

Tour fresk

Energy performance without compromising style

Since December 2016, Quebec City's trendy *Nouvo Saint-Roch* neighbourhood has been home to an elegant, contemporary tower called **Fresk**. The building marks the arrival of the real estate firm Cromwell Management in the capital city.

Fresk tower has a surface area of 202,000 square feet, with 20 floors: the first two are reserved for commercial spaces and resident services, and the remainder house 169 luxury apartments and several common areas. Tenants and visitors share an underground parking.

Designed to provide a high-end urban living experience, this multi-residential rental property doesn't only look good; it is also energy-efficient. It uses up to 30% less energy than a classic building—despite its impressive fenestration!

Redesigned for optimal performance

In construction, as in other domains, it can be profitable to depart from established practices. Thanks to a change in vision and the redesign of its building services, Fresk went from being an ordinary project to an extraordinary accomplishment.

Initially, each apartment had its own equipment: an electricity meter, a water heater, electric baseboards, and a wall air conditioner. Although this standard solution was economical, it came with certain drawbacks and challenges: less floor surface, increased acoustic annoyance from the equipment, and the

need to access each apartment and balcony for maintenance and repairs. For example, the air conditioner compressor was located on the balcony of each apartment. Although the compressors would have been protected by housing units, they still would have generated heat and noise, in addition to being bulky and unaesthetic.

The building owner, a seasoned real estate promoter, was not satisfied with the solution. He wanted to offer residents a prestigious and pleasant living space, with heating, air conditioning, hot water and electricity costs included in the rent. He therefore asked the team to return to the drawing board.

A challenge leading to innovation

The engineering firm Génécot was mandated to review the building services and propose an integrated, centralized, energy-efficient, and affordable solution. Adding to the challenge was the fact that the building plans had already been approved. The firm decided to adopt an original approach, using innovative technologies.

Maximizing the building's potential

The design team developed a strategy focused on **recovering and transferring energy** in order to take advantage of Fresk's abundant fenestration and transform what would ordinarily have been a disadvantage into a benefit. In short, the chosen system captures excess solar energy and redistributes it as needed before evacuating it, thus reducing heat loss in winter and heat gain in summer. For example, the system allows heat generated by the air conditioning system on the sunny side of the building to be used to heat areas located on the shady side, or to pre-heat hot water for domestic use.



One solution, several innovative methods

The designers realized that to ensure tenants' comfort and provide an optimal solution overall, they would have to combine several innovative strategies, including those listed below.



Hydronic network with a reversible configuration and remote distribution network

The wells are connected to a hydronic glycol-free network that serves the entire building. The network has a reversible configuration that allows for air conditioning on one side of the building and heating on the other. These modes can be inverted at any time.

Between the wells and network is a 250-ton liquid cooler. Four insulated pipes pass through a riser: two for the heating loop and two for the cooling loop.



Six-way valves



A service room on each floor provides access to the riser pipes and the equipment that distributes water to the apartments on the floor below. The location of the six-way valves offers two major benefits: no air vents are required and the water is sent to the fan coil of each apartment via two narrow pipes instead of four.

