



Cottage Country Goes Cutting Edge

Haliburton Highlands Health Services gets geothermal upgrade

By Michelle O'Brodovich

Located about three and half hours north of Toronto, Haliburton Highlands Health Services (HHHS) serves the 17,000 residents of Haliburton County who are residents, cottagers, and visitors in the villages of Haliburton and Minden.

With its northern border running along Algonquin Park, Haliburton County is surrounded by some of Canada's most breathtaking natural landscapes and vital ecosystems. Its denizens have historically had a keen interest in sustainability and the environment, and so it is not surprising that they have been so supportive of HHHS's ground-breaking energy efficiency project involving solar panels, and geothermal heating and cooling.

Construction on this \$2,238,000 project took place from 2010 to 2011. Today, HHHS boasts energy consumption rates that are 50% below the average of similar facilities.

The alternative energy solution

Being located in a more rural area without access to natural gas, HHHS was sensitive to changes in unregulated and volatile oil prices. Rates varied considerably; in 2011 alone, oil climbed from \$0.68 to over \$1.00 per litre. Before the project, oil represented two-thirds of the hospitals' total energy consumption.

"We had to handle a couple of problems," explains HHHS President and C.E.O. Paul Rosebush. "We needed to find a cost-effective solution to meet our heating and cooling needs in the



future. In addition, we operate in a very green community. This made us want to explore alternative types of energy systems.”

HHHS’s Environmental Supervisor Peter Fearrey saw enormous potential for integrating alternative energy solutions to reduce energy costs and greenhouse gas emissions, noting, “I felt strongly for years – over five years of working towards this – that HHHS would get a lot of savings out of this.”

Following a competitive tender call, HHHS partnered with Ecosystem, a performance-based firm of energy specialists, to bring the project to life. As part of an energy performance contract in which annual energy savings, construction costs, and government incentives are guaranteed, Ecosystem and HHHS worked together to redesign and optimize the

energy infrastructure at both Haliburton and Minden hospitals.

Geothermal heating and cooling

Both HHHS hospital sites were good candidates for geothermal energy measures due to high oil prices and the unavailability of natural gas. That being said, it was only natural for there to be concerns regarding the implementation of newer technologies.

Recalls Rosebush: “The challenge for the organization was that the geothermal solution looked good on a theory level, but would it actually work? Would our lakes be adequate? Would it be practical?”

At Minden Hospital, Ecosystem’s team drilled 15 wells, each 540 feet deep. Engineers discovered that the area’s overburden was about 60 feet, which is quite deep. As a result, the wells had to descend further in order to increase the solution’s heat transfer capacity.



At the Haliburton site, 15 loops of 400-foot pipe were sunk into the lake using weights. The pipes come from the hospital penthouse to the lake in a trench located 6-feet deep, below the frost level.

As Ecosystem's project designer Guillaume Lavallec notes, the project was designed to ensure there was no damage to the HHS's natural inhabitants both during construction and operations, explaining, "We wanted to make sure that our energy solution didn't have a negative impact on HHS's surroundings. That's why we took several precautions during construction, including the installation of geotextile cloth to protect the lake

from the work area. We also made sure that work took place outside of fish spawning season and that minimal alterations were made to the shoreline when the pipes were laid in the lake."

At both Minden and Haliburton hospitals, the geothermal measures were optimized by the conversion of the cooling network to a dual temperature network for the heating and cooling of air. This allowed the heat pump to operate at temperatures as low as 95°F, thereby reducing electricity consumption and increasing efficiency. A second heat pump was installed in cascade to increase the temperature up to 160°F for the main heating network.

Rooftop solar panels

The Ontario Power Authority's microFIT incentive program made solar energy a financially attractive option for the project by providing 0.8025/kWh for power generated by the photovoltaic (PV) solar panels. Both hospitals have inclined roofs facing southwest; a set-up providing for easier installation, lower costs, and a shorter payback period. In addition to being a renewable source of energy, the solar panels are also a visible reminder to Haliburton's community of the HHS commitment to sustainability.

Other ECMs

The project at HHS also included several energy conservation measures (ECMs) to reduce consumption, including the installation of a building automation system and the addition of variable frequency drives on chilled water pumps and air handling units. These measures helped to optimize hospital building operations while also increasing comfort for patients and staff.

The results

Today Haliburton Highland Health Services benefits from \$190,000 per year in guaranteed energy savings and an additional \$12,000 in avoided maintenance costs. Energy consumption has been reduced by 42% and greenhouse gas emissions by 800 tons of CO₂, the equivalent of removing 250 cars from the roads.

Thanks to the alternative energy measures, the hospitals are less dependent on oil and therefore less sensitive to oil price variations. In addition, HHS was able to renew some critical assets, including its entire cooling networks and new heat pumps to replace aging boilers and chillers while also providing system redundancy.

The benefits for the community – which include jobs for local contractors and business for local hotels and restaurants – are what makes HHS's management especially pleased.

"This has been met with wide approval from politicians to patients who come into the hospital," said Rosebush. "[They think] this is a great thing to be doing because we're reducing pollution while meeting our energy requirements."

"Everyone had some ownership, everyone is on board" added Fearrey. "We're a small community and as the project starts to show the savings, it will become even more of a win-win." ■

By Michelle O'Brodovich, a writer focused on the North American energy efficiency sector.

