The New ENERGY City

ABOUT SIEMENS CANADA IN THE NEW ENERGY CITY

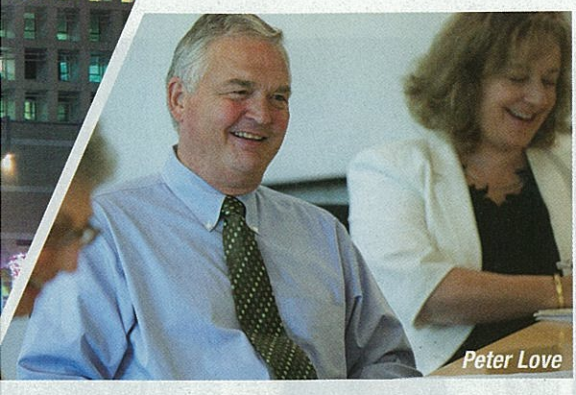
With a portfolio that includes integrated mobility solutions, building and security systems, power distribution equipment, smart grid applications and low- and medium-voltage products, Siemens Canada creates sustainable technologies for cities and their infrastructure across Canada. Its Infrastructure & Cities Sector, Industry Sector and Energy Sector allow Siemens Canada to provide comprehensive solutions for the new energy city. Siemens Canada employs more than 4,500 people in 53 offices and 14 manufacturing and assembly facilities across Canada.

Jamie Hall

Tim Gibson

Canada's cities are where most of our citizens live, work and raise their families. Cities are this country's biggest economic engines—but they also consume huge amounts of energy. And this consumption comes with a cost: as much as 82% of man-made greenhouse gases are created in the production and consumption of energy. We need to find cleaner forms of energy, especially as demand increases, but this is difficult. Canadian city dwellers and their municipal leaders are often suspicious of new technologies—their cost, their efficacy and the impact they might have on quality of life. How can this country's civic governments, the utilities that serve cities, and indeed the greater public, improve the way we produce and consume energy?

Recently, seven experts with a special interest in cities and the ways they use energy gathered in Toronto to discuss these topics. They were: Keith Cronkhite, vice-president of generation and business development for New Brunswick's NB Power; Jamie Hall, co-chair of smart grids for Manitoba Hydro; Peter Love, president of the Energy Services Association of Canada; Jane McRae, CEO of Sustainable Cities International; Ian Philp, executive director of the MaRS Energy Institute; Lucy Casacia, vice-president of the low- and medium-voltage division at Siemens Canada; and Tim Gibson, vice-president of Siemens Canada's smart grid division. These seven experts had a variety of viewpoints on technology and innovation, on better ways to use energy, and on raising the broader public's awareness of their energy consumption. Their thoughts were illuminating and sometimes surprising.


Peter Love


Keith Cronkhite


Jane McRae

TECHNOLOGY AND INNOVATION

There is no shortage of innovation taking place in Canada toward making better use of energy. Keith Cronkhite of NB Power told the group about New Brunswick's recent experience with LED street lighting. "It's a technology that has grown in leaps and bounds [in terms of] innovation and the price point, which has made it competitive to the point where we've changed 100% of our street lights. You get a 60% energy savings, you get a better light; it's more reliable and, from a safety perspective, you can count on the light being there a higher percentage of the time."

But there are different paths to innovation, and some utilities necessarily approach new technology with measured caution. Jamie Hall of Manitoba Hydro said that large utilities like his may wait for such technologies to mature. "We are by nature risk-averse in that we need to ensure our customers have reliable energy all the time. Only when that technology is mature enough can we confidently deliver it to our customers." Siemens's Lucy Casacia said that city planners, too, must be cautious. In their many decisions about new energy technology, they have to balance the need to approve new capacity against the risk that their investments will become technological guinea pigs. They often operate in an environment where decisions are in the hands of financial people. These people often have limited technical knowledge and are more focused on short-term goals due to budget constraints.

Apart from innovations that reduce consumption and save money, like LED lights, there are other technologies that help people better understand their relationship with energy. Smart meters, for example, record how much electricity the customer consumes hour by hour, rather than over a whole billing period. Ontario has rolled them out to 100% of residences—4.7 million meters—and MaRS's Ian Philp said his group is working with utilities to allow consumers to download their energy-use records. The service connects people with their energy usage, with meaningful information, including how they compare with other people on their own street. This behaviour-oriented technology helps consumers benchmark their electrical consumption. It makes them aware of the different time-of-day rates, and of the link between consumption and the total on their hydro bill. It's a connection consumers don't often make when it comes to electricity—but have always understood when it comes to gasoline consumption, thanks to metered gas pumps.

Tim Gibson of Siemens declared that smart grids—modern electrical grid systems that use information technology to make our use of power more efficient, reliable and economical—can give consumers more choice and engage them on what they're spending and how they can use energy in their homes more efficiently. However, electricity and other fuel consumed is only one part of any building's efficiency. Peter Love of the Energy Services Association of Canada reiterated that for motorists, the relationship between consumption and cost is crystal-clear at the gas pump. But how can people look at a house or a commercial building and determine its efficiency in the absence of more holistic data? He said that although new, LEED-certified buildings are adding to Canada's inventory of buildings built with energy efficiency in mind, the vast majority of Canadian building stock was made before LEED certification, and there is an enormous need for building retrofits. That's more than a matter of technology—it's one of economics, financing and effective stakeholder partnerships.

> ***"It's [about] embracing that messiness and realizing that complexity requires we change the way we think."***
>
> *– Jane McRae, CEO, Sustainable Cities International*

ENERGY HACKATHONS

At Toronto's MaRS Discovery District, "hackathons" have been finding innovative new ways of addressing problems. Hackathons gather together various experts for intensive spells of brainstorming on software projects. In one recent hackathon, health care experts were given 48 hours to address some aspect of health care with an app. Through spontaneous collaborations, the group came back with an app that uses a cellphone's camera to monitor wound healing. The innovative approach to finding solutions will be applied next to energy innovation as MaRS prepares to launch an energy-research institute in partnership with Siemens.


Lucy Casacia


Ian Philp

NEW PARTNERSHIPS

Technological innovation can be costly, and there is an investment hurdle that municipal employees need to justify when considering matters like building retrofits. Cash-strapped governments need to come to terms with the initial steep cost of new technology. There is often an inordinate emphasis placed on this initial cost, but Peter Love said municipalities also need to focus on the long-term return on investment. He noted that there is a global movement known as C40 Cities—a network of large cities making efforts to reduce greenhouse gases and address climate change through the sharing of best practices—that can help cities come to terms with the initial investment. Meanwhile, utilities themselves are partnering to share insights. NB Power's Keith Cronkhite said his utility has cordial and helpful exchanges on what works and what doesn't, with non-competing utilities such as Nova Scotia Power and Duke Power in the United States.

One partnership that proved very successful was between the city of Brussels and a local credit union, collaborating on an energy retrofit program. SCI's Jane McRae recounted that the Belgian capital paid the interest on credit union loans for residents of low-income neighbourhoods and took over the risk of non-recovery of the money lent. Households paid back the loan payments from household energy savings. And while the program was in low-income areas, the default rate on loans was very low. Here at home, Manitoba started a similar program last year in low-income areas. And Siemens's Tim Gibson said that his company has committed to working long-term with NB Power on energy programs—and has moved smart-grid research and development programs from Princeton, N.J. to Fredericton, N.B.

Such co-operation between the private sector and governments not only creates jobs but also leads to new generating capacity, new products and new processes. Still, the round table noted, public-private partnerships (PPPs, or P3s) are often wrongly equated with mega-projects such as massive generating projects. In fact, increasing numbers of P3s are very modest and subtly beneficial. "You say PPP and everybody goes, 'Whoa!' " Tim Gibson noted. But, he said, they can be small, making them quicker to solve needs and show results. His firm worked with Kansas City Power and Light on a blighted neighbourhood with high unemployment. The utility used U.S. federal funds along with an investment from Siemens to install a smart grid. To save energy, the utility led an insulation program for area homes—which also gave local employment to residents who installed the weatherizing. Not only that, the utility prepared abandoned land for reuse and upgraded street lighting. "It took government money, private money and (is) doing something good," Gibson said.

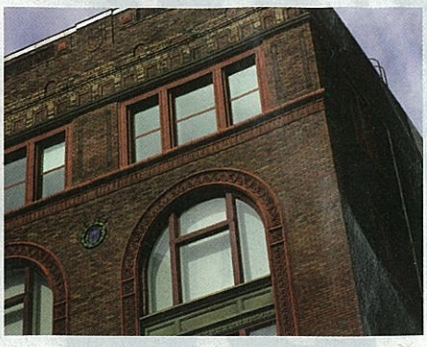

Image courtesy of Manitoba Hydro

THE DISCREET SUBSTATION

When citizens think of public-private partnerships, they often think of megaprojects, but P3s can be modest and very effective. Manitoba Hydro allayed public resistance to a new substation in a new southern Winnipeg housing district. Instead of building a large transformer station and switchyard that glowered at residents from behind brick walls, Hydro worked with Partner Technologies Inc., a Regina transformer manufacturer, to create small pad-mounted substations, each with one-10th the capacity of a traditional station. The mini-stations were so unobtrusive that most residents didn't notice them, and more can easily be added as the city grows.

NEW LIFE FOR OLD BUILDINGS

Retrofitting Canada's vast stock of older buildings to improve their energy efficiency has become a growing industry. Peter Love of the Energy Services Association of Canada describes an ingenious financial approach. It sees energy services companies retrofit buildings used by the public sector at their own cost while guaranteeing energy savings. Then, over a long-term contract, they are paid back with a profit from part of the savings in energy costs. The result is markedly lower energy costs for public institutions and less money spent overall.



URBAN PLANNING AND POLICY

Surprisingly, a holistic combination of urban planning disciplines is only now emerging. Jane McRae said that Calgary has achieved a breakthrough by integrating land use studies with transportation planning to counteract the city's energy-inefficient sprawl. "It's easy to say; it's hard to do," she said. Integrating the two disciplines took two years. Bringing the two planning teams and two processes together, McRae said, "was messy and complex. And it's [about] embracing that messiness and realizing that complexity requires we change the way we think. Is it getting us what we need, in terms of what we need to see? Not yet, but there's a huge opportunity out there to see gains."

Peter Love said that climate change will become a major driver of policy change. "It is beginning to dawn on more and more municipalities that this isn't some abstract theory." The insurance industry too, which must redress losses from climate-caused disasters, is very interested in planning for climate change. Solutions are out there, Love said, but getting public engagement is important. Tim Gibson called for consumer education on energy. "Most people believe that our climate is changing. But most people don't realize 82% of man-made greenhouse gases come from the production and use of energy." The more people understand the energy value chain, he said, the more effective their use of energy will be.

PUBLIC BUY-IN

The "social licence" to generate and deliver energy depends on the public's acceptance, a point keenly understood by the members of the round table. One particular challenge is getting buy-in from municipal public servants who are well-motivated but are not rewarded for successful ventures, and indeed may face criticism if they try something new that does not work. "There is a huge inertia," said Peter Love. "That is a huge challenge to overcome." Siemens's Lucy Casacia said that acknowledging public employees' achievements in new energy adoption in their communities is critical. "They don't get rewarded in their paycheques, so [we need] awards or recognition opportunities for people tasked with riskier decisions [in] municipal infrastructure and planning [so that they] get the sense they're doing the right thing."

And the broader public must be engaged as well. "The customer is the centre of this, and we cannot succeed unless the customer is on board," NB Power's Keith Cronkhite said. "It cannot be mandated as 'Thou shalt participate' because that will not work. It's got to be built around trust." Is it merely a top-down, paternalistic task of selling the public? MaRS's Ian Philp says no, not if you work to enable people to see the amount of energy they consume and understand the correlation between use and cost. This way, you empower them, he said.

> ***"Most people don't realize that 82% of man-made greenhouse gases come from the production and use of energy..."***
>
> *– Tim Gibson, Vice President Smart Grid, Siemens Canada*

Peter Love thought differently. He noted that a culture of conservation is emerging. "These sorts of cultural changes don't happen quickly and not very often. In Canada, we've seen a number: non-smokers' rights, drinking and driving, seatbelts, anti-spitting campaigns from a hundred years ago. These things start small, but to quote [urban activist] Jane Jacobs, never doubt the power of a small group of people, because that's what changes things," Love said that Canadians will absorb that culture of conservation when energy efficiency becomes second nature. For her part, Jane McRae summed up how society will evolve toward a new energy city, saying you start with small actions. "[These have] a multiplier effect that you don't necessarily notice until [a culture of conservation] becomes second nature. We have to sell those small successes and make those initiatives more visible."

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1. One Canadian city has transformed the way it uses energy and, in doing so, it's preparing for a sustainable and prosperous future. Listen to a podcast interview with Fredericton mayor Brad Woodside.

2. Smart meters, smart grids, smart cities–we interview consultant and author John Cooper to learn new ways of thinking about cities and energy.

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