

Innovative partnership has Trois Rivières seeing the light

AS A RESULT of a partnership between an enterprising engineering firm and a global leader in innovative lighting, the City of Trois Rivières, Québec could save as much as \$10 million in savings over the next 25 years by replacing its existing street lighting system.

In 1999, VFP Consultants, a Trois Rivières engineering firm with four additional field offices across the Province of Québec, contacted Phillips Lighting Account Manager Adrien Houde, also located in Trois Rivières, to discuss a product of great interest. "They heard through the grapevine that we had a QL (quality lighting) induction product available," says Houde. "We weren't really doing anything with it because North American fixture manufacturers weren't interested in a product of that kind at the time."

The QL system, a patented Phillips innovation, was developed for the 100th anniversary of the parent company in Holland. The main feature of QL lighting is its 100,000-hour life, which far exceeds normal standards. The unit is comprised of three parts – electronic components for a generator, an antenna that creates a wavelength that stimulates mercury atoms and a phosphorous powder that reacts to create light. "There are no mechanical parts or filaments that can break or be affected by power fluctuations," explains Houde.

VFP had a bright idea. "We saw an opportunity to replace existing HPF (high pressure sodium) lighting systems with QL induction lights," says Serge Lapointe, director of the Québec Division for VFP Con-

Power

Cities keep the lights on

sultants Inc. The two companies worked closely together to develop a QL retrofit kit, consisting of a reflector and a sealed reflector that was designed by VFP. "We spent 3-4 years developing these units, with the latest generation being the optimum," says Lapointe. "It has a photometric efficiency of 76 percent, which is extremely high."

The kit was then presented to the City of Trois Rivières. A deal was struck in 2000 to conduct a test installation of 400 units at Chateau Richer, an historical site near Québec City. The Phillips engineering group has been monitoring the test project and, so far, none of the units has failed. "We also conducted a preliminary study to evaluate the payback period for the city, which was determined to be about seven years," says Lapointe. "The estimated annual savings is expected to be \$300,000 for the next 25 years, based on an annual usage rate of 4,000 hours."

Despite a more conservative payback estimate of 10 years, the numbers were enough to sell the City of Trois Rivières, which will replace 13,000 lights over the next couple of years. The cost of replacing the internal fixtures will cost approximately \$400 per lamp – almost four times the cost of replacing traditional fixtures – but the return on investment is expected to be considerable.

"There were a few things that really interested us in this project, beginning with the economy of energy savings and a reduction of maintenance costs," says Michel Byette, general manager for the City of Trois Rivières. "Additionally, VFP Consultants Inc. is a reputable local company with almost 45 years of experience in research and development."

From an energy consumption standpoint, the new 85-watt QL induction lights will replace existing 100-watt HPS lights, and provide a brighter, whiter light. "Consider also, the performance of an HPS lamp includes a ballast that consumes about 30

additional watts," adds Houde. That adds up to a total consumption savings of as much as 35 percent annually, which also assists the city in meeting the obligations of the Kyoto Protocol.

On the labour side, the savings could rise as high as 70 percent annually. "This project demonstrated to [the city] that they could save dramatically on manpower over the long term," says Houde. "Their own internal staff will make the initial replacements, and then several positions will be phased out through retirement." A standard city street lighting operation replaces lamps every 7-8 years, and for every third lamp changed, there is usually a need for a ballast change as well.

"These units provide a full spectrum of white light, showing the grass as green, rather than the biased brown that the traditional sodium lamps provide, and gives a better contrast in winter against the snow," explains Danielle Thibault, assistant manager for the City of Trois Rivières.

Despite the tests at Chateau Richer, the long-term results of the QL retrofit kit remain to be seen, but, the results look promising. "The only drawback we have had so far is that the cone of light from the QL systems is narrower, so the lamps have to be a little bit closer to each other to maintain fluid lighting," says Thibault. "We're designing our new streets with poles spaced closer together, but our existing streets will have small, unlit areas between the poles."