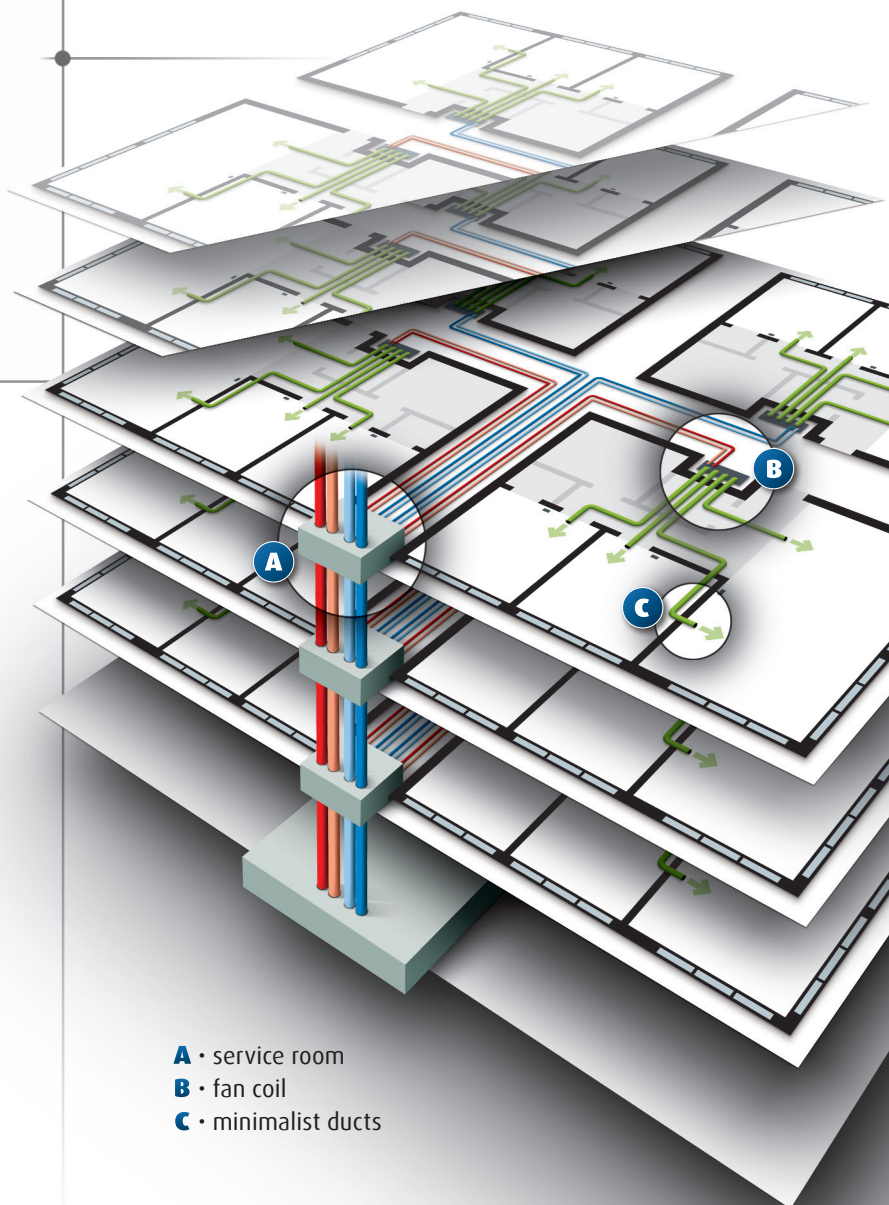
There are 197 valves in the building, including one for each apartment. The valves have a motorized actuator and allow for modulating, stable and precise regulation.



Energy efficiency through dual energy and recovery

To support their heat recovery and transfer strategy, the designers opted for a centralized hydronic system and an original use of dual energy.

In Quebec, this type of system generally uses electricity as the main source of energy and a fuel as a backup. In this instance, ten geothermal wells are the main energy source, accumulating heat or cold, as needed. If these wells can no longer meet the demand, additional energy is provided by electric and gas boilers when the temperature drops below 15° C, and a dry electrical cooler in the summer.

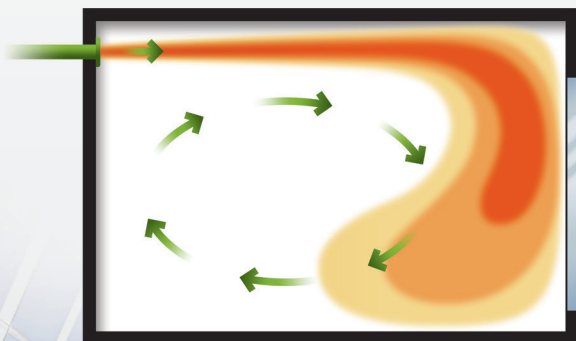




Design using minimalist ducts

In terms of comfort, the chosen solution aimed to provide heating, air conditioning and fresh air to each room independently.

