Coming Together

Transparency, benchmarking, and standards are taking energy management in a new direction

by **NATALIE BRUCKNER-MENCHELLI**

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It's an interesting time for those involved in energy management. Regulations are quickly changing, technology is fast advancing, incentives are in place to help reduce costs and move Canada toward a sustainable future, and individuals in companies are collaborating to share experiences and further advance the sector.

"There's conversations being had today that just weren't happening a year ago," says Eric Chisholm, sustainability and energy technical lead at WSP Canada. "Three big changes we see are increased scale, a focus on carbon, and a desire for transparency."

Indeed, as far as scale goes, things are getting bigger. "Where organizations were looking at buildings as silos, owners are now looking at solutions across their portfolio, and rather than just picking the low hanging fruit like lighting, there is a desire to reach to the higher branches such as mechanical overhauls, better windows, and aging building renewal," says Chisholm.

Today you can't mention energy management without talking about carbon. "It's the new buzz word, because globally it's what we truly must address," adds Chisholm.

The third big change, transparency, is also leading energy management practices in a new direction. "In Ontario we now have mandatory energy benchmarking so building owners will need to disclose how much energy they are using every year. We'll see energy performance improve because nobody wants to be the black sheep," says Chisholm.

WSP's project history includes a great number of buildings that demonstrate the benefits of well implemented energy management. One example is 77 Bloor Street West in Toronto. The aging office space was in need of a serious overhaul. "Instead of looking to balance annual cashflows, the owners realized that a co-ordinated deep renovation done all at once could get a better bang for their buck. The building envelope and HVAC were renewed, spaces were modernized, cash flow and property value increased. Almost 20,000 square feet of new leasable space was unlocked due to modern, low-profile HVAC allowing mechanical rooms to be repurposed, and the building reduced energy use by 36 percent saving almost half a million dollars a year. All because they decided to go deep," explains Chisholm.

Over at Williams Engineering Canada they are seeing the effects that not only regulations are having on energy management, but advancing technologies and integration.

"Regulation is definitely driving the direction, and in general the industry is growing to a better engineering practice as green building design is a fundamental thing. In addition, with the technology, entrepreneurs are designing better products that can be utilized at an acceptable premium," explains Peter Kuo, mechanical team lead.

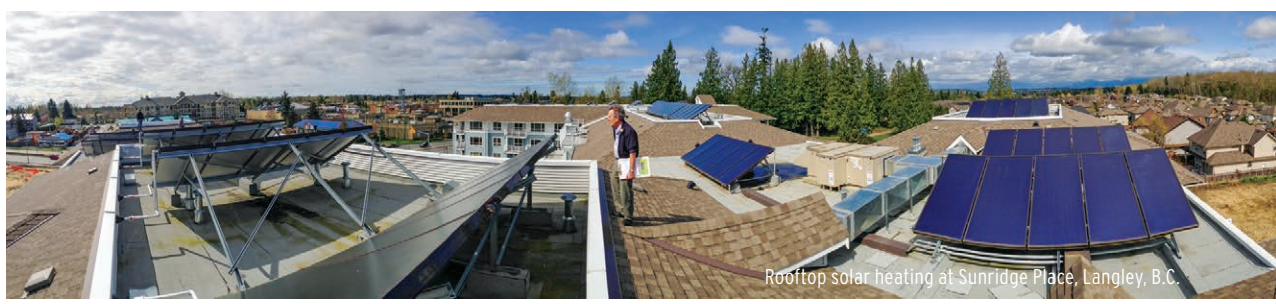
Williams is currently collaborating with many technology manufacturers to help them develop new products that the market is looking for, but not yet available. "Further, we are having staff go through Passive House design training, as we are designing the tallest and largest Passive House building in the world. The project is currently registered under the Passive House Association in Germany," says Kuo.

The building Kuo is referring to is 1488 Alberni Street in downtown Vancouver. "We are aiming to utilize less than 60 kWh/m2/yr energy usage intensity [EUI] level, which is almost half of what a typical building consumes." In general, Williams has noticed more projects with lower total EUI and higher energy recovery efficiency as a result of new technologies. "For example, buildings constructed five years ago have a EUI range from 140 to 160 kwh/m2/yr, and recently a typical building consumes from 100 to 120 keg/m2/yr," says Kuo.

The team at Norman Disney & Young (NDY) agree that technology is quickly changing, and keeping up with the latest and greatest equipment can be challenging. "We are working with municipalities and utility companies to help share some of our energy management systems experience and common practice in the hope of adoption into their requirements," explains Gideon Loh, project manager, NDY.