VFP Consultants Inc. is actively marketing the kits in Québec and the Maritime provinces, with plans to entice 15 additional municipalities by the end of the year. "It takes up to two years to sell someone on the idea," says Houde. "You need to convince the guys working in the field to start with, and then comes the whole political chain of events." VFP is currently running 12 test sites, including a project with NB Power in New Brunswick. *mm*



Photo courtesy of City of Trois Rivières

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CASE STUDY

Hamilton's "little engine that can" makes light of the blackout

by David Pye

WHEN THE NORTHEASTERN power grid came tumbling down in August 2003, a glow of light emanating from the downtown core of the City of Hamilton had many surrounding municipalities scratching their heads – in the dark.

"We tripped at the beginning like anyone else when the grid went down," admits Robert Desnoyers, president of Hamilton Community Energy (HCE), a subsidiary of Hamilton Utilities Corporation. "But our operators restarted the plant, and we were back up and running within 45 minutes." Hamilton's oasis of light came courtesy of HCE's \$11.5 million district energy plant, a facility located in the heart of the city's downtown core. Operational since March

police and fire, the general managers of each of our departments, and representatives from hospitals, etc."

The HCE plant operates from Monday to Friday, between 7AM and 11PM, and its power supply is seamlessly diverted to the Hamilton Hydro grid outside of business hours. "It's an internal combustion engine, fired up by natural gas – basically a large, modified marine engine," explains Desnoyers. "This technology actually dates back to the Romans, but what we've done is add the electrical generation side of things."

On an average carefree weekday, the HCE district energy plant distributes 3.5 megawatts of electrical power to 11 specially designated facilities in the Hamilton's

ning at an efficiency rate as high as 95 percent, the thermal system also recovers heat from the engine's exhaust and jacket water systems, which is then converted into an additional 3.1 megawatts of generated power. "By putting in this generator, we're producing electricity, recovering the heating off of the equipment and supplying a complete district energy system," explains Desnoyers. "We produce hot water and distribute it to the downtown buildings that would have had their own stand-alone boilers prior to connecting to our system. We have essentially shut down 14 inefficient boiler plants throughout the downtown core, which significantly reduces the release of greenhouse gas emissions and smog precursors."

During normal operational periods, the specially designated buildings in the downtown core consume approximately 25 million kilowatt hours per year, 54 percent of which is provided courtesy of the HCE district energy plant. The remaining supply comes from the Hamilton Hydro grid, unless it fails as it did last August. "Whenever we have a blackout, we rely on a direct feed from [HCE]," summarizes D'Angelo. "They generate their own power, so we're never totally dependent on the grid system."

Hamilton's innovative energy source has become known as the little engine that could, gaining national and international media attention for its successes. "I've been like a professional tour guide over the past 12 months with a regular stream of municipalities and private sector companies that are interested in our system," says Desnoyers. "They all want to come and kick the tires to see how this thing works." Though test drives aren't available, those who remember seeing an oasis of light in the desert of darkness last August have a good idea of what this baby can do. *MP*



Photo courtesy of City of Hamilton

Hamilton Community Energy Plant.

2003, the plant was put to the test during last summer's regional blackout when it was called upon to step up its delivery dramatically. "During that period, the plant was up and running 24/7, providing 3.5 megawatts of electrical power," says Desnoyers. "We continued to power up facilities in the downtown core, including City Hall where our Emergency Operations Centre (EOC) is located."

"City Hall is critical to our infrastructure," agrees Rome D'Angelo, manager of Corporate Buildings and Technical Services for the City of Hamilton. "The EOC becomes the hub of all decision making, which includes the mayor, the chiefs of

downtown core, illuminating 1.5 million square feet at City Hall, the Hamilton Convention Centre, the Central Utility Plant and other buildings labeled as essential. "We're wired to the Hamilton Hydro grid behind the meter," says Desnoyers. "Whatever our clients don't consume flows through to the Hamilton Hydro grid." The plant also supplies an additional 12.5 megawatts of thermal energy in the form of hot water for heating buildings in the downtown core.

The HCE district energy plant was built as part of an initiative to find alternative sources of energy for the city. While run-

David Pye is a Montreal-based freelance writer.