

OFF THE GRID

THE ENERGY MANAGEMENT FIELD DEVELOPS INNOVATIVE SOLUTIONS TO THE CHALLENGES INHERENT IN THE GREEN-FOCUSED BUILDING INDUSTRY

by Don Procter

Not long ago, going green was not to be taken too seriously.

It might have been good for the environment but not so good for the pocketbook. But as energy rates soar, sustainable technologies and energy-saving initiatives mature – illustrating how the still-fledgling industry can make an increasingly strong financial case for itself. And perhaps at the same time, give users a warm and fuzzy feeling from doing good for the planet.

A case in point is the Ontario Power Authority's (OPA) High Performance New Construction (HPNC) Program, launched in March 2008. It provides design assistance and financial incentives to reduce summer peak demand for new construction, additions and renovations that exceed building code standards in Ontario (other than the 416 area code in Toronto). Eligible sectors are ICI and multi-unit residential. Enbridge Gas Distribution and Union Gas also offer gas incentive programs that can be piggy-backed on the HPNC.

If success is measured by interest, the program has hit its mark: it received 1,300 applications for projects ranging from small retail to large office buildings when sales wrapped up on Oct. 31, 2010. Participants have a two-year build-out period, says Susan Clinesmith, manager of HPNC for Enbridge Gas Distribution, who delivers the program on behalf of the Ontario Power Authority.

The program offers two incentive streams. The first is prescriptive, tailored to small or less complex buildings. Incentives are available for high-efficiency equipment, such as lighting and energy-saving HVAC systems. One participant, Shoppers Drug Mart, installed improved cooling and lighting systems in 120 new stores and expansions. In addition to cutting energy costs, the retail drug store chain benefits from a reduced environmental footprint, says Clinesmith.

The second incentive stream is for those who are stretching the envelope with designs based on complex engineering calculations. Owners receive

incentives from \$250 to \$400 and designers \$50 to \$100 per kilowatt saved when the building code is exceeded by 50 per cent or more. "Savings are tangible," she points out. "Average custom projects are saving over 100 kW and are receiving incentives ranging from \$25,000 to \$40,000."

The OPA is expected to announce the second generation of the HPNC program soon. "I think people are evaluating the business case around energy efficiency and are finding it makes a lot of sense," says Clinesmith.

Government initiatives are a key driver in the green energy industry. Ontario's Feed-in-Tariff (FIT) program, for example, allows owners of solar systems to sell electricity back to the grid – more than 80 cents/kWh for rooftop systems, less for ground-mounted systems. Saskatchewan offers a 35 per cent grant on solar electric projects and is reviewing other financial initiatives. Through its Clean Energy Act, B.C. is assessing a possible feed-in-tariff initiative for emerging sustainable technologies such as tidal power.

The downside to any government incentive is longevity. When the governing party loses power, will the next party axe the program? Ontario's Conservatives have indicated that if elected they would trash the Liberal's FIT program, says Tim Schulhauser, president, SkyFire Energy, which provides turnkey solar electric systems for commercial and residential across Canada. Among SkyFire Energy's projects is the largest in Alberta, a 43.4-kilowatt solar system on the University of Calgary's Child Development Centre, a LEED Platinum building erected in 2007. At Okanagan College's Penticton campus, SkyFire is installing a solar electric system on a research centre into sustainable technology. It will produce more than 200 kilowatts of solar power – twice that of any other building in Canada outside Ontario.

Schulhauser says one of the issues holding solar back is that the industry is not on a level playing field with the oil, gas and coal sectors which receive government subsidies. Another impediment is electricity rates. While some countries are at or near grid parity (solar is priced on par with traditional electrical), rates in Canada are still relatively low. As they rise, however, solar sales will grow, resulting in more production – mass production, in fact – which will bring the price of solar down.

Schulhauser says many developers take advantage of the "good PR" that solar brings them. "It's a great marketing investment because many people want to go green now."

That's what the owners of Bullfrog Power are betting on. The green electricity provider's customers are loyal because they are reducing their carbon footprints and not because they get cheaper electricity prices. In fact, Bullfrog's customers pay 20 per cent more, on average in Alberta, but realize they are helping the renewable energy industry grow, says Theresa Howland, vice-president, western region, Bullfrog Power. Rates paid in other provinces vary.

Bullfrog's electricity comes exclusively from wind and

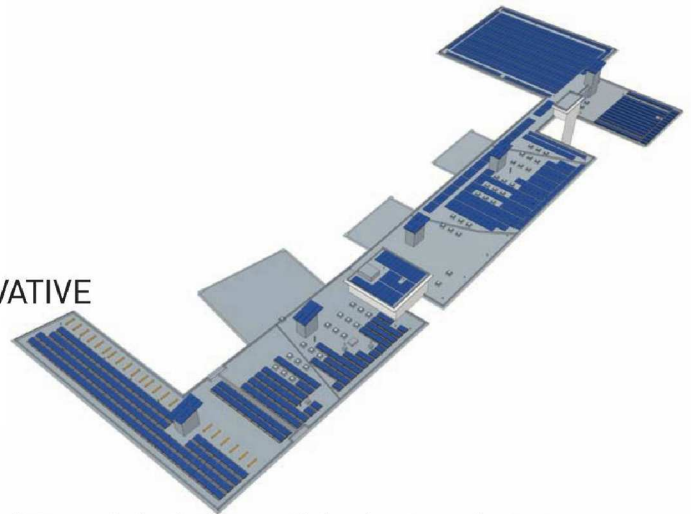
hydro facilities certified as low impact by Environment Canada under its EcoLogo® program. "We're helping to create the market for renewable electricity," says Howland, noting that more than 1,200 businesses and 8,000 households across Canada are customers. Increasing the customer base will lead to the development of more wind energy, ultimately lowering prices in the future.

