

The Remington – Make-up Air Unit Electrification Retrofit Case study

PREPARED BY: FRESCo



Building Name/Address	The Remington, 3528 Vanness Ave, Vancouver
Building's Asset Class	Multi-Unit Residential (MURB)
Building Size	~5,760 sq.m (~62,000 sq.ft.)
Year Built	1999
Building Owner & Manager	Concert Properties / Concert Realty Services
Engineering & Mechanical Consultant	FRESCo



Project Overview and Background

The Remington is located at 3528 Vanness Ave., in the Collingwood Village neighborhood of Vancouver. It's a 21-story, 256-unit multi-tenant residential building, built in 1999 of reinforced concrete with textured panel exterior. The facility is split into a 6-story mid-rise adjacent to the 21-story main tower, both of which share common gas and electrical utilities.

The Remington offers various types of apartments and is professionally managed by Concert Realty Services. Amenities include a central laundry facility on the first floor, rooftop picnic area and a parkade.

An energy study, commissioned by Concert, revealed the building's existing makeup air (MUA) system was at the end of its useful lifespan. The MUA system delivers tempered outdoor air to the common areas of the building, such as the hallways, to pressurize them and mitigate against odour and smoke migration.

FRESCo was engaged by Concert Properties to first provide an options assessment report to evaluate the different MUA options suitable for the building, including:

- Heat pump with electric backup
- Heat pump with natural gas backup
- High efficiency gas
- High efficiency gas with variable speed fan controls

The heat pump with electric back up was the choice that best aligned with Concert Properties sustainability framework. They have a goal of reducing their building's operational carbon emissions by 80% by 2050.



Figure 1 Original MUA unit - low efficiency natural gas

Linear regression analysis of the gas utility bills in comparison to weather further indicated that MUA heating likely accounted for roughly half of the gas consumption at The Remington, so the heat pump with electric back up presented a significant opportunity to reduce emissions while also potentially reducing operating costs by replacing it with a better performing unit.



Rebates offered by Clean BC also made the MUA upgrade a preferred choice over the alternatives. CleanBC Custom Lite offers up to 50% of the energy study cost and, a rate of \$60/tCO₂e (for heat pumps) of lifetime greenhouse gas savings, up to \$48,000 per customer towards the capital cost. Incentives are capped at the lesser of 50% of a project's incremental cost, or to the point where the payback for the measure is less than 4 years after the incentive.

Project Implementation

Once Concert Properties had decided to go ahead with a heat pump MUA with electric backup, FRESCO was engaged to provide implementation support. This consisted of engineering design, tendering and summary of contractor bids, building permit documentation, construction support, as needed, with final inspection and review, and obtaining professional Letters of Assurance.

Options assessment timeline: initiated March 2019; completed May 2019

Implementation timeline: initiated January 2020; installed September 2020; commissioned August 2021; completed December 2021.



Figure 2 New MUA unit – heat pump w/ electric back up

Measured savings

Measure Description	Total Cost Savings/ Year	Total Project Cost	Rebate	Net Incremental Project Cost	Simple Payback (Years)	GHG Savings / Year (tCO ₂ e)
Heat Pump MUA; Electric Backup	\$20,459	\$165,500	N/A	\$96,560	4	59

Realized benefits associated with the upgrade included:

1. Annual energy & GHG savings
2. Addition of ventilation air cooling in the hallways and other common areas
3. Commissioning to improve indoor environmental quality

Challenges encountered

The main challenge for this project was obtaining the City of Vancouver building permit. The building permit process added 4 months to the project timeline and also added costs for building permit fees and additional engineering fees.

A second challenge encountered was incomplete system commissioning. During the engineers' final review, the MUA unit was functional but relying on the back-up heat source instead of the heat pump due to incorrect control settings. Additionally, the control and monitoring point connections to the Building Automation System had not been completed. The controls contractor had to be re-engaged to address and reprogram sequence of operations of the BAS.

Another challenge was a noise complaint from one or two tenants in the adjoining tower to the Remington building. After a thorough investigation by an acoustical consultant it was found that, although the added sound from the new heat pump was only marginally higher than the ambient background noise, it would be prudent to install the manufacturer's sound reduction kit to appease the tenants. This installation was done under a separate, subsequent contract.

The last challenge was finalizing complete operations and maintenance (O&M) manuals, which is an EGBC engineering practice requirement and specified in the project contract documents. The project closeout and building permit signoff were both significantly delayed despite the fact that the new system was installed and operational.

Delay between initial installation and the Engineers' final acceptance of the MUA systems (including commissioning, O&Ms & closeout) was almost an entire year. These delays were not attributable to COVID. The contractor did a great technical job and was a decent communicator, but simply struggled at addressing any of the higher construction-management functions that were outlined as part of their contract.

Lessons learned

- Commissioning, in most cases, is best provided by a 3rd party separate from the installing contractor, to objectively verify that the system installation is complete, properly balanced, and thoroughly tested to confirm sequence of operation control.
- Owners should always adhere to the Builder's Lien Act guideline of 10% holdback for final payment on projects, to incentivize contractors to complete all aspects of the project in a timely fashion. Payment holdback is intended specifically to ensure that the contractor has delivered ALL items necessary for a fully functioning system and proper closeout. In this case, the



contractor completing the commissioning and O&M took almost a year to complete their work. Had the owner held back their fee, they might have been more earnest to complete the project in a timely manner

Future Opportunities

The Remington shares common mechanical infrastructure with other buildings; particularly domestic hot water. Other opportunities for further decarbonization at this location would involve the domestic hot water system; namely installation of hot water heat pump technology.

