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Régulvar
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Régulvar

Régulvar inc. In a new head office!

In December 2013, staff from Regulvar Inc.'s headquarters moved into a newly renovated building. Find out about this latest addition to the company's building inventory.

An energy-efficient and innovative building

Founded in 1974, Regulvar has grown steadily and today has more than 500 employees in 12 branches. Since the former head office had reached full capacity, the company decided to relocate to a 4095 square metre building at 3985 Boulevard Industriel, in Laval. Its goals: to concentrate all administrative activities in one location; to bring the distribution centre back to the head office; to reorganize its plant according to the **5S** and **LEAN** approaches; and to set up a training centre for clients and technicians.

Renovating to innovate

Regulvar decided to renovate an existing building, which it stripped down entirely, leaving only the load-bearing elements inside. This large, empty space offered a great opportunity to organize the new headquarters from scratch, adopting a bold and customized approach to the design of technical systems.

The company's aim was clear: to make the new head office a showcase for its expertise, products, and control and mechanical systems. Regulvar was therefore closely involved in the technical design, ensuring that the new building would be both a useful demonstration tool for clients and a teaching resource to help employees develop concrete skills.

In terms of control systems, the design team deliberately chose to integrate various types of technological equipment into the same building automation system. This strategy allowed them to prove that wireless and wired communication systems can be combined, and that a wide range of devices, made by different manufacturers and based on different protocols, can work seamlessly together.

On the mechanical front, the company opted for a range of innovative technical solutions to reach its objective of achieving zero carbon emissions, limiting energy consumption to $1 per square foot (about half that of a similar building), and showing how effective energy-saving measures can be put in place without breaking the bank. The new mechanical system is connected to an energy measuring and monitoring system.

A versatile building automation system

As mentioned above, Regulvar chose to diversify its control system to demonstrate the technical feasibility and viability of such an approach.

As far as the equipment used to detect and control ambient conditions is concerned, the new head office is equipped with a variety of thermostats: some are wired, others use wireless communications; some allow the set point to be modified, others do not; and certain models have a motion detector, a humidity sensor and a CO_2 detector. The integrated lighting control system is connected to light and motion detectors and, in the offices facing west, is linked to wireless switchers/dimmers and automated blinds.

The operation of these devices is based on a variety of protocols, including BACnet IP, BACnet Ethernet, BACnet MS/TP, Meter-Bus, EnOcean, Modbus, ZigBee, and SDN (Somfy Digital Network). The building automation system designed by Regulvar is able to efficiently manage all of these protocols with a single control interface.

It is helpful to observe the performance of this type of system on a daily basis, to use it to train employees, and to test its programming, capacities, expandability and other features. This allows us to enhance our knowledge and methods, to the benefit of our clients.

LED lighting
A bright choice

In terms of lighting, Regulvar wanted to equip its new building with a system that would be energy-efficient, sustainable and high-performance. The designers opted for a solution based exclusively on LED[1] technology. Both inside and outside the building, all lights are LED models.

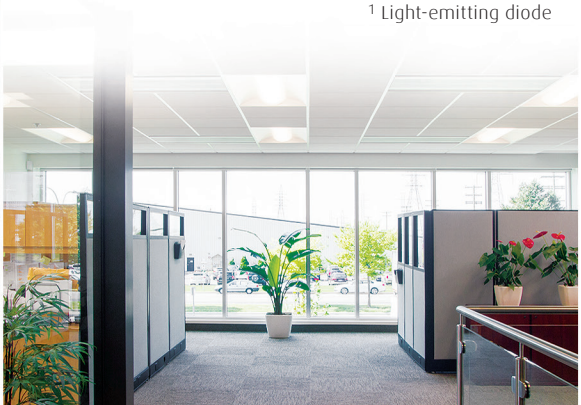
Despite the high up-front cost, the decision was considered advantageous in the long term, since this type of lighting is extremely energy-efficient. A conventional lighting system accounts for approximately 40% of a building's energy expenses. At Regulvar, thanks to LED technology, lighting accounts for only 20% of these costs.

Another advantage is the bulbs' lifespan, which can exceed 50,000 hours. Depending on use, this can translate into 20 years without maintenance, thus generating major savings in equipment and labour.

A complementary strategy was put in place to limit the use of lights and make the most of natural light. The glass surface was maximized by transforming the facade into a curtain wall; installing glass garage doors in the plant, cafeteria and warehouse; and installing floor-to-ceiling glass walls in offices and conference rooms.

The lighting control system is connected to ambient light sensors in certain offices, as well as automated blinds, to avoid solar gains in the summer and make use of them in the winter.

[1] Light-emitting diode



Zone Régulvar

Heating and air conditioning

An exceptional strategy energy-saving

In contrast to light industrial buildings of the same type, which usually heat their offices with electricity and their plant with gas, Regulvar has opted for an unusual solution based on **50% geothermal energy with storage and 50% energy recovery.**

The comfort of the building's occupants is ensured by a hydronic system that provides both heating and air conditioning to the offices and plant. It feeds chilled beams, as well as radiant floors and walls, and is backed by an energy recovery system. It is worth noting that the energy added to the water comes from the geothermal system and heat transfers, never from electric elements or from gas, oil or wood boilers.

Geothermal energy

According to engineering calculations, the project would have required 12 geothermal wells for a 90-ton cooling load. Given their high cost, only six wells were dug, since our experts were confident they would be able to find other energy sources. As a result, during the summer, needs are met 100%, while in winter, approximately 400 hours of heating must be provided by thermal energy stored during off-peak periods.

Recovery, storage and distribution

The thermal recovery strategy depends on a number of complementary devices. These include: storage radiators with bricks that are heated at night when electricity can be used without affecting peak demand; a passive solar wall that allows outside air from the warehouse to be preheated; a heat wheel that collects heat from evacuated exhaust air; and an exterior air cooler.

The main system comprises a central 45-ton heat pump and some 20 water-air heat pumps installed at strategic locations in the building—for example, in front of the facade windows, in the plant and in the training classrooms.

Three of these heat pumps play a key role. The two that are installed in the server room are our second source of heat, thanks to the five tons of heating load they provide. The pump in the electrical equipment room is our third source of heat. Since this room contains several types of heat-generating equipment and is unoccupied, the temperature can be varied to remove or recover excess heat.

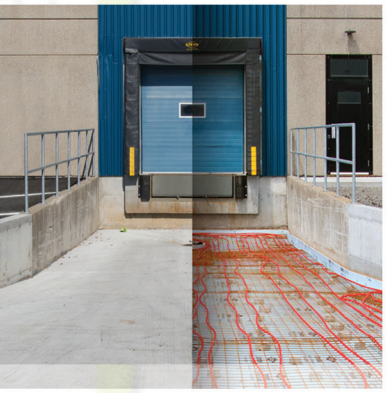
Finally, to meet storage and transfer needs, two tanks have been installed in the mechanical equipment room: one for hot water (3000 gallons), the other for cold water (1500 gallons). In the summer, the two tanks are connected and contain cold water to meet cooling needs on peak days.

Concrete slab and wall heating

During the stripping of the building, the team noticed cracks in the concrete slab and decided to replace it. The designers also took the opportunity to install a radiant heating system in the floors and walls of some rooms.

In the offices on the ground floor, over a width of four feet from the exterior wall, the radiant floor is used for supplementary heating, eliminating the need for other types of perimeter heating. Using the information provided by temperature sensors installed in the concrete slab, the building automation system keeps the temperature constant at 22°C.

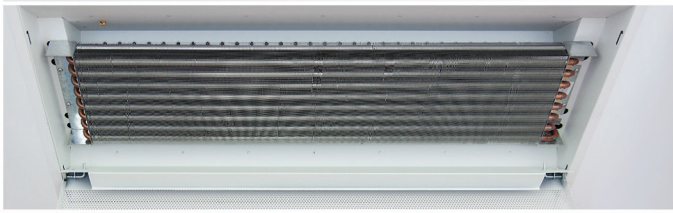
Certain exterior areas—the main entrance, the employees' entrance and the shipping dock—are equipped with a snow melting system, which is also used to evacuate excess heat between seasons and in the winter when solar gains are significant.



Nathalie Fradet, Editor
nfradet@regulvar.com

Chilled beams

A key innovation at the new head office is the use of chilled beams connected to six-way valves as the main source of heating and air conditioning. This is a first in Canada. The fact that the six-way valves are located away from the terminal equipment reduces the amount of piping by half.



These devices installed in the ceiling consist of hydronic coils in which hot or cold water circulates. The air from the room and ventilation system circulates around the coils and is heated or cooled before being pushed back into the room.

Chilled beams have the advantage of being very energy-efficient and silent, and ensuring gentle, comfortable air circulation. Since they work by induction, they require 70% less air than a variable air volume (VAV) system. The air handling unit at the new headquarters is three times smaller than a conventional system.

Finally, the chilled beams are supplied by a low-temperature hot water network (± 29 °C) and a high-temperature cold water network (± 17 °C), increasing the system's efficiency by maximising the delta T. In addition, the return hot water from the chilled beams supplies the heat pumps mixed water network, which also maximizes the delta T.

UPCOMING **TRAINING**

	In **Laval** in French	In **Ottawa** in English
ORCAVIEW Beginner	Upon request	Upon request
ORCAVIEW Intermediate	June 1 - 2 2015	June 4 - 5 2015
ORCAVIEW Advanced	June 3 - 4 2015	June 8 - 9 2015
GCL PROGRAMMING	June 8 - 9 - 10 2015	June 16 - 17 - 18 2015
CREATING GRAPHICAL INTERFACES	June 17 - 18 2015	June 22 - 23 2015
INTRODUCTION TO WIRELESS CONTROL	June 22 - 23 2015	July 6 - 7 2015

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visit our Website
www.regulvar.com
or contact the
training department
at **450-629-0435** ext. **1777**
formation@regulvar.com