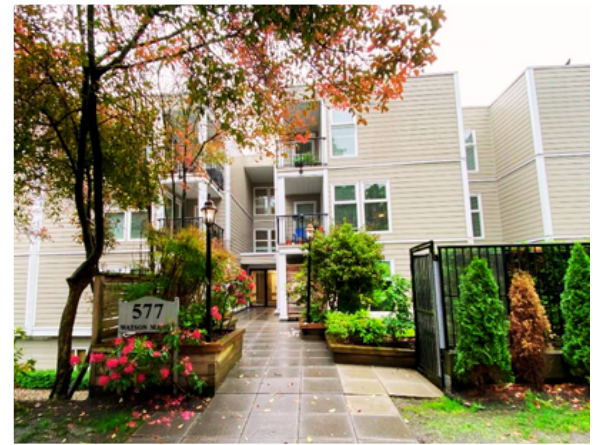
Refrigerant: CO₂ (R-744). With global warming potential (GWP) of 1, CO₂ has dramatically lower GWP than conventional refrigerants like R-410A or R-134A.

Demand Response Capabilities:

- A CTA-2045 heat pump controller enables smart grid communication with BC Hydro for demand response and load shifting.
- An increase in hot water storage from 480 to 720 gallons enables the system to heat water during off-peak electrical demand hours and store that water for use during peak periods.

The Right Team

- This retrofit was a collaboration of Third Space Properties with City of Vancouver and CleanBC funding, LandlordBC project leadership, Haakon for mechanical contracting, BC Hydro for demand response pilot, and FRESCO for engineering and implementation support.



Building Details

Year built: 1983

Building size (sq ft): 31,412

Number of units: 39

ENERGY STAR® certification rating: 99

Location: Mount Pleasant, Vancouver, BC

The Numbers



421 GJ
annual gas saved



\$1,825
annual utility savings



370 tCO₂e
lifetime emissions avoided

“To achieve our Planet commitment and reach net zero, we need electrification projects like this that move the needle, even if they cost more than like-for-like gas replacements.”

Leo Glaser, Third Space Properties

“Watson Manor shows that full DHW electrification is possible without major electrical upgrades when the system is properly sized to balance heat pumps, storage and building demand.”

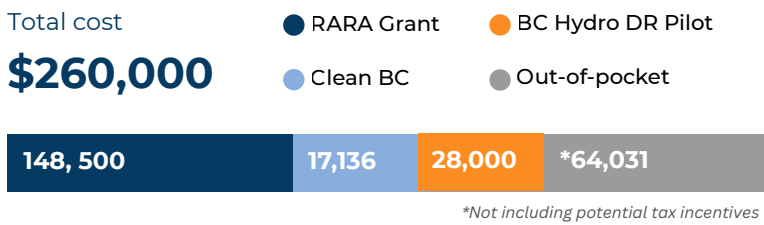
Cameron Eggen, Haakon, Contractor

“CO₂ heat pumps are highly efficient, fully electric, and rated for cold climates - requiring no backup heating system in the Lower Mainland. The CO₂ refrigerant (R-744) is ozone-safe and has an ultra-low Global Warming Potential (GWP), making it significantly more climate friendly than conventional refrigerants.”

Frank Lee, FRESCO

Costs & Funding

Electrification retrofits can come with higher upfront cost compared to like-for-like gas boiler system replacements, particularly in early stages of innovative retrofit equipment adoption. In this case, for similar out-of-pocket costs (after incentives) to a new gas boiler, Third Space upgraded to a highly efficient electric system, with additional water storage and a demand response system that will reduce energy costs by \$1,825 per year.



Retrofit Approach & Lessons Learned

- 1

Project Planning: The project was carefully planned over the course of a year to select the right equipment, heat pump location, and installation contractor. Detailed planning is especially important for electrification projects, as the more sophisticated technology often comes with greater complexity.
- 2

Contractor-Led Design-Build Delivery Model: This approach integrates the design and installation and enables early and on-going collaboration between the owners, contractors, suppliers, manufacturers, utility partners, and engineers. This approach can be particularly valuable when timelines are short, unforeseen conditions may arise and creative problem solving may be needed to address constructability, code compliance, and innovative retrofit systems integration.
- 3

Heat Pump Placement: The heat pumps were installed in a small underused parking stall within the building’s gated garage. Located just outside the mechanical room, this location allowed for a simple connection to the water tanks and freed up space for the additional tanks required for the demand response pilot. No additional permitting was required under the City of Vancouver’s guidelines.
- 4

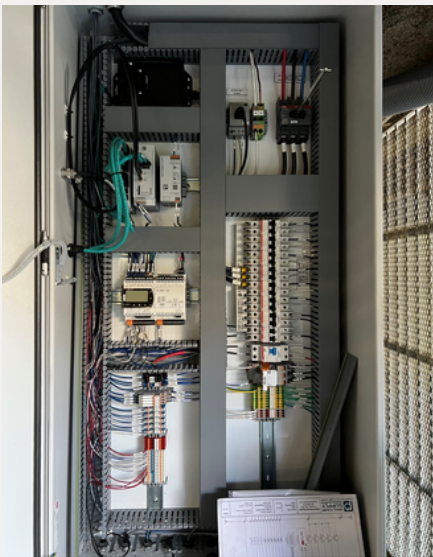
Tenant Experience: Replacing hot water systems in an occupied building can be challenging. To minimize disruptions, a temporary boiler was installed alongside the heat pumps. This allowed the mechanical room to be cleared and new storage tanks installed without extended water shutoffs. Switching to the new system required only a brief shutdown, minimizing tenant inconvenience.

Demand Response Benefits

Demand response is the adjustment of a building's electricity use in response to signals like utility pricing, demand charges, or grid needs.

- At the building level, benefits include:
- Lower energy bills by shifting electricity use to off-peak times and avoiding demand charges.
 - Reducing or avoiding costly electrical capacity upgrades.

- When implemented at scale, demand response can:
- Ease strain on the electrical grid, helping utilities defer infrastructure upgrades.
 - Minimize the need for costly electrical capacity upgrades.
 - Help qualify buildings for future utility demand response incentive programs.



Master Control Panel
with Demand Response Integration

Rental Apartment Retrofit Accelerator Program (RARA)

RARA is a free, one-stop support program that helps rental building owners plan and implement retrofits. Led by LandlordBC in partnership with FRESCo, RARA offers technical support, education and support accessing incentives and grants.

FRESCo provides wrap around support, including retrofit opportunity assessments, energy benchmarking, feasibility studies, mechanical design, implementation support, commissioning, measurement and verification and facilitating access to rebates, financing and tax incentives.

Funding: RARA launched with leadership and funding from the City of Vancouver, which leveraged funding from the Province of BC and BC Hydro.