

Discussion Paper - DRAFT

Increased Consumer Engagement in Ontario's Wholesale Electricity Market



The need and opportunity for increased participation in Ontario's wholesale electricity market from the demand side has been a recent recurring theme of the IESO, the stakeholder community and other industry commentators. The IESO's new vision statement introduced last year highlights the potential role for consumers as does the Electricity Market Forum and the Ontario Smart Grid Forum in their recent reports. Both groups issued specific recommendations calling on the IESO and others to take steps to more closely integrate the demand side within the system.

The Market Forum, for example, wrote: *"The opportunity to engage the demand-side is, challenging as it is, worth pursuing. Consumers have been able to benefit from technological and service developments in virtually every other product and service in our economy. These benefits should derive from electricity services as well. A customer-focussed electricity system would look to consumers as a key resource to help meet its capacity and operability needs."*

Stakeholders have echoed this sentiment in describing priorities for the IESO for the coming years. Consumers have talked not only about their desire to take a more active role in the market but also the need for the IESO to encourage and facilitate that engagement. This paper highlights some of the opportunities, potential barriers and seeks to stimulate discussion amongst stakeholders about a future path forward.

An Untapped Potential

Customer engagement in the market is commonly characterized as demand response (DR), which is the process of consumers changing their energy use in response to a signal such as price. Demand response can take a variety of forms. It can be dispatchable with load participating in a program or a market where it responds to a direct signal – whether it's from a program co-ordinator or a system operator. It can also be price-responsive – with consumers responding to a price signal outside of any formal market or program structure (such as the Global Adjustment allocation in Ontario). System operators in North America have in place or are considering having loads provide a range of services including: energy, emergency energy, operating reserve, regulation, capacity, direct load control (e.g. peaksaver) and ramping.

Much like any other resource, demand response can contribute to grid stability in real-time operations. In emergency operating situations, DR can help ease strain on the system by reducing energy use during peaks. It can also help address local constraints on the system, depending on where the resource is located. It also has the potential to help raise minimum demands during Surplus Baseload Generation conditions, reducing the need to spill water at hydro stations, manoeuvre down nuclear stations or dispatch off wind turbines.

Unlike other resources, however, demand response also allows markets to tap into existing infrastructure to create new supply. Not only does demand response help avoid putting shovels in the ground to build new generation, it provides an additional level of efficiency. Simply put, it's cheaper to ask someone to stop consuming energy for a short period of time than to keep some generators idling.

In markets with increasing levels of variable generation, more flexibility will be needed. Maintaining operating reserve may be challenging during significant wind ramps or fall-outs, which could be more effectively balanced by the demand side of the system. New technologies are enabling load to respond to much more finely tuned requirements and provide a viable alternative to generation currently providing these services. Consumers and aggregators believe the capability to contribute to solving system issues exists on the demand-side – as long as the needs are clearly defined, there are price (or other) signals to respond to and customer education efforts.

Most important though, given today's economic climate and rising costs, is the opportunity to provide consumers with the ability to better manage their costs.

The North American Perspective

Demand response has grown significantly over the last decade. Total estimated potential peak load reduction in the U.S. grew significantly – from 41,000 MW in 2008 to 58,000 MW in 2010ⁱ, due in large part to wholesale market participants and commercial and industrial customers. Many ISOs south of the border have been able to rapidly expand their demand response portfolios – opening up the capacity and different ancillary markets to loads. They've accomplished this by adapting their rules and processes to accommodate more participants and a much broader range of load within the market.

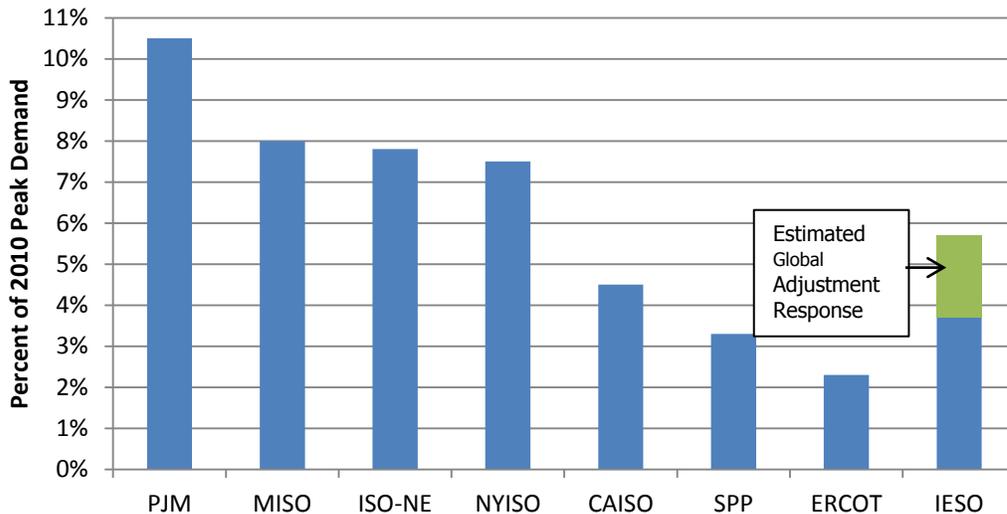
Across the US, wholesale demand response levels vary by region, but generally is approximately 8-10% of peak load in the mid-western and northeastern parts of the country (PJM, the Midwest ISO, ISO New England, and the New York ISO) and 2-5% in the southern and western parts (the California ISO, Southwest Power Pool, and ERCOT).