Understanding energy usage is essential and with the cost of information meters on the decline, mechanical systems are incorporating more information meters to provide feedback on the client usage. "The building management system point list has increased exponentially and has allowed for a more comprehensive network to respond to the actual demand and not over deliver; thus reducing energy consumption," explains Loh.

One NDY project that exemplifies energy management is the Shannon Mews project in Vancouver, which utilizes a district energy plant. "The use of information meters to determine each building demand allows for precise operation of pumps in delivering building heating, cooling and domestic hot water. The plant efficiency is optimized based on the overall site demand and excess energy is put back into the system," says Loh.



Rooftop solar heating at Sunridge Place, Langley, B.C.

Another great example is Sunridge Place in Langley, B.C., which achieved a 60 percent energy saving compared to a LEED baseline building by installing such things as in-floor radiant heating, high-efficiency boilers, and being connected to solar heating and a ground loop geothermal system.

Of course, energy affordability is also key to the progress of the sector, and NDY's global director of sustainability, Tony Arnel, says that the International Energy Agency has found in many developed counties, improvements to energy efficiency have slashed power bills by up to a third.

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In Ontario, the Independent Electricity System Operator (IESO) is continuing to lead the energy management movement. "Climate change is driving a lot of companies to excel; pressures on the bottom line are pushing companies to look for more sophisticated ways to make their businesses more efficient, and energy efficiency is a natural place to look. Energy management is key," says Bryan Young at the IESO.

The IESO has been incenting through its Certified Energy Manager training energy manager certification for five years now, and has the most accredited energy managers in the country.

"One change we have seen is that energy management has become more than a discussion. It's in practice everywhere you look," says Young. "It's about organizations such as ours taking a risk when they recognize an opportunity, and creating programs like the energy manager program for forward thinking companies, that has proven to be a success. We can have all the incentives and skilled people in the world, but if there isn't a corporate direction to say 'we will do this,' then we will fail."

Across the country, BC Hydro is staying one step ahead of changing regulations and incenting its customers toward effective energy management practices. Paul Seo is senior program manager and looks after all commercial customers, of which there are 90,000. Seo's focus is on the retrofit market and opportunities towards supporting strategic energy management practices.

"The program has shifted from looking at a practical one-off solution after receiving a high bill, to a more strategic approach where everyone has a role. When we first came up with the concept of strategic energy management in 2009 for the commercial sector, the 20-year plan was to create the role of a chief sustainability officer. At the time facilities manager's roles were just renamed to include energy management. The industry has evolved quicker than we could have imagined. Out of the 60 energy managers we have today, 10 are directors," says Seo.

He adds that strategic energy management is built off of three pillars, with the energy manager being the core component: business management – understanding where you are and where you want to go to; asset management – incenting capital dollars to upgrading equipment; and change management – which goes hand-in-hand with the controls and is about changing behaviours.

Of course lighting is still BC Hydro's and its customer's "bread and butter," but the future in this realm holds something quite exciting. "Moving ahead we are looking into advanced lighting controls. Having an advanced lighting control system includes traditional technologies like occupancy sensors, daylight harvesting and timers, but also incorporates newer abilities like power measurement and high-end trim, with the ability to address and collect performance data from each individual fixture. The lighting system can also become integrated with other historically disparate systems, sharing data for example with the building automation system [BAS]. With the growth of Internet of Things [IoT] and Integrated Businesses, having a smart lighting system will enhance the technology by offering more savings and additional value for organizations," says Seo.

FortisBC agrees that advancing technologies have become increasingly important in the move to become more efficient and reduce emissions, all while making sure customers have access to affordable energy choices such as natural gas.

The most recent FortisBC pilot project looked at Calgary-based CleanO2 Carbon Capture Technologies. "This first-in-world technology reduces energy use in boilers and captures carbon from flue gas, which is then converted to sodium bicarbonate, also known as soda ash. This system resulted in cost savings for the commercial business and a reduction in greenhouse gas emissions. Cadillac Fairview Richmond Centre and Blue Horizon Hotel are among the organizations testing the technology in their buildings and the company expects to have results by the end of 2018," says Nicole Bogdanovic, spokesperson for FortisBC.

Another FortisBC pilot project looked at a more energy-efficient alternative to standard rooftop units called condensing make-up air units. "With rooftop units collectively consuming about 5.5 million gigajoules of natural gas each year in B.C. alone, this is an important area for positive change," says Bogdanovic.

For FortisBC, like other leaders in the sector, the one theme at the forefront of energy management is collaboration. Whether it is FortisBC's Climate Action Partners program, engineers working alongside technology companies, or companies providing total transparency of energy usage, the future is about working together toward the goal of reducing energy and being fluid enough to manoeuvre to new goals as increasing data is released. A