

volume 13, number 2  
May 2019

**zone**  
**Régulvar**  
www.regulvar.com

# Regulvar-Elkon: A great duo taking on a great project

In our 2013 newsletter, we informed you that **Regulvar** had been chosen to implement the building automation system at the Centre hospitalier de l'Université de Montréal (CHUM).

Once completed, the new hospital will have a total area of 3,300,000 square feet. The clinic and laboratory section were inaugurated in September 2017. The clinic includes 772 rooms, 415 examination rooms and 39 operating rooms. This hospital-based construction project is currently the largest in North America.

But how did **Regulvar** and its subsidiary **Elkon** stand out from the crowd in order to participate in this mammoth project? How did they contribute to the CHUM's objective of outperforming LEED Silver certification in sustainable development? What were their challenges and successes in the second phase of this project?

## 1. Efficient energy management

In an era where comfort and energy savings are the watchwords, the CHUM has launched an initiative to achieve 40% greater energy efficiency than reference buildings in order to surpass LEED Silver certification, a guarantee of superior construction quality in terms of human health and environment. The hospital centre builder called on **Regulvar's** expertise to install a centralized building management system to monitor and manage system performance, thus avoiding energy waste and detecting anomalies.

To date, **Regulvar** has installed more than 1,450 energy meters to compile the energy consumption of the entire building. To do this, **Regulvar** integrated the LMS energy management platform using a Modbus IP gateway (enteliBRIDGE). It also installed 551 power and electrical energy meters for lighting, 81 energy flow computers for fluids and steam, 74 hot and cold water flow meters, 20 natural gas meters, and integrated consumption data for the 751 starters and frequency inverters.

The collected data makes it possible to create energy dashboards in enteliWEB, and is also exported to the operator's energy management platform with the nBox platform developed by **Regulvar**.

## 2. A dual purpose HVAC system: comfort and safety

In order to meet the CHUM's design criteria for environmental quality, the constructor and its engineers have designed a modular air distribution system to manage microbiological contamination while maintaining occupant comfort and safety. These systems integrate precise pressure control (operating and respiratory isolation rooms, laboratories) and smoke management (refuge areas, smoke control) in rooms with wide temperature variations (burn units) while maintaining the ventilation, temperature and humidity standards required in a hospital.

To meet the constructor's specifications, **Regulvar** designed and installed a hybrid building automation system distributed over two communication networks: a UUKL-certified network (UL864 - Standard for Control Units and Accessories for Fire Alarm Systems) and a standard network. The UUKL network was used for all ventilation systems, as well as terminal units (VAV boxes). **Regulvar** installed and commissioned the UUKL network in accordance with Delta Controls Inc. manufacturer's guidelines.

In the event of a fire, the hybrid building automation system allows part of the smoke to be evacuated from an area and fresh air to be transferred to it using the terminal boxes' motorized dampers, as well as smoke dampers in refuge areas. As a result, thanks to the smoke management panels manufactured by **Regulvar**, firefighters can access the premises more easily, occupants can be evacuated more rapidly and the fire does not progress as quickly. All other components of the building automation system have been connected to the standard network.

### 3. A mobilized workforce and an innovative way of working

Due to the amount of work, **Regulvar** has set up a team entirely dedicated to the CHUM construction project. In total, 125 employees were mobilized, including about 100 electricians and some 20 technicians from the various branches of **Regulvar**.

In addition, as part of this major project, **Regulvar** has implemented new working methods to meet tight deadlines. For example, the controllers were integrated into the motor control centres (MCC), the HVAC box controllers were installed on the boxes at the **Regulvar** workshop, the air handling units were

pre-wired in a warehouse before delivery, and all were programmed, powered and validated before being shipped to the site. Several programming deployment and automated commissioning tools have been specially designed for this project. Result: uniformity, quality of installations and time savings. On site, the employees only had to install the finished product.

### 4. Number of Elkon and Regulvar products installed for both phases

**150,000** physical inputs and outputs  
**10,000** lighting control points  
**60,000** room control points  
**60,000** system control points  
**2** communication networks (UUKL and standard)  
**1** enteliWEB server, for up to simultaneous 100  
**32** archiving modules  
**9,500** digital controllers  
**1** Modbus IP gateway (enteliBRIDGE)

**47** BACnet motor control centres for air handling units  
**70** BACnet motor control centres for pumps  
**500** variable frequency drives  
**500** magnetic starters  
**300** lighting control panels  
**8,000** motion and light detectors  
**2,000** electrical, thermal energy and virtual meters  
**1,300** km of cables



## 5. Régulvar and Elkon: Completely complementary

It is in part thanks to its complementing relationship with its subsidiary **Elkon** that **Régulvar** won the contract for the CHUM project: it was able to offer a solution that integrated building automation into all controls and driving power connections.