The significant growth in DR capability in the US can in large part be tied back to the introduction of DR into capacity markets. These typically take the form of forward markets which can procure capacity commitments for as much as three years ahead. By participating, customers receive credit for the amount of capacity they are willing to curtail in a given period – which will be called upon during emergency operating situations.

Beyond actually allowing load to participate, U.S. markets have also worked to reduce two significant barriers to entry. While many markets started at 1 MW or larger as the minimum resource size, these numbers have been steadily falling, and now most allow single resources as small as 100 kW. In addition, most markets allow for aggregators to submit as a single resource, allowing smaller, even retail-size resources, to participate.

A number of ISOs have also worked to reduce many of the technological barriers that inhibit DR participation. For example, PJM uses Internet communications protocols for demand resources providing regulation (< 50 MW), eliminating the expense of dedicated communications network infrastructure. Changes such as this are designed to maintain standards, but avoid unnecessary investments in processes or technologies that won't actually improve the participant's performance in the market.

2010 Demand Response Capacity



Note: Demand response programs for Ontario include Dispatchable Load, Peaksaver and DR 1, 2 and 3 programs.

Ontario's Experience

Ontario has built a core group of market participants who actively offer into the market – to signal at what price they will curtail their energy use and provide operating reserve. Currently dispatchable load accounts for 492 MW in capacity to the system, providing 11-19 per cent of the province's operating reserve requirements and reducing overall OR costs.

The Ontario Power Authority's DR3 program (comprising 383 MW) is a contractual demand response program where participants reduce load for defined periods when predetermined supply cushion and price triggers are met. Participants are compensated for these activations and are expected to be able to be on standby for 100 to 200 hours a year, but receive most of their payments for providing capacity.

Changes to the allocation of the Global Adjustment have also allowed large users (5 MW or more) to reduce costs and better respond to market conditions. By reducing their share of the

top five peaks, these consumers can reduce their share of the Global Adjustment. This effort has already had a noticeable impact on demand peaks and has been well-received by consumers.

Drivers for Change

Demand response is expected to become a key component of the transformation taking place within the electricity sector. With a rapidly growing portfolio of wind and solar resources, the IESO is looking for ways to increase flexibility in the system with all existing resources. At the same time, smart grid technologies are expanding the ability of utilities and consumers to more capably manage the flow and use of energy. Now, more than ever, demand response provides an opportunity to increase the efficiency of the power grid by providing valuable services to support its operation.

As the Long Term Energy Plan sets out increasing levels of conservation targets up until 2030, distribution companies are looking for options that go beyond efficiency. For its part, the Ontario Energy Board is working with industry to develop a new regulatory framework that recognizes and promotes the development of customer control and participation through smart grids.

South of the border, demand response is also seen as a cost-effective means to enhance the nation's energy security and help achieve environmental objectives with the energy sector moving aggressively forward on demand response initiatives. States are setting mandates for demand response – with some as high as 15 per cent peak load reduction by 2015.

FERC has established a National Action Plan on Demand Response as an effort to promote the development of cost-effective demand response resources through greater levels of coordination amongst all players. It also issued Order 745 which requires ISOs and utilities to compensate load at market-based prices when it can offer a capable and cost-effective alternative to generation. On the standards front, ISOs (including the IESO) have also been active in developing operability standards that will facilitate the integration of demand response within markets.

Barriers to Customer Engagement

Large customers, LDCs, aggregators and others have said that barriers prevent increased engagement from the demand side in the wholesale electricity market including:

Lack of market signals: Many called for the extension of market signals to a broader group of customers. Even if the price differences are small, many will still shift.

Too strict market rules and regulations and unwieldy program rules: It was widely suggested that current market and program rules incur unnecessary fixed costs that undermine any value that consumers could derive from the market. While many of these requirements make sense for large-scale generators, applying the same criteria to small load might not.

Customer awareness: Consumers also cited a lack of general awareness about the value of demand response and the need for more demonstration projects to support the proposition.

Moving forward

Currently, demand response in Ontario is an amalgam of market options – with dispatchable load offering mostly OR but adhering to the higher requirements demanded of generators, the opening up of regulation services to alternative providers; a demand response program (DR3) that provides substantive capacity payments; price signals through the Hourly Ontario Energy Price and the Global Adjustment (for consumers over 5 megawatts); Time-Of-Use rates and peaksaver.

Growing the presence of demand response in Ontario will need to take into account the unique needs of our province's electricity system, taking advantage of potential opportunities. Additional analysis and discussion will be required to establish exactly how these demand resources should operate, but reframing some of the requirements for demand response could open the door to greater opportunities.

ⁱ FERC, *2010 Assessment of Demand Response and Smart Metering*, February 2011.