

HVAC Upgrades Cut Annual Energy Costs by \$100,000 for Arbor Memorial



“ The opportunity to achieve greater operational efficiency, which would result in cost savings while enhancing our green commitment, was important to Arbor Memorial. ”

ROB COLBOURNE,
Building Manager, Arbor Memorial

PROJECT DETAILS

740,623 ESTIMATED ENERGY
– kWh – SAVINGS PER YEAR

271% DEMAND SAVINGS **145** kW
LIFETIME ROI
SAVINGS OVER THE 10 YEAR EQUIPMENT LIFE **\$665,270**

ANNUAL ESTIMATED SAVINGS **\$100,000** | ESTIMATED PAYBACK **2.42 YEARS**

PROJECT COST: \$315,400

\$135,600 TOTAL INCENTIVE RECEIVED

saveONenergy™
CHAMPION



Industry Sector:

- Funeral Services

Project:

- Integration of VFD to Unitary AC Systems & Electrical Heatings System Retrofit

Representing between 25% to 70% of the monthly electricity consumption for most non-industrial buildings, HVAC system improvements can offer great potential for energy savings. Leveraging over \$135,000 in financial incentives received through the saveONenergy program, Arbor Memorial was able to “green” its Toronto-based head office by upgrading its energy-intensive HVAC systems to reduce its overall energy costs by \$100,000 annually. Moreover, the energy-efficiency measures resulted in greater tenant comfort and offered a payback period of just two-and-a-half years.

Arbor Memorial is a Canadian-owned and Toronto-based funeral company established in 1947. From its Jane Street head office, staff manage the organization’s 82 funeral homes, five reception centres

and 41 cemeteries across the country. The company used financial incentives offered through the **saveonenergy** to replace its aging and energy-intensive heating processes with an efficient, centrally controlled system. It also converted its six rooftop units from a constant volume system to a variable-air-volume system, and installed variable frequency drives on supply fan motors to further improve the building's energy efficiency and reduce its energy-related costs.

BACKGROUND

Rob Colbourne, building manager at Arbor Memorial's head office, is charged with the ongoing monitoring and analysis of energy use in the building. The organization's strong commitment to sustainability means that is always open to recommendations for reductions in energy consumption for the building, and one area in particular was identified for improvement: the building's energy-intensive patchwork of heating systems.

The headquarters previously used a combination of baseboard heating, duct heaters and gas-powered heating to warm the premises. This multiple technology heating system resulted in a significant variance in temperature throughout the building, as temperature set points controlled locally and building-wide were often conflicting and working against one another. Furthermore, the building's HVAC operated on a constant volume system (CV). In CV systems, a constant volume of air is moved and heated or cooled regardless of the temperature needs of the space, resulting in considerable amounts of energy wastage.

"In addition to consuming more energy than necessary, it was difficult for me to control the heat of the building," explains Colbourne. "We would have heating and cooling running at the same time, so one person could be cold and have their duct heaters going, while the person beside you could have their air conditioning running."

PROJECT

In March 2013, Arbor Memorial enlisted the help of Laser Controls, an energy consultancy company, to find a solution to the building's heating and cooling problems. Following an energy audit, it was decided that the constant volume system would be converted to a variable air volume system. This conversion offers savings by allowing the system to deliver only the volume of air needed to meet the actual load.

To further improve the system's efficiency, variable frequency drives were installed on the supply fan motors of the existing rooftop units, designed to continually match fan speed and torque to changing building load conditions. Additionally, 120 variable air volume dampers were installed to circulate air around the building for cooling. These dampers allow fresh outdoor air to enter in through the building's ducted ventilation system through diffusers, resulting in a more comfortable environment for tenants.

In an effort to streamline the building's heating systems, it was also decided that the property's 72 duct heaters that previously operated year round would be removed, and the building's heating requirements would be delivered through the existing electric baseboard heaters. This system operates by heating the perimeter of the building and acts as a shield that keeps the centre of the building warm without heating. The baseboard heating was then tied into a building automation system to allow operators more control over the building's temperature requirements.

The savings achieved over an eighteen month period from these collective energy-efficiency measures resulted in a drastic reduction in energy-related costs for the building, which enabled Colbourne to focus on phase two of the project—replacing the six rooftop units with modern, energy-efficient models. Originally installed in 1990, the aging rooftop units were not operating as efficiently as they could be, so Colbourne worked directly with Arbor Memorial's local electric utility, Toronto Hydro, to apply for further **saveonenergy** incentives to replace two of the six units in September 2014. New rooftop systems can be



25% to 50% smaller than older systems, which can result in reduced load, energy consumption and monthly electricity costs. New units also require less maintenance.

RESULTS

Arbor Memorial received a total of \$135,600 in incentives from the **saveonenergy RETROFIT PROGRAM** to cover 43% of the investment towards both phases of the project. The heating and cooling system upgrades reduced energy costs by \$100,000 annually and saved more than 740,000 kWh per year, providing a two-and-a-half year payback and a 271% return on investment over a ten-year period.

Arbor Memorial employees also appreciate the benefits of the HVAC upgrades, with many saying that the building feels more balanced. "Staff comment regularly and say that the building is a much more comfortable place to be," explains Colbourne. "There's none of the hot and cold spots that there used to be, and people say that it feels like there's more fresh air in the building—and they're right. With the building automation system and the new dampers, we try to cool the building with outside air whenever we can because it's cheaper."

As part of a continuous cycle of improvement, Arbor Memorial plans to use **saveonenergy** incentives and the savings gained from each phase of the project to fund future energy-efficiency initiatives. "We replaced two of the six rooftop units in 2014, and plan to replace the remaining four over the next two years," Colbourne explains. "With the help of Toronto Hydro, we'll be doing the next two rooftop units in fall 2015, and the final two in fall 2016."

For Colbourne, his job has become much more straightforward since the upgrades. He is now able to monitor and control the heating and cooling in different zones of the building from the comfort of his office through a building automation system (BAS). "With the new system in place, I'm able to accurately control temperatures in the building. It's definitely made my job a lot easier."

About saveONenergy

Businesses across Ontario are benefitting from incentives to support energy efficiency projects that conserve electricity, use innovative technology and deliver savings. You can learn more here:



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