



## Power over Ethernet Less wiring, more freedom

The strength of a building automation system is based on its ability to network equipment in order to centralize control and provide data as well as the means to visualize it. Furthermore, in order to simplify network management, it is now possible to take advantage of a method called **PoE** or **Power over Ethernet**.

Thanks to PoE, standardized in 2003 by the IEEE (Institute of Electrical and Electronics Engineering), the building automation system's data passes through the existing communication network Ethernet cables, avoiding having to manage many parallel networks.

Moreover, given that an Ethernet cable is made up of four pairs of wires and that only two are used to transmit data, PoE recommends using the remaining two pairs of wires for electrical power supply, which is greatly facilitated. The connection of the devices and controllers is characterized by a direct relationship with the central switch given that a daisy chain connection would lead to a loss of energy. This does not affect user-friendliness in any way because the communication infrastructures already take this reality into account.

The best PoE success story is, without a doubt, IP telephony. Today, this type of installation benefits many companies whose telephones are integrated into and powered by the digital network and accessible via the IT system.

### PoE at Carleton University

In 2009, **Carleton University** began building Canal Site, a seven-storey building covering 95,000 ft<sup>2</sup>. Designed with the objective of achieving a **Green Globe** certification, this eco-responsible and energy-efficient construction will be home to the sustainable engineering department, among others.

It is interesting to note that the project will also be used as a learning tool for students who will be able to consult and study the data provided by the building automation system in real time; that is one of the reasons that motivated the people in charge to use the Ethernet network and technology already in place. Regulvar was therefore assigned the mandate of integrating all the components of the lighting control system and the heating, ventilation and air conditioning (HVAC) system via PoE, as well as several measuring and sub-measuring devices designed to gather key information for the analysis, follow-up and ongoing improvement of building performance.

As a result, at the end of the project, which is planned for the fall, the HVAC system will benefit from about 100 variable air volume boxes associated with as many multifunctional probes (temperature, humidity, presence and CO<sub>2</sub>). As for lighting control, it will use ambient light sensors to turn on or off or reduce the intensity of the light in the large rooms, and it will use thermostat buttons to manage office

lighting. Measurement and sub-measurement operations will provide large quantities of useful data regarding cooled water, central plant steam, domestic water and the main power supply, as well as regarding lighting panels, electrical panels, starters and the variable speed drives. The Delta Controls enteliWeb software program will be given the task to process the data, which occupants will be able to view using dashboards and a Web portal in the main entrance.



In short, Power over Ethernet will have enabled the owners to integrate the building automation system in a user-friendly way into the communication network, giving them the means to optimize the "metabolism" of Canal Site and to study it for innovation purposes.

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# The Plein-Soleil school in Candiac



Commission scolaire  
des Grandes-Seigneuries

The Commission scolaire des Grandes-Seigneuries (the Grandes-Seigneuries school board) has made energy efficiency a priority for quite some time. In November 2002, it inaugurated the Du Tournant high school, in a new environmentally friendly, high energy performance building. A long-term vision and applying several innovative concepts proved to be a winning combination, given that the annual energy savings led to a return on investment in six years.

In the wake of this success, the school board asked the designers of the **Plein-Soleil school** to base their work on that model and improve on it. Situated on a site measuring 20,000 m<sup>2</sup>, this two-storey establishment covers an area of 4326 m<sup>2</sup> and has a double gymnasium. Since 2010, it has welcomed students in three preschool classes and 18 regular classes.

To reduce the production of greenhouse gases and to optimize energy savings, it was decided that the building would be powered entirely by hydroelectricity through a geothermal system. Therefore, the heating, ventilation and air conditioning (HVAC) system

at the Plein-Soleil school uses 17 geothermal wells connected by a closed loop network of approximately 5 km associated with 38 water-air heat pumps.

The solutions selected included the variable air flow system that controls the quantity of new air in each room, the use of variable speed fans and pumps, adding valves to block the circulation of water in the heat pumps that are not being used, and a high-efficiency reverse flow heat recovery equipment (up to 90% efficiency during the winter months).

In addition, all the devices are connected to the building automation system that was implemented by Regulvar, a system that centralizes management and ensures that the devices operate at the right time with the required power. It also orchestrates some 550 control points, and includes about 60 controllers, 80 networked room thermostats, approximately 40 motion sensors and many other detection and measuring devices. The benefits include being able to recharge the heat accumulator based on the outdoor temperature, lower

the heating set point or reduce the intensity of the ventilation when a room is empty.

The results have most certainly been convincing. In fact, where schools in Quebec recorded an average annual energy consumption of 0.7 gigajoule per square metre<sup>1</sup> for the 2009-2010 school year, the Plein-Soleil school should remain under the 0.25 GJ/m<sup>2</sup> mark (this includes the estimates for June and July 2011). This result represents a cost reduction, but it is all the more impressive if we consider that, unlike most other similar schools, the Plein-Soleil school is air conditioned—proof that comfort, savings and eco-responsibility can indeed co-exist.

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<sup>1</sup> Source : Bilan énergétique du réseau des commissions scolaires du Québec 2009-2010, gouvernement du Québec, mai 2011

## UPCOMING TRAINING

**Laval (French) :**

**ORCAVIEW 3.33**  
intermediate level  
September 12•13

**ORCAVIEW 3.33**  
advanced level  
September 14•15

**GCL + PROGRAMMING**  
September 19•20•21

**CREATION OF  
GRAPHIC INTERFACE**  
September 28•29

**Ottawa (English) :**

**ORCAVIEW 3.33**  
intermediate level  
October 3•4

**ORCAVIEW 3.33**  
advanced level  
October 5•6

**GCL + PROGRAMMING**  
October 11•12•13

**CREATION OF  
GRAPHIC INTERFACE**  
Depending on enrollment

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information,**  
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