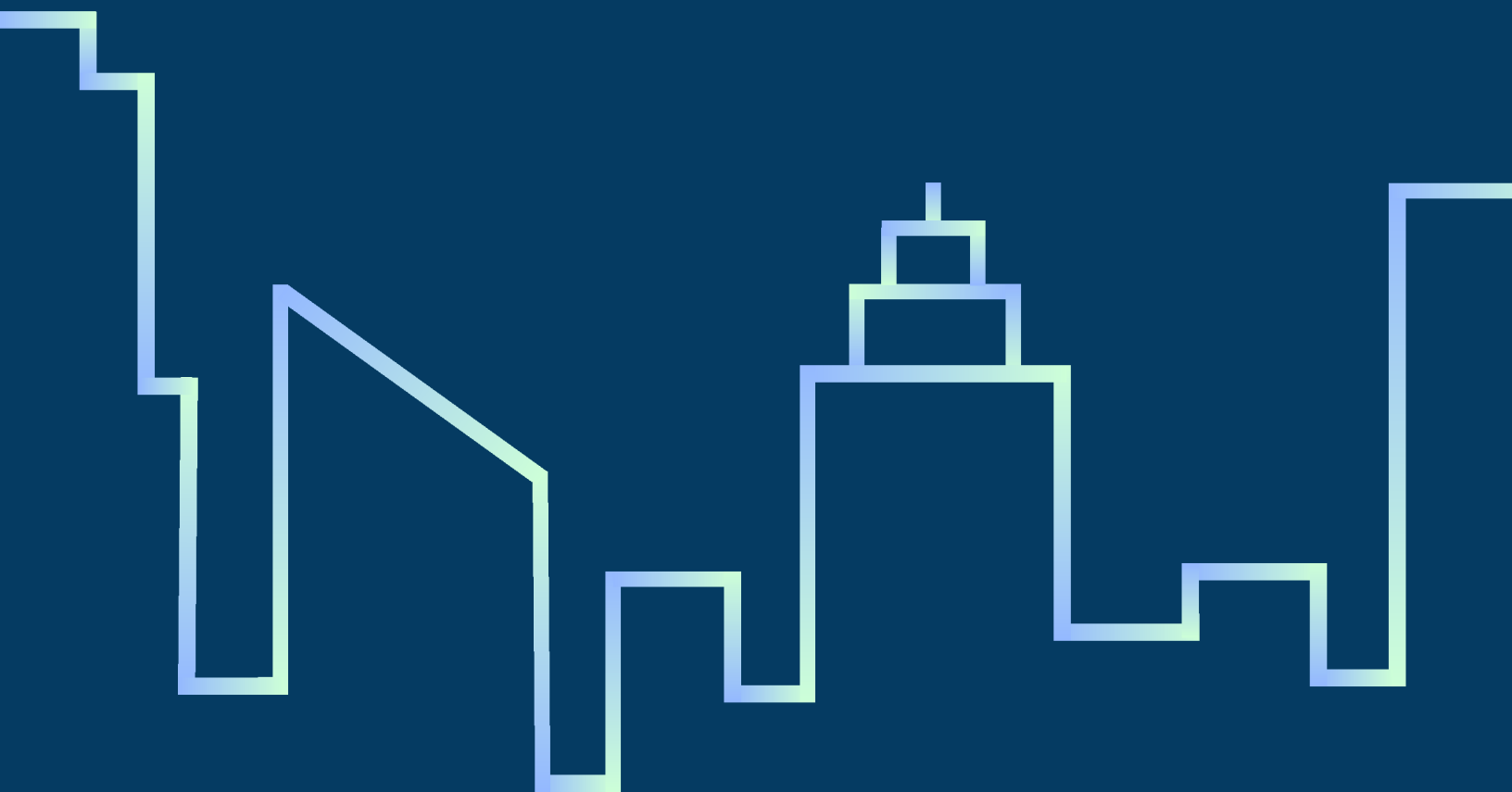




CASE STUDY

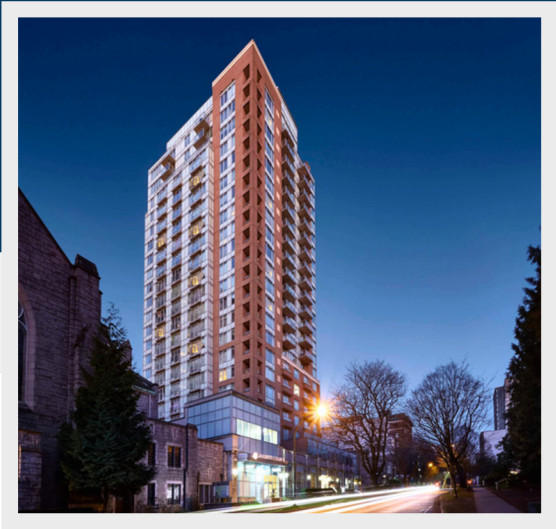
A Hybrid Pathway To Low Carbon Ventilation

Make-Up Air Retrofit in Vancouver Market Rental Building

Market Rental

High-Rise Building

LANDLORDBC



Retrofit Overview

A low-efficiency, gas-heated make-up air (MUA) system in a market rental building in Vancouver was upgraded to a hybrid dual-fuel heat pump MUA system. A MUA system supplies fresh, tempered outdoor air to maintain hallway pressurization for indoor air quality and to mitigate smoke and odour migration between suites. In the upgraded system, the heat pump serves as the primary heating source, with gas auxiliary heat used only during cold conditions, reducing the system size and cost. Smart controls enable automatic switching between electricity and gas based on outdoor temperature.

