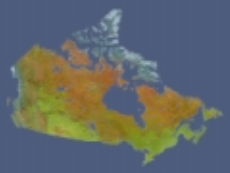

Office of Energy Efficiency
Energy Innovators Initiative

Energy Innovators Case Study

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CÉGEP DE SAINT-HYACINTHE: A CASE IN ENERGY MANAGEMENT

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Introduction

Established in 1968, Cégep de Saint-Hyacinthe has approximately 3000 students registered in eight pre-university programs and 13 technical programs. In addition, it is the only institution in Canada to offer college-level training in textiles. The Cégep also boasts two technology transfer centres, focusing on textile and agri-food. It has an annual budget of about $30 million.

In 1975, the Cégep took possession of a new, 34 184 m^2 building, large enough to house all of its activities and 1600 students. At the beginning of the 1990s, the college experienced major development due to growth in its technology transfer centres coupled with a large increase in its student population. To accommodate this growth, the facility has been enlarged five times since the early 1990s, its floor space increasing from 34 184 to 49 214 m^2.

Energy Management – A Historical Overview

The main structure was designed in the early 1970s, at a time when energy prices were relatively low and buildings were equipped with oversized systems that were difficult to break down into modules. The building is also almost entirely ventilated and air-conditioned and has sealed windows.

Following the oil crisis of the 1970s, management hired an energy consultant to implement a series of energy-saving measures. These measures were oriented toward

Cégep de Saint-Hyacinthe

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improving energy management practices rather than implementing technical retrofits.

In 1983, additional measures were taken. An energy consultant implemented changes that involved automating and centralizing the heating, ventilating and air-conditioning systems. Lighting levels were also reduced – in some cases by too much because some of the measures later had to be reassessed. The entire upgrade cost more than $400,000.

At the end of the 1980s, the facility's building envelope was greatly improved, particularly around the windows. A new roof also increased the insulation factor considerably.

The Quest for New Savings

In spite of previous upgrades, the building's energy consumption remained fairly high. In 1996, the Cégep decided to hire another energy consulting firm to carry out a new study. The following major improvements were recommended and implemented:

- The lighting system was fully upgraded, with installation of electronic ballasts and low-energy tubes.
- The swimming pool was fitted with a Dry-O-Tron® dehumidifier.
- Control panels dating back to 1984 were upgraded, and new control points were added.
- A campaign to raise energy awareness among staff and users was implemented.

More than $500,000 was invested in the facility to implement these measures. Meanwhile, several additions had been made to the building, and system designers were instructed to ensure that all new construction was energy efficient. No funds were allocated to installing and deactivating light fixtures.

New Initiatives in 2000

Despite previous work, an analysis of the facility's energy consumption showed that additional savings could be achieved. As a result, in early 2000, the Cégep issued a call for tenders, hoping to reduce its energy consumption level.

Three proposals were evaluated, and a contract was awarded to Ecosystem. Ecosystem took a turnkey approach to the project, including guaranteed savings. With a capital outlay of $862,500 and annual savings of $227,500, the project will have a payback period of 3.8 years (assuming constant energy prices).

Energy Measures Implemented

- replacement of the 815-tonne absorption air-conditioning unit with a 450-tonne electrically powered centrifugal unit
- reduction in the power of the cooling pump
- optimization of main ventilation system air circulation by eliminating restrictions in the mixing chamber and return ducting
- replacement of the two 250-hp main fan motors with high-efficiency 125-hp units
- other ventilation system modifications, including installing less powerful fan motors and variable-speed drives (VSDs) and removing existing vortex-type units
- decentralization of sanitary hot water production and installation of four dedicated high-efficiency water heaters
- optimization of heating water pump by adding a VSD system and regulating output according to return water temperature
- installation of zoned damper controls on the H-block ventilation system, programmed according to occupation level
- replacement of the steam-type humidifier with a high-pressure, reverse-osmosis atomizer
- reduction of steam boiler operating pressure to minimum user requirements
- control of all electromechanical units by adding control points to the central system
- programming for optimal sequencing based on new equipment, building requirements and energy rates

Significant Results

The following key results were observed after a full year of monitoring and tracking the new systems:

- a 43 percent reduction in energy consumption, from 64 623 gigajoules (GJ) per year to 36 797 GJ per year
- the annual energy bill has been reduced to $539,894, a savings of $312,349
- a decrease in overall energy intensity, from 1.31 to 0.87 GJ/m^2 – the Cégep is now below the 2000–2001 Canadian college sector's average of 0.96 GJ/m^2, despite the fact that the building is almost fully ventilated and air-conditioned

Classroom facilities at the Cégep

Other Major Advantages

- A positive impact on the environment has resulted from a 77 percent decrease in the amount of natural gas consumed annually – from 1 005 021 to 217 000 m^3, leading to a 1628-tonne reduction in the amount of greenhouse gases (GHG) released into the atmosphere.
- The project is rapidly paying for itself through savings realized. The Cégep is now using the latest equipment, including coolers, motors, pumps and humidifiers, and is saving on maintenance and replacement costs.
- Occupant comfort has been enhanced because the cooling system used reaches control points faster than the old absorption cooler. In addition, there is less risk of interruptions to academic activity because of equipment breakdowns.
- Funding has been reallocated to the college's core activity of education.
- In an institution whose mission is to educate and teach, support services such as human resources, finance, real property and building maintenance must be efficient. They must provide the required services at the best possible cost so that the maximum amount of capital be invested toward the institution's core mission.

Financial Support From Government Agencies

The Quebec government's Agence de l'efficacité énergétique contributed $10,000 toward the project, which covered half the cost of the project's feasibility study.

Another assistance program offered by the Energy Innovators Initiative (EII) of Natural Resources Canada's Office of Energy Efficiency could have provided almost $200,000 toward the project, significantly reducing the project's overall payback. However, the Cégep did not qualify for EII funding at the time it implemented this project. The Cégep, along with other commercial and institutional organizations, made the EII aware of the need to expand the scope of its original program to better meet client needs. The EII's newly restructured Energy Retrofit Assistance provides up to $250,000 in funding to qualified organizations. The Cégep de Saint-Hyacinthe has been a member of the EII since 1995.

Conclusion

Through several major enhancements, including the one undertaken in 2000, the Cégep de Saint-Hyacinthe has transformed an energy-intensive and comfortable building into a highly efficient building that is equally comfortable.

As environmental issues become more critical over the coming decades, institutions of learning must train young people to deal with environmental issues and raise awareness of them. The institutions must also set an example in areas such as energy management and demonstrate how improving energy efficiency reduces GHG emissions that contribute to climate change.

Centre for Textile Technologies

For More Information

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The Office of Energy Efficiency of Natural Resources Canada strengthens and expands Canada's commitment to energy efficiency in order to help address the challenges of climate change.

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