

spark

editor's note

Welcome to the first edition of SPARK, Sempa Power's quarterly newsletter. The team at Sempa hopes to leverage SPARK as a tool to share information and to ignite new exchanges between our customers, partners and the clean tech community.

We welcome your feedback at spark@sempapower.com.

Spring 2010

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Sempa Power receives coveted "Technology Green 15™" Award at the 2009 Deloitte Technology Fast 50™ Awards

Sempa Power is a winner of the prestigious Deloitte Technology Green 15™ Award, an award created in 2007 to showcase 15 Canadian companies that are leading the way to create major breakthroughs in the field of green technology.



"The Deloitte Technology Green 15 Award recognizes those Canadian companies that offer solutions to global environmental challenges by creating intellectual property and technology that reduce society's environmental impact," said John Ruffolo, National Leader, Technology, Media & Telecommunications Industry Group, Deloitte. "Companies such as Sempa Power are creating technology solutions that have a significant environmental impact and demonstrate a compelling return on investment, despite being in a recession. In doing so, they are helping position Canada as a global leader in the development of commercially-viable green technology."

Sempa Power's CEO Ron Dizey credits his team's tenacity and passion for green technology as a key differentiator in enabling the company to achieve success. Dizey said, "In a tough year Sempa made considerable progress in product and market development. The team's enthusiasm for enabling customers with intelligent energy solutions allowed our value proposition to remain relevant during the economic slowdown. We have always had great technology, this year it was the team that made the difference"

CTO's corner

A Word with the CTO on Power System Regulation

By Malcolm Metcalfe

Electricity is a currency for energy. The electric system is much like the drive line of a car; an engine burns fuel, and delivers energy to the wheels. We intuitively understand that the amount of power generated by the engine is always balanced with the amount of power that is used. Apply more power, and the car speeds up. The electric system operates in the same way; control systems within the grid adjust generation so that the supply of electricity is in exact balance with the demand on a second by second basis.

Early power systems were largely based on hydro plants that could be adjusted quickly as needed. But the picture has changed in almost 130 years since Edison started the Pearl Street generating plant in New York. Two issues dominate this change:

- Customers have become accustomed to using electricity as and when needed, and have established patterns with large daily variations in demand. As markets have deregulated, and real time pricing has come into effect, wholesale prices for electricity have become even more volatile than the load, often increasing at peak hours to levels that are more than 10 times those at night.
- Large coal fired and nuclear powered generators now dominate US supply systems, and these generators do not change load either easily or quickly. Regulation of the electricity system is difficult.

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Leveraging Distributed Loads and Generation for The Smart Grid

By Ron Dizey, President & CEO

Sempa has always been about developing innovative approaches to delivering energy solutions for large commercial buildings. We work to understand how our customers' energy systems are designed, and then deliver efficient solutions that reduce costs, emissions and energy use without impacting the comfort of the buildings' occupants. For over four years now, the Sempa Hybrid Heating System™ has delivered impressive savings in energy costs and significant reductions in carbon emissions for building owners.

Smarter Buildings Make a Smarter Grid™

Most recently, we have been working on ways to leverage customers' distributed loads and generation capability to supply valuable ancillary services to help manage the electricity system. Fundamentally, we have always believed highly managed solutions improve the way buildings consume energy.

At the same time, we strongly believe that actively managed energy systems in buildings can translate into great advantage to the way the entire electricity system works. We are now working with electricity system operators to tightly integrate highly controllable, carefully managed building loads and generation with the electricity system -- to provide even better value to building owners, while delivering critical services to the electricity system operator.

We call our new offering the Sempa Power Regulation Services Network. Initially, this platform is available in regions with deregulated electricity systems -- because these system operators already procure system regulation services from third party suppliers. In any electricity system, supply and demand must be continually balanced -- and today, electricity system operators typically reserve a portion of generation assets to react to the second by second fluctuations in demand. This is inefficient and wasteful - and system operators would much prefer to manage demand and minimize or eliminate the need to reserve generation assets to provide regulation.

Sempa Power Regulation Services Network

By tightly coupling building energy systems to the electricity system, Sempa is delivering one of the first real Smart Grid solutions -- and allowing our building customers to become smart grid enabled. In regions that we offer the Regulation Services Network, we offer no-cost installation of controls and metering to allow qualified building loads and generation to participate in our Regulation Services Network. We then actively manage and control of these devices -- first assuring their primary operational responsibility is satisfied and then allowing the device to participate in the smart grid.

Once we aggregate the disparate capabilities of different loads and distributed generators, we provide valuable system regulation services to the electricity system operator. Sempa is reimbursed for these services and we share the economic value with the businesses and buildings that have become host to the Regulation Services Network.

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CTO's corner

A Word with the CTO

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With the addition of new intermittent renewable sources such as wind and solar, a supplementary level of volatility is being added. This will significantly increase the challenge of maintaining balance.

Several years ago, Sempa identified opportunities to reduce customer energy costs using a Hybrid Heating System. Because most utilities charge for both energy, and for the peak rate of use, or demand, Sempa realized that a constant load would essentially result in the delivery of maximum energy at a minimum unit cost. The Hybrid Heating system selected fossil fuel or electric heat, aimed at maintaining the steady use of electricity while minimizing costs. This system has been successfully installed in buildings across Canada. The same concept of smoothing load over the day can help to improve the efficiency of the power system. It is costly for a utility to meet short peaks, and this has been a driver behind Demand Response (DR). At the same time, it is getting more difficult for utilities to commit fast response generation to the role of maintaining the balance between supply and demand.

To address this need, Sempa is deploying the first Regulation Services Network, a collection of distributed resources that may include loads, Combined Heat and Power (CHP) plants, small generating plants, and storage devices into a single network.

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Leveraging Distributed Loads and Generation for The Smart Grid

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Our Regulation Services Network is now available in Ontario, New England and New York. If you own or manage a commercial building, industrial facility or a business and are interested in connecting to the smart grid contact Sempa Power. Sempa will perform a free analysis of your building to determine your eligibility. Once accepted, your company will begin benefiting economically while assisting in the stable delivery of electricity throughout your jurisdiction.

Let's Talk Smart Grid - An IESO Perspective

Don Tench is the Director of Market Assessment and Compliance at Ontario's IESO (Independent Electricity System Operator). The IESO works at the heart of Ontario's power system, connecting all participants - generators that produce electricity, transmitters that send it across the province, retailers that buy and sell it, industries and businesses that use it in large quantities and local distribution companies that deliver it to people's homes.

Every five minutes, the IESO forecasts consumption throughout the province and collects the best offers from generators to provide the required amount of electricity. This allows customers to see prices fluctuate based on supply and demand. As a result, they can shift consumption away from peaks in demand to times when the price is lower.

Among Don's responsibilities is managing the IESO's participation in the "Smart Grid". Sempa sits down with Don and asks about the Smart Grid, what it will mean to building owners and consumers and how the IESO is helping to prepare Ontario for the new opportunities that the Smart Grid will create.

1. Don, the "Smart Grid" is all over the news. It is hard to tell what it really means. Can you help us understand what it is, and why it will be important?

Smart Grid talks to two distinctive developments in the electricity market. The first is an upgrade of the management and communications infrastructure that supports the electricity system connecting generation, transmission, distribution and consumer stakeholders.

The second component of Smart Grid is modern tools that are being developed to leverage this upgraded information infrastructure. This is where we can expect to see new products, market innovations and applications that will enable evolutionary change in the electricity market. With these new tools stakeholders will have the ability to gather, assess and communicate information related to energy consumption.

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CTO's corner

A Word with the CTO

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The operation of the network is optimized at a central location which is connected to the Independent System Operator (ISO) to accept control signals for balancing load and generation. This patent pending system is a first, both for Sempa and the Utility industry. The first system is scheduled to go into operation in the summer of 2010 in Ontario grid.

past events

GreenBeat 2009

The conference on the Smart Grid

The seminal conference on the Smart Grid, GreenBeat 2009, held on November 18 and 19 in San Mateo, CA brought together leading entrepreneurs, investors, utilities, technology executives, and policymakers to accelerate the development of a leaner, more efficient electrical grid.

GreenBeat 2009 was the place to connect with the people leading Smart Grid initiatives, including former Vice President and Noble Prize winner Al Gore, Kleiner Perkin's John Doerr, Khosla Venture's Vinod Khosla, and Cisco's Laura Ipsen.

[Download conference presentations here](#)

- or -

[Watch GreenBeat 2009 videos here.](#)

Let's Talk Smart Grid - An IESO Perspective

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This will allow for enhanced system performance, improved energy efficiency and reduced costs.

2. Does the IESO have any initiatives planned that will help Ontario participate in the Smart Grid? What sorts of technologies are you considering? What things will have to change in the electricity system?

One of the first steps IESO took was to establish the Ontario Smart Grid Forum, which was made up of several market stakeholders, including government, consumer and industrial participants.

The public can find this Smart Grid report on the IESO web site:

http://www.ieso.ca/imoweb/marketsandprograms/smart_grid.asp

The Smart Grid Forum is continuing its work – moving from a vision for the province to implementation of a Smart Grid.

The IESO is considering the adoption of other new technologies that will help keep us at the forefront of smart grid technologies such as the incorporation of reduced cost options for exchanging the vast increase in information which is a central part of the smart grid and improved systems to aid decision making.

3. Where do you see the Smart Grid technology taking us over the short and medium term? What will be the benefits?

In the short term, the extension of smart grid technology across the network from the distributor to the consumer is the challenge most stakeholders are focused on solving.

By 2010, every home and small business in Ontario will have a smart meter, and by spring of 2011, most Ontarians will be paying time of use rates. That's a big undertaking that has been underway for the past few years. This initiative will give consumers new options for managing and reducing their electricity costs. If consumers can change when and how they use electricity, will have a positive impact on the entire market and will help us to reduce the requirement for new generation plants, reduce waste and lower green house gas emissions.

In the medium term, I think we're going to leverage smart grid intelligence to help overcome challenges with the adoption of technologies like distributed generation, wind power and electric vehicles. There is no doubt that smart grids will be essential to the adoption of clean energy supply and better more efficient market consumption.

4. Do you think we are leaders or followers in the smart grid in Ontario?

We are leaders for sure. We were the first jurisdiction to adopt smart meters on such a large scale -- and the Green Energy Act puts us in the company of some of the most progressive regions and countries in the world. On the development side, Ontario is well positioned to adopt and promote smart grid technologies and systems.

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Did you know?

- The largest emission source (57%) at the Vancouver 2010 Olympic and Paralympic Winter Games is from air travel for athletes, officials, sponsors, the media and spectators.
- Energy usage (5%)
- Local transportation during the Games (14%)

Calculate your Games carbon footprint with the [2010 Travel and Accommodation Calculator](#).

Source: Centre for Sustainability and Social Innovation at the University of British Columbia's Sauder School of Business

Let's Talk Smart Grid - An IESO Perspective

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The Ontario Centres of Excellence (OCE) currently have 14 projects underway or in the pipeline that relate to smart grids. Sustained funding for research and development is essential if Ontario is to realize the potential benefits from developing and commercializing smart grid applications.

5. Are there ways for energy customers to become participants in the smart grid?

Consumers will soon have a number of options available to them to help them be more efficient in their energy use. From time of use rates, to home automation systems, and smart appliances.

This knowledge and the tools to act on it, is a powerful tool in managing the costs and the impacts of energy use.

Sempa Partnering with Offsetters to Offset the Vancouver 2010 Olympic and Paralympic Winter Games



The Vancouver Organizing Committee for the 2010 Olympic and Paralympic Games (VANOC) has set a goal to make the 2010 Winter Games the first carbon neutral Games in history and has formed a partnership with Offsetters, Canada's leading carbon offset and carbon management company, to leave Canada and the world an environmental legacy of carbon neutral games. Sempa Power, among other Clean Tech partners, will help Offsetters reach its goal.

Through Offsetters, Sempa and its clients will participate in energy efficiency and renewable energy projects that will offset 118,000 tonnes of direct emissions. The goal is to also offset an additional 150,000 tonnes of indirect emissions resulting from Games-time travel by participants and spectators. The 25 partners will provide the credits for a blended portfolio of British Columbia clean energy technology projects and international Gold Standard offset projects. As part of its offset portfolio for the Games, Offsetters is working with Sempa to establish demonstration projects for Sempa's hybrid building heating systems, further demonstrating commitment to create real value by reducing costs and greenhouse gas emissions for our clients.

Since inception, Sempa has contributed numerous projects to British Columbia's leadership in energy efficiency, with many of the hotels and resorts throughout B.C and surrounding area having been outfitted with Sempa's Hybrid Heating System™. Through partnership with Aspens on Blackcomb, Cahilly Lodge, Fairmont Chateau Whistler, The Four Seasons Residence, The Four Seasons Resort Whistler, Glacier Creek, Roundhouse Lodge, The Winnipeg Convention Centre and the Whistler Cascade Lodge, Sempa will assist Offsetters with approximately 40,000 tonnes of emissions, representing the equivalent of 11,164 Honda Civics being removed from the roads.

Sempa is proud to be partnering with Offsetters, the Official Carbon Offsetter to support a zero footprint to the Vancouver 2010 Olympic and Paralympic Winter Games.