The Phenix, Lemay's Montreal office, was designed as an experimental laboratory for innovations in sustainable development and workplace design. A socially and environmentally responsible gesture, the building is located in the heart of Montreal's South-West borough, an effervescent neighbourhood. Instead of designing a new building, Lemay chose to make a bold statement by transforming a neglected 1950s era warehouse into an innovative headquarters for its growing transdisciplinary team. The metamorphosis of this abandoned edifice highlights an adaptive reuse of Montreal's industrial heritage. In its renewed form, the building reflects a confluence of best practices in architecture, urban planning, landscape architecture, urban design, interior design and sustainability strategies. This was a unique opportunity for the design team to internally test the work environment strategies they have developed and put forward for clients.

The Phenix has achieved the rare Fitwel 3-star rating, as well as Zero Carbon Performance certification, LEED-Platinum certification, and Living Building Challenge-Petal certification. In 2020, the project was awarded the title of "Game Changer" by the World Green Building Council, in recognition of its contribution to the greening of the building industry.
Stakeholders

Contractor
Name: Lemay
https://lemay.com/

Construction Manager
Name: Entreprise de construction T.E.Q. inc
http://groupeteq.com/en/

Stakeholders
Function: Others
Martin Roy and Associates
https://mra.qc.ca/
Engineer

Function: Others
Dupras Ledoux
https://www.dupras.com/
Engineer

Function: Others
ELEMA
https://elema-ing.com/en/projects/the-phoenix/
Engineer

Contracting method
General Contractor

Type of market
Design and implementation

Other type of market
Working environments

Allocation of works contracts
Separate batches

Energy

Energy consumption
Primary energy need: 156,00 kWhpe/m².year
Calculation method: Other
Breakdown for energy consumption:
No repartition is made as the building has only one energy meter.
Initial consumption: 350,00 kWhpe/m².year
Envelope performance

Envelope U-Value : 0.60 W.m⁻².K⁻¹
More information :
External walls are not insulated and composed of brick and concrete. Windows are triple-glass on the north section while the south is double-glass.

Roof is insulated with 2 cm polystyrene.

Note that the air tightness value is calculated using the Canadian energy code NEBC 2011 and the units are L/sm² (0.25)

Building Compactness Coefficient : 0.20
Indicator : 14
Air Tightness Value : 0.25

More information
Calculation method : NEBC 2011

Real final energy consumption

Final Energy : 120.00 kWh/m².year

Renewables & systems

Systems

Heating system :
- Boiler fuel
- Heat pump
- Water radiator
- Low temperature floor heating
- VAV System
- Solar thermal

Hot water system :
- Individual electric boiler

Cooling system :
- Reversible heat pump
- Fan coil
- VRV Syst. (Variable refrigerant Volume)

Ventilation system :
- Natural ventilation
- Double flow heat exchanger

Renewable systems :
- Solar photovoltaic
- Solar Thermal
- Heat pump

Renewable energy production : 30.00 %

Other information on HVAC :
- Heating. Air-to-water heat pumps coupled with a solar wall collector, thermal storage and electric boiler backup
- DHW (domestic hot water). Electric storage tanks
- Cooling. Air-to-water heat pumps
- Ventilation. Double flow with energy recovery >80%
- Renewable energy. Heat pumps and photovoltaic panels

One of the strategies used to reduce the energy consumption of the building's heating system was the integration of a solar wall on the south façade. It allows for passive heat collection (high sunlight levels, especially on the coldest days). The outside air, which can reach -25°C, is preheated in this wall and then used by the heat pumps. The output is therefore stable even during the coldest periods. The building also has a photovoltaic production on the roof (375 panels) which not only allows a large part of the energy produced to be consumed by the building itself, but also limits the demand for power through a storage system. The savings observed are of the order of 30% of the building's energy bill. It should be noted that in Quebec, the network manager charges a significant amount for the power demand, and this cost can represent half of the energy bill. With the system implemented in the Phenix, the gains observed are considerable.
Environment

Urban environment

The building is located in Saint-Henri, in Montréal, which offers an access to all the services but is also central for public transportation (bus and metro) as well as biking paths. The building is well integrated into the neighbourhood in order to encourage employees to prioritize public or active means of transportation.

Products

Product

Photovoltaic panels
Rematek
https://rematek-energie.com/
Product category: Management / Others

Costs

Construction and exploitation costs

Total cost of the building: 3,391,855 €

Energy bill

Forecasted energy bill/year: 74,719.43 €
Real energy cost/m²: 9.34 €
Real energy cost/Work station: 186.8 €

Health and comfort

Indoor Air quality

As part of the LEED certification, the building was subjected to air quality measurements using passive radiello sensors. Fine particles, formaldehyde and total VOCs were measured at the end of the construction.

In the same way, the following strategies have been integrated

- An indoor air quality management plan
- Specification of low VOC (volatile organic compound) and low emission materials
- MERV 13 high efficiency air filters
- CO2 detectors in meeting rooms to optimise the supply of fresh air

Quality of life and services

The following strategies have been integrated to assure quality of life and services for the occupants:

Comfort:

- Heat detectors to ensure occupant comfort
- Water filters to provide quality drinking water
- Multifunctional relaxation areas

An active environment:

- An active design that prominently features the main staircase connecting all floors, as opposed to the lift
- A gym and activity programme
- Bicycle parking to promote active transportation
Carbon

**Ic Energy**

Ic Energy : 1.00 KgCO₂/m²

**Ic Construction**

Ic Construction : 88.00 KgCO₂/m²

**Carbon sink**

A Life Cycle Assessment was carried out. It consisted in comparing the existing building with the future building in order to determine the reductions obtained thanks to the reuse of the building 65% reduction was calculated by an independent company (AGÉCO).

**Initiatives promoting low-carbon mobility**

The building is located in Saint-Henri, in Montréal, which offers an access to all the services but is also central for public transportation (bus and metro) as well as biking paths. The building is well integrated into the neighbourhood in order to encourage employees to prioritize public or active means of transportation and reduce carbon emissions.

Contest

**Reasons for participating in the competition(s)**

The design of the Phenix demonstrates the potential for development, revitalization and densification of North America’s aging infrastructure. As a result of this transformational project, a once-abandoned building is now fully occupied, the soils have been decontaminated, and vegetated areas provide a respite from the surrounding heat islands. Not to mention its white roof, covered with 379 photovoltaic panels, and the presence of deliberately limited parking that both further reduce the building’s carbon footprint on its urban environment. The project combines active and passive energy strategies to significantly reduce energy consumption related to the cooling of interior spaces. For example, a mixed-mode ventilation system cools the building in the spring and fall by simply opening operable windows, while providing fresh air to the work areas. The building’s revitalization also diverted 93% of construction waste, compared to 50% for a typical project. Its multiple sustainable strategies also result in annual energy cost savings of 83%, and a 35% reduction in water use compared to similar buildings. With thermal and electrical storage to support its off-grid capacity, the Phenix is a model of resource efficiency, energy self-sufficiency, and social and natural connectivity.