

Memo to: Independent Electricity Market Operator (IMO)
From: Jack Gibbons, Ontario Clean Air Alliance
Re: Achieving significant demand response in Ontario
Date: March 17, 2004

Introduction

Paying electricity consumers to reduce their demands during periods of system peak demand and/or supply shortages can provide significant benefits to electricity consumers and the Government of Ontario. The benefits include:

1. *A dramatic reduction in the market clearing price of electricity.* According to the National Economic Research Associates, a 2 to 5% reduction in demand on peak days could reduce spot prices by 50% or more. [Michael Rosenzweig et al., "Market Power and Demand Responsiveness: Letting Customers Protect Themselves", *Electricity Journal*, May, 2003.]

In addition to the direct benefit to consumers, a lower spot price will reduce the deficit of the Ontario Electricity Financial Corporation (OEFC), an agency of the Government of Ontario. The OEFC maintains the retail electricity price cap for small volume consumers by financing the difference between the wholesale spot price and the fixed retail price.

2. *Reduced risk of blackouts and brownouts.* Existing supply and transmission resources can serve a greater range of customer needs with greater reliability margins if demand response resources are available at critical times.
3. *Reduced need for new electricity generation and transmission infrastructure.* The Government of Ontario has promised to phase-out Ontario's coal-fired power plants (7,500 MW) by 2007. An RFP for the first 2,500 MW of replacement generation will be issued in the near future by the Government of Ontario. An effective demand response programme will reduce the amount of new electricity generation capacity that will be needed to replace Ontario's existing coal-fired generation capacity.

Ontario Electricity Demands and Prices

Ontario's demand for, and price of, electricity is weather sensitive. Ontario's peak winter demand of 24,937 MW occurred on January 15, 2004 and our peak summer demand of 25,414 MW occurred on August 13, 2002. Nevertheless, as Table 1 indicates, Ontario's demand for electricity exceeded 20,000 MW for only 10.6% of the year, on average, from 1999 to 2002.

Table 1

**Ontario Hourly Load Characteristics for the 1999-2002 Average:
Number of Hours in which Load Falls within Selected Intervals**

	11:00 pm- 6:59 am	7:00 am- 12:59 pm	1:00 pm- 5:59 pm	6:00 pm- 10:59 pm	All Hours
>24,000 MW					
Winter	0	0	0	0	0
Spring	0	0	0	0	0
Summer	0	5	17	3	25
Fall	0	0	2	1	3
Year	0	5	19	4	28
<u>23,001-24,000 MW</u>					
Winter	0	0	0	4	4
Spring	0	0	0	0	0
Summer	0	8	18	9	35
Fall	0	1	2	1	4
Year	0	9	20	14	43
<u>22,001-23,000 MW</u>					
Winter	0	2	0	29	31
Spring	0	0	0	0	0
Summer	0	14	30	14	59
Fall	0	2	3	2	6
Year	0	18	34	45	96
<u>21,001-22,000 MW</u>					
Winter	0	12	9	77	98
Spring	0	0	0	3	3
Summer	1	23	44	29	97
Fall	0	3	6	13	21
Year	1	37	59	121	218
<u>20,001-21,000 MW</u>					
Winter	4	89	66	130	288
Spring	0	6	4	18	28
Summer	2	44	71	45	161
Fall	0	9	23	36	67
Year	6	148	163	228	544

Table 2 shows the strong correlation between electricity demand and prices. On average, when the demand for electricity exceeded 25,000 MW, the price of

electricity, including the IMO uplift charges for high-priced imports, was 26.3 cents per kwh. In contrast, the average wholesale price of electricity from May 1, 2002 to April 30, 2003 was 5.7 cents per kwh. [IMO, *The Ontario Wholesale Electricity Market: Year in Review: May 2002 – April 2003*, p. 4.]

Table 2

Estimated Commodity Cost Excluding and Including Uplift in the Year 2002

Load (MW)	Energy (GW.h)	Excluding Uplift		Including Uplift		Average Import Price (¢/kW.h)
		Cost (million \$)	Average Price (¢/kW.h)	Cost (million \$)	Average Price (¢/kW.h)	
>25,000	479	76	15.8	126	26.3	62.5
24,001-25,000	1,686	270	16.0	384	22.8	55.4
23,001-24,000	2,604	386	14.8	469	18.0	35.1
22,001-23,000	2,851	341	12.0	406	14.3	27.9
21,001-22,000	5,891	529	9.0	602	10.2	17.7
20,001-21,000	13,974	1,025	7.3	1,089	7.8	8.4

Note. For the period prior to market opening, "spot" prices were estimated using average price associated with similar load levels after market opening.

Tables 1 and 2 were produced by Hydro One. [Hydro One Networks and Hydro One Brampton, *Electricity Demand In Ontario: Submitted to the Ontario Energy Board regarding RP-2003-0144*, November 2003]

The IMO's Demand Response Proposal

The IMO's proposed demand response (DR) programme, *Transitional Demand Response Program*, (February 9, 2004) is neither aggressive, nor consistent with the policies of the new Government of Ontario. Our critique of the IMO's proposal and our recommended modifications are outlined below.

Objective

According to the IMO, the objective of its DR programme is to "build on the Ontario market's demand response "capability" and infrastructure (loads, suppliers, LDCs and the IMO)." Furthermore, according to the IMO, "the proposed program is a transitional program intended to "kick start" demand responsiveness in Ontario by working to overcome specific barriers that are currently preventing some Ontario loads from being responsive to wholesale market price signals."

The IMO's modest DR objