

SMART METERING IN ONTARIO

By Ven Seshadri

In 2004, the province of Ontario began developing policies that would result in the implementation of smart metering technology in Ontario's electricity sector. The decision to replace all meters in Ontario with smart – interval – meters was driven by a need to create a culture of conservation in the province.

Over the next 20 years, much of Ontario's existing generation capacity will be retired. Generators must be able to meet rising demand driven by climate, a large industrial base, and population growth.

In planning for the next 20 years of electricity supply for Ontario, the Ontario Power Authority (OPA) has identified a supply gap of approximately 24,000 MW, of which it expects conservation initiatives to address 6,000 MW. Introducing smart metering to residential consumers is a key component in creating the culture of conservation that is required to achieve this. Time-of-use (TOU) pricing combined with consumer education and empowerment allows pricing of electricity to better track the true cost of generation, and gives consumers the choice of paying less by conserving or changing their consumption patterns.

ONTARIO MARKET BACKGROUND

The province of Ontario has approximately 13 million residents and 4.5 million electricity meters. Ontario is unique in that it has over 80 local distribution companies (LDCs), most of which are municipally owned. The largest of these serves approximately 1.5 million meters, while the smallest utilities serve a few thousand meters.

Many different metering and billing technologies are currently used by the LDCs. The market is partially deregulated, and energy marketers are active in both the commercial/industrial and residential sectors, with about 15% of the meters currently being served by a competitive supplier. Marketers interact with LDCs to enrol and bill their clients, and settle with the LDCs through the exchange of electronic business transactions (EBTs), supported by EBT service providers.

SMART METERING IMPLEMENTATION

The implementation of smart metering in Ontario has been underway since 2005. Because of the large number of LDCs and the variety of back-office and metering technologies in use, priority was placed on defining technical standards that would be used throughout the jurisdiction. Standards for metering technologies were developed first, and vendors were qualified through a process run by the largest LDCs in the province. Procurement and installation of smart meters and their associated infrastructure have been in progress since 2006.

The province had set a target to have 800,000 smart meters installed by the end of 2007, and all residential meters replaced by smart meters before the end of 2010.

A decision was taken in 2006 to have the management of meter data performed centrally by the market operator, instead of having the LDCs each implement their own meter data repositories. This includes the validation, editing, and estimation (VEE) processes and the production of bill-ready data that LDCs will use to bill their clients. This approach requires the implementation of a centralised meter data management/repository (MDM/R) supporting all 4.5 million meters in the province, storing all interval data, and producing bill-ready TOU data from raw interval meter data for over 80 LDCs.

The current structure of TOU billing in Ontario has been designed to accommodate three pricing periods – on-peak, off-peak, and mid-peak. During summer months, the on-peak period is 11 a.m.–5 p.m. on weekdays, with mid-peak between 7 a.m. and 11 a.m. and also between 5 p.m. and 10 p.m. on weekdays. In winter months, there are two on-peak periods – on weekdays between 7 a.m. and 11 a.m. and between 5 p.m. and 8 p.m., with two mid-peak periods between 11 a.m. and 5 p.m. and between 8 p.m. and 10 p.m. All other weekday hours and all weekend hours are considered off-peak.

CURRENT STATUS

As of December 2007, over one million smart meters had been installed in the province against a target of 800,000. LDCs in Ontario are on track to have all meters replaced by smart meters before the end of 2010. During the first quarter of 2008, two mid-sized utilities in Ontario began using the centralised MDM/R to bill their residential consumers on time-of-use, and more LDCs are scheduled to come on line during the rest of the year.

During the past 24 months, a number of pilot projects have been undertaken in the province to gauge the effectiveness of smart metering and TOU billing in achieving the province's conservation objectives. One of these projects, the Ontario Smart Price Pilot, was led by the regulatory body, the Ontario Energy Board (OEB), in conjunction with a large Ontario LDC, Hydro Ottawa. In this project, 375 consumers volunteered to participate in a seven-month project (August 2006 – February 2007) in which they were billed on different time-of-use rate structures:

- The TOU structure described previously
- A TOU structure with a critical peak price (CPP), and
- A TOU structure with a critical peak rebate (CPR).

With CPP and CPR, participants were notified one day in advance of a critical peak day (3-4 hours during the on-peak period). On-peak prices were approximately three times the off-peak price, while critical peak prices and rebates were approximately three times the on-peak price.

Detailed results from the study can be found on the OEB's website (www.oeb.gov.on.ca). The results showed that load shifting was significantly greater with the CPP and CPR consumers than with the TOU consumers. During the summer critical peak days, TOU consumers shifted 5.7% of their load while CPP and CPR consumers shifted 25.4% and 17.5% of their load respectively. Over all summer days in the period (not just critical peak days), TOU consumers shifted only 2.4% of their load, while CPP and CPR consumers shifted 11.9% and 8.5% of their loads respectively.^{1, 2}

In addition to load shifting, conservation effects were also observed. CPP consumers reduced their consumption by 4.7%, TOU consumers reduced their consumption by 6% and CPR consumers reduced their consumption by 7.4%. Conservation

effects were attributed to increased awareness and education of the consumers resulting from information provided as part of the pilot.

Participants in the pilot were also asked for their feedback on the pricing structures, and 74% indicated a preference for the TOU structure as opposed to the CPP or CPR structures, regardless of which pricing plan they participated in.

FUTURE DIRECTIONS

Smart metering is a significant upgrade to the electricity delivery infrastructure. Going forward, a number of opportunities exist for leveraging this infrastructure to increase consumer choice to assist in managing electricity consumption.

In Ontario, most apartment buildings and condominiums have historically had a single meter for the entire building. With smart metering, these buildings are now being suite-metered, where every unit in the building is individually metered. This will allow each household to make its own individual choices regarding consumption, conservation and price.

While most consumers in Ontario pay a regulated price for electricity (the regulated price plan, or RPP), electricity marketers are active in the province. Currently, marketers provide fixed-price, long-term contracts that hedge consumers against potentially rising regulated prices. Marketers also currently provide consumers with green power options, enabling them to procure a supply mix that can be as much as 100% green. With access to interval data, marketers

can provide a rich variety of new products to consumers, thus increasing customer choice. For example, marketers can provide variations on the different pricing schemes tested in the pilot described previously, or invent entirely new schemes that go beyond the RPP.

Furthermore, demand response is increasingly becoming a strategy that system operators use to manage load on critical peak days. To date, demand response has involved large industrial users that have the metering infrastructure to monitor actual demand reduction. With the availability of interval meter data for residential and other small consumers, demand response programmes can potentially be extended to a significantly greater number of consumers, making such programmes more effective. **MI**

1. Ontario Energy Board Smart Price Pilot Final Report, IBM Global Business Services and eMeter Strategic Consulting, July 2007.
2. Ontario Energy Board Staff Discussion Paper on Regulated Price Plan – Time-of-Use Prices: Design and Price Setting Issues (EB-2007-0672, April 17, 2008.



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ABOUT THE COMPANY: The SPi Group Inc. (SPi) is a provider of transaction management, billing, settlement and other back-office services to the North American retail energy market. SPi operates the largest electronic business transaction (EBT) clearinghouse for retail market transactions in Ontario, managing enrollment, metering and billing data for nearly 100% of the province's retailer-enrolled consumers.

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