There are approximately 3,500 megawatts of wind power in the country: about a million homes or just over one per cent of the country's total electrical demand. Those numbers might seem insignificant but Howland points out only about a decade ago wind power was new to the renewable energy market. "Every year, it [wind power] sets records for growth."

How fast it grows will depend on the voluntary customer demand and government initiatives. In 2009, The Juniper Hotel & Bistro became the first hotel in Western Canada to move entirely to renewable electricity through Bullfrog Power. It is part of the Banff hotel's agenda as a green destination, explains Howland, noting the hotel had also completed a number of green renovations in 2003-2004.

Automated heat management systems that rely on exterior thermostats to determine optimum temperatures inside high-rise residential buildings are not accurate enough to maintain uniform temperatures. A better alternative? Intelligent computer control systems designed to maintain near-uniform temperatures – 21C, for instance, using temperature sensors placed in various outdoor locations and throughout the boiler system (on risers, return lines, hot water lines and stacks, for instance) to feed real-time data to the control system.

Above: Proposed solar electric system for the Okanagan College, Penticton, B.C. campus. 109 kW have been officially approved – the remaining 60% is in design stage. Below: Child Development Centre, Calgary, Alberta: 43.4-kW grid-tied solar electric system. Photos courtesy Skyfire Energy.



Build Green Solutions Canada (BGSC) does that and more: it installs wireless sensors in 30 per cent of the apartments and its outdoor thermostats are linked to weather station forecasts so temperatures can be adjusted accordingly. "It's a huge component to taking away the guesswork of managing heat," explains Albert Frankel, president of BGSC, which opened in Toronto for business across Canada last fall.

BGSC's digital remote heat control system, VB-2100, continuously monitors conditions, analyzes performance, produces reports and sends alerts when a heating system requires attention. Shortly after installation, the computer 'learns' the temperature habits of residents to calculate appropriate heat loads for the building, 24 hours a day, says Frankel.

Are systems like it the wave of the future? The energy savings would indicate so. Frankel's company guarantees a minimum 15 per cent energy savings – which typically translates to an 18-month amortization. Surveys indicate, however, payback for many clients is under a year because energy cuts are often 23 to 35 per cent, says Frankel, noting that BGSC has completed two installations in the Greater Toronto Area and is finalizing deals on 10 more. Its U.S. company has installed systems in about 1,000 buildings – a number he expects will be topped in Canada in a few years.

High-quality solar lighting products are not always an easy sell, even though they can be an integral part of a successful energy management system. A number of reputable solar light manufacturers have gone out of business in recent years because many potential clients (architects, engineers and landscape architects) shun solar lights sold in big box retail stores, perceiving the products to be of poor quality.

But not every solar light is created equal. While run-of-the-mill units use inexpensive rechargeable batteries with short lifespans, superior systems incorporate long-lasting capacitors that store energy for hundreds of years. Such lights are becoming energy efficient wayfinding systems for

school campuses, commercial and residential landscaping and as safety markers for crosswalks and highways.

Another application is airports. Skyfuel Enterprises Inc. is testing its solar lighting at a U.S. international airport to delineate air traffic ground lanes. The current red and white painted markers are difficult for aircraft operators on the ground to see at night, says Skyfuel's president Ross Christie.

The storage capacitors in Skyfuel's lights operate for 100,000 cycles – each cycle representing a day. They work without performance degradation from -40C to 70C. The company's lights cost more than low-voltage lights before installation but less than the equivalent hard-wired light. However, Christie says through energy savings and low maintenance costs they best both competitors. For example, based on conservative energy costs, 10 Skyfuel lights cost about \$1,700 to install and operate for 10 years. Ten low-voltage lights will cost about \$3,400 over the same period, while hard-wired lights will run \$7,500. Skyfuel's lights are just one more example of why green energy is starting to be taken very seriously.

Gregory Lord, a partner of MCW Consultants Ltd., says his firm enjoyed a record year in 2010 thanks to a mix of retrofit and new construction projects. Though he acknowledges the construction market is showing signs of weakness, "we have plenty of spillover work to keep us busy."

MCW Vancouver's current projects include:

- Surrey City Hall (new LEED-certified building featuring geothermal heating/cooling and under-floor air distribution throughout)
- UBC Biological Sciences (LEED renewal of two old science buildings into a modern research lab)
- Marine Gateway (mixed-use LEED project; the first major Vancouver project aimed at creating density and community nodes around Canada Line stations)

Lord remarks, "It's fair to say that LEED continues to be a powerful trend in the province. It's almost totally pervasive in the public sector on new buildings, and interest in sustainable design and energy efficiency is continuing to strengthen in the private sector."

He adds that "the Energy Services Contracting (ESCo) field has been great, whether the work is in Nova Scotia, B.C., or anywhere in between. In the field of energy retrofits, we do everything from chiller replacements to building controls, lighting retrofits and envelope upgrades. Government mandates have helped keep us busy, including B.C.'s Climate Action Plan which passed into law the greenhouse gas emissions reduction targets."

MCW Custom Energy Solutions Ltd. is a leading Canadian energy services company. It provides energy performance contracting (EPC) that incorporates several key provisions: superior organizational management skills and experience with EPC; in-house engineering skills; and program cost-effectiveness combined with the ability to secure utility incentives. Projects on the go include energy retrofits and building renewal for BC Housing, an energy services contract on government buildings in Iqaluit, ESCo of city facilities in Kingston and a campus-wide ESCo for York University. ■



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