Why This Retrofit at This Building?

- Aligns with owners long-term decarbonization and Environmental Sustainability Goals (ESG) objectives for this flagship property.
- The existing MUA was at end of life and needed replacement.
- Multiple incentives supported a strong retrofit business case.
- Sufficient electrical capacity to support a dual-fuel MUA system.
- Cooling was a core objective for comfort and thermal resilience.

Installation Highlights

- Contractor:** Enviroware Projects Ltd
- Project Completion Date:** November 2025
- Equipment Selection:** AAON RNA 040 series cold climate air source heat pump with gas back up auxiliary

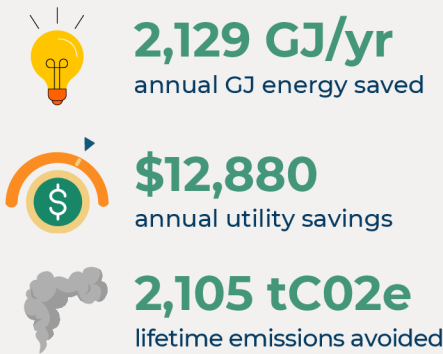
Equipment Specifications:

Airflow	Modulating up to 10,000 CFM
Refrigerant	R-454B Low-Global Warming Potential (GWP)
Heating Capacity	Modulating heat pump 409 MBH; Gas backup 720 MBH
Gas Heating Turndown Ratio	5:1
Cooling Capacity	Modulating to 560 MBH
Coefficient of Performance	3.8 at -3°C/27°F
Heat Pump Minimum Operation Temperature	-5°C/23°F
Sound Level	Max 90 (Decibels)

Building Details

Year Built:	2002
Building Size (sq. ft):	153,000
Number of Units:	199
Number of Storeys:	22
Location:	Downtown, Vancouver, BC

The Estimated Savings



Project Challenges

The project team addressed several challenges through proactive coordination and technical problem-solving, including:

Equipment supply delays: which extended overall project timelines.

Crane logistics and scheduling: adding significant complexity and cost in a dense urban, high-rise context.

Electrical capacity constraints: addressed through an innovative control sequence to prevent the system from exceeding available building capacity.

RARA Case Study

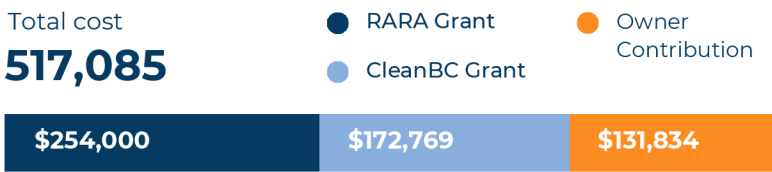
Market Rental

MUA System Cost

Total Project Cost: **\$517,084**

- Equipment: \$252,000
- Labour: \$31,292
- Materials: \$19,061
- Roofing: \$23,000
- Electrical: \$50,000
- Crane: \$102,000
- Controls: \$21,831
- Permits: \$2,500
- Other (coring, welding, tree trimming): \$15,400

Funding Breakdown



Noise Mitigation



MUA equipment produces operational noise such as humming, airflow, and vibration. If not properly isolated, this noise can travel through building structures and become a source of occupant or neighbour complaints, or conflict with municipal noise bylaws.

- As part of this retrofit, measures were implemented to limit noise transfer and maintain a quiet environment, including:
- Placement of the system on the rooftop, increasing separation from occupied areas.
 - Use of the existing screen wall assembly, providing an acoustic barrier.
 - Internal and external vibration isolation, including installation on a custom vibration-isolation plenum curb designed to absorb and dissipate vibration.
 - Flexible duct connections to prevent system vibration from transferring into the building's ductwork.
- These measures work together to reduce sound transmission and support quiet and reliable operation.

"This dual-fuel retrofit is a great example of what modern heat pump technology can achieve. It reduces operating costs, introduces cooling to the building, and helps owners take a major step toward long-term decarbonization."

Paul Ristow, Chief Engineer, FRESCO

R-454B Refrigerant

R-454B is a newer refrigerant (fluid used in heat pumps and air conditioners) that has 78% lower Global Warming Potential (GWP) than R-410A and meets current and emerging federal and provincial refrigerant regulations. It performs just as well as older refrigerants, has lower climate impact, does not harm the ozone layer, and can be used in new equipment with only small design changes, making it a practical option for HVAC systems.



Rental Apartment Retrofit Accelerator Program (RARA)

RARA is a free, one-stop concierge retrofit program that helps rental housing providers plan and implement energy efficiency and decarbonization retrofits, offering technical support, education, and central intake for accessing incentives and grants.

The program is led by **LandlordBC**, whose leadership and advocacy in the rental housing sector play a central role in shaping owner-focused, sector-informed retrofit approaches and accelerating market uptake.

RARA is delivered in partnership with **FRESCO**, the prime consultant, which leads participant recruitment, feasibility assessments, and engineering. FRESCO also handles system design, tendering, installation, commissioning, and performance verification.

RARA is funded by the City of Vancouver, City of Victoria, District of Saanich, the Province of BC, BC Hydro, and Natural Resources Canada through the Zero Emissions Innovation Centre (ZEIC) as part of the BC Retrofit Accelerator (BCRA).