The minimalist duct approach, which involves positioning the air vents on the walls opposite the windows, was the perfect solution. Thanks to sufficient air flow and speed, as well as specially designed grills to produce the Coanda effect, the air circulates from the ceiling to the opposite wall and returns along the floor. Heat is redistributed evenly rather than accumulating near the ceiling through convection. No additional heating is required, even along exterior walls.



Innovative fan coils and cost-efficient zoning

The choice of equipment was key to implementing the minimalist duct design and ensuring cost-efficient zoning.

The design team opted for an innovative fan coil manufactured by Eurevia. This highly compact, multi-zone device recovers heat in up to four variable-volume zones, and has an electronically commutated motor (ECM) that allows for full air-flow modulation. The fan coil includes aeraulic, hydraulic, thermal and electronic functions, and its reversible operation permits heating as well as air conditioning, thanks to a single coil.

The integrated zoning in the compact fan coil is without a doubt its greatest advantage, providing not only enhanced comfort in each of the rooms, but also eliminating the need for auxiliary heating.



Each apartment has a fan coil, which is installed in the entrance hall ceiling. It is connected to smart thermostats with quick connectors that are pre-wired, programmed and factory-tested by Regulvar to ensure simple, rapid installation and use.

Centralized building automation system

The building automation system designed and provided by Regulvar ensures integrated, centralized management of all mechanical and electrical systems.

It controls the ventilation of common areas, service rooms, the indoor parking and apartments, the electric underfloor heating and snow melting system, the heating and cooling system (including pumps, water heaters and the cooler), the domestic cold water pressure boosting, the submersible


pumps, electric meter readings, and the garage door.

This system plays a crucial role in optimizing energy performance, since it allows the flow to be entirely managed by Delta T (temperature differential). This strategy eliminates the need for balancing valves and independent pressure control valves, reducing installation costs, the number of components, and, to a significant degree, the required pumping power.

Positive outcomes

There is no question that the revised design of Fresk's building services, using an innovative approach and methods, has created a variety of positive outcomes on every level.

The **property owner** enjoys centralized management of all systems, which facilitates maintenance and optimizes operations. Overall energy consumption has been cut by 30% compared to similar buildings, despite the fact that the exterior walls feature over 70% fenestration.

In addition, Génécór assisted the owner in obtaining financial support from Gaz Métro and Hydro-Québec, on account of the building's many innovative features, as well as the beneficial rate for dual-energy systems. 

And the building **occupants** benefit as well. In addition to paying an all-inclusive rent, they enjoy a peaceful and pleasant living environment: bright rooms with plenty of windows, high ceilings, and an uncluttered floor space and balcony.

They also enjoy a uniform and silent supply of hot or cool air, adjusted according to their needs.

This project proves that by stepping off the beaten track, we can construct buildings that are both energy-efficient and aesthetically pleasing.

visit **fres**  at www.tourfresk.com

Reduced



- ▶ Installation, energy and operating costs
- ▶ Number of heating and air conditioning units
- ▶ Number of ventilation ducts
- ▶ Number of water pipes

Increased



- ▶ Versatility
- ▶ Thermal and acoustic comfort
- ▶ Floor and ceiling space
- ▶ Life span

In short

Simplified

- ▶ Design
- ▶ Prefabrication
- ▶ Installation
- ▶ Maintenance



Centralized

- ▶ Energy production (hot/cold water)
- ▶ Distribution equipment
- ▶ System control



Completion of the project

Owner ▶ Cromwell Management

Mechanical and electrical systems ▶ Génécór, experts-conseils

Building automation ▶ Régulvar

Architecture ▶ LEMAYMICHAUD

Contractor ▶ Garoy construction

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