By using **Elkon's** modular solutions, **Régulvar** was able to reduce the physical footprint of the control cabinets on site.

The integration of control components inside the power cabinets has resulted in an assembly that complies with CSA standards, often overlooked in the industry. This integration also made it possible to isolate the low-voltage power sources of the control sections (24 V), which reduced the risk of arc flash exposure to maintenance personnel.

## 6. Three custom-made products

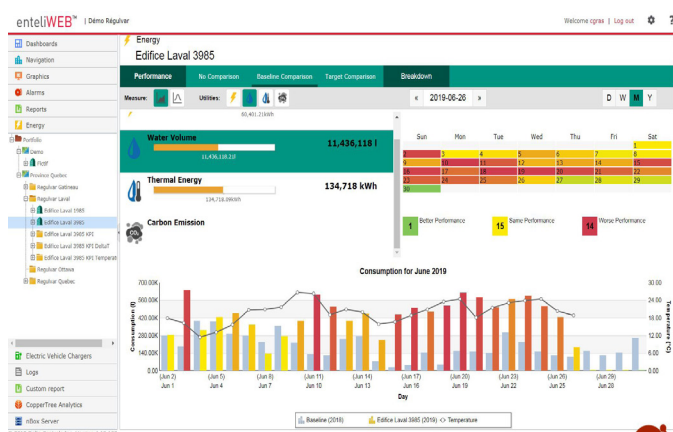
**Motor control centers:** These control centres are used for motor starting and electrical distribution. They allow real-time monitoring of the operation of equipment and protection and troubleshooting applications.

As part of the CHUM project, the MCCs were custom-made by **Elkon** for the 47 air handling units, making it possible to continuously renew the air in the hospital. These units are one of the Hospital's major innovations.



**Lighting control panels:** they are capable of adjusting the brightness at any time, manually or automatically, and are equipped with a BACnet power meters. They integrate perfectly with building automation systems, as they are equipped with BTL certified Delta Controls relay controllers, which use BACnet/IP and BACnet MS/TP. Thanks to enteliWEB's dashboards, it is possible, among other things, to manage lighting as well as energy usage.

To meet the CHUM's needs, these control panels have been equipped with motion and light level sensors and programmed with optimized sequences. For example, the lights automatically switch off if there is no one in a room and the brightness changes automatically according to natural light.



enteliWEB energy module dashboard

**Magnetic starters:** these magnetic starters are designed for remote starting of all types of motors, pumps, fans and compressors.

At the CHUM, these starters are used for motors and connected to the building automation network panels. They are also used to control unit heaters (about 200) in mechanical rooms, which in this case have been equipped with integrated digital controllers.





## 7. Safety at the level of the project

Safety is a fundamental value for **Regulvar**. During the peak of activities on the CHUM's huge construction site, on which a large number of tradespeople from various companies were working, **Regulvar** distinguished itself by deploying a full-time health and safety coordinator on this project to ensure that the relevant policies, regulations and procedures were properly applied.

Every week, during an occupational health and safety meeting, electricians and technicians were made aware of the various risks and dangers, as well as the good practices to be adopted on site according to its evolution, such as working in a contaminated environment, working at heights, working on live equipment, and the measures to be taken when working in heat or cold. As a result, for every 485,000 hours worked, only four lost-time, non-severe accidents occurred.

## The CHUM project, phase 2, in a few figures

- Project duration: 7 years
- Number of employees mobilized: 125
- Total number of products installed: more than 10,000
- Area of the CHUM: 3,300,000 square feet
- Hospital capacity: half a million users

## ACQ René-Lafontaine Award

On March 16, Marc Dugré, President of **Regulvar**, was awarded the prestigious René Lafontaine Prize at the Banquet Reconnaissance of the Association de la construction du Québec. This award honours a contractor who has been very involved in the construction industry. Discover how he contributed to ACQ: <https://www.acq.org/entrepreneurs/evenements/banquet-reconnaissance/laureats2019/> (in French only)



## Project team

<b>General Contractor</b>	Santé Montréal Collectif CJV S.E.C.
<b>Architects</b>	NEUF ARCHITECTE, CannonDesign
<b>Engineering firm</b>	HH Angus
<b>Building automation</b>	REGULVAR

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<b>BACNET OBJECT HANDLING</b>	In <b>Laval</b> (French)	In <b>Ottawa</b> (English)
<b>ADVANCED OBJECTS AND CONTROLLERS</b>	September 16 • 17	Upon request
<b>GCL PROGRAMMING</b>	September 18 • 19	Upon request
<b>CREATING GRAPHICAL INTERFACES</b> with <b>Illustrator</b>	September 23 • 24 • 25	Upon request
<b>CREATING GRAPHICAL INTERFACES</b> with <b>entelivIZ</b>	October 1 • 2	Upon request
<b>INTRODUCTION TO WIRELESS CONTROL</b>	Upon request	Upon request

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