

Hydro One Solves an Energy Challenge



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Leadership and Teamwork Get the Job Done at Hydro One

Faced with energy supply challenges, Hydro One forged partnerships and focused everyone on common goals. Their efforts led to the utility receiving the 2011 Utilimetrics Excellence in Project Management Award.

By Walter Lowes

Ontario's Hydro One is the Province's largest distributor of electricity, operating 20,000 miles of high-voltage lines and 80,000 miles of distribution lines serving nearly 1.3 million customers over a rural service territory of 247,000 square miles. That's a land mass about twice the size of Texas with roughly half the population.

In 2005 there was a supply challenge looming in Ontario. No significant new generation projects were on the horizon and the province was committed to reducing greenhouse gas emissions associated with coal-fired generation.

Alternative energy, though embraced, could not close the gap between supply and demand. It became clear that if the alternatives to create more supply were

limited at best, the only solution was to dramatically increase the conservation of the supply that Ontario already had.

Government initiatives made it clear that smart meters would be among the more critical tools needed to begin promoting a culture of energy conservation in the province – a new way for consumers to help manage their costs, reduce strain on the electricity system and help the environment.

Vendor and Customer Partnerships

Hydro One was at the forefront of this smart meter deployment challenge and not only met it head-on but succeeded by staying on budget and delivering on schedule.

Key to this success was creating an ecosystem of partners. Though multiple partners in such a project is not unusual, how they came together determined the project's success and defined some highly leveraged best practices.

When it came to maximizing the benefits of vendor partners, lesson one was to develop a strong sense of one team. Joining Hydro One was a network provider that delivered purpose-built smart energy communications so the current smart meters as well as future services could communicate as an integrated system. There was a systems integrator, skilled in unifying disparate technologies. There were also independent consultants that brought subject matter expertise to the project.

All partners worked toward a single set of common goals regardless of subject matter expertise. Coupled with this was employee purpose and pride built around project accomplishment. One critical tool for the team was a project plan that distilled all work streams from meter installation to network build to systems integration onto one page. This allowed everyone from top management to the field technician to understand what was happening, how it fit into the larger picture and the project's progress – all at a single glance.

But the concept of partnership did not stop there. Customers were every bit as important when it came to project success. Communication with the customer as a partner came early and was staged to provide customers with the information they needed, when they needed it.

Though no amount of consumer education can completely eliminate issues, the utility and its partners were proactive in identifying and addressing concerns before they became public issues. In fact, the level of customer complaints actually declined by half over the course of the project.

Networks Drive Energy Conservation

With regard to core technologies, perhaps the most critical lesson is to deploy the network first and add meters once the network is in place. Doing it in this order makes it easier to tune the network. The meters can then associate themselves to the mesh as they are installed.

Even then, there's a learning curve. For instance, one network will not do everything. Early AMI vendors initially thought one network would fit all smart grid applications. Some applications require high bandwidth while others require very low latency.

Using public carriers for backhaul results in unpredictable performance as digital cellular is built for mobile applications, not for the more demanding needs of AMI. AMI mesh networks need to be optimized for applications like meter reading,



Rick Stevens (center), Hydro One accepts the Utilimetrics Project Management Award from Utilimetrics Chairman of the Board Bob Sitkauskas, DTE Energy and Past Chairman of the Board Nan Williams, Integrys Energy Group, at Autovation 2011 in Washington, DC.

outage reporting and voltage monitoring. Vast amounts of information need to be processed to deliver Time of Use data and this can bog down the system.

The key is to have a smart network in place that can accommodate a rich portfolio of applications – both current and future. At the onset, Hydro One believed in developing a smart multi-tier network that could handle multiple smart grid applications with smart meters just being among the first.

Having a purpose-built network built around 2.4GHz provides the required higher bandwidth. Adding intelligence to a smart network that can proactively move meter data up through the mesh can also help prevent bottlenecks. This is critical as real-time power outage notifications can produce crippling amounts of messages if there is a big storm with large outages.

Similarly, HAN data can be bandwidth intensive. To counter this bottleneck, it was found that using a smart network which uses a management strategy that controls the AMI network so it only communicates when needed further alleviates debilitating loads.





The Meter as an Enabler

Lessons were also learned when it came to material supply – separating the network vendor of choice from the meter vendor of choice is an important element.

The implication of this lesson can be seen in the computer industry. When the computer manufacturer also supplies the operating system, you often end up in a walled garden where your strategic direction may be held hostage by that of the vendor.

Products and technologies evolve quickly in an emerging space such as the smart energy market. The deployment team should expect change and be prepared to modify work methods and plans as product capabilities and technologies improve.

The Hydro One project had to deal with three successive generations of radio technology due to evolving technologies, doubling the range with each generation. The network was purposefully designed to adapt and capitalize on the broader mesh coverage as it became available. The design and deployment teams work closely to embrace change.

Additionally, meter supply is an issue that warrants consideration. Manufacturers take on expansive projects and routinely, and not surprisingly, encounter supply chain issues. It is also not uncommon for them to experience product issues that can halt supply. Ensuring the system has been designed to support multiple meter suppliers allowed Hydro One to switch without hesitation as required.

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On the more tactical side, another practical lesson is to ensure the accuracy of the geospatial data for all meters and ideally have location of poles and transformers cleaned up prior to network design. The network design team needs to have 100 percent accurate location data during design. Often times, this is not possible. A team of field technicians became an indispensable ingredient to success of the project.

The Devil in the Details

While the lessons learned in the Hydro One project might seem like common sense in retrospect, given the pressures of deployment, customer concerns, technological differences, manufacturing surprises, and multiple partners, even the most trivial lesson learned might be critical to project and budget success.

Above all else, the single most mitigating element in the equation of success is having the right team working as one. In this case, it was the right team working as Hydro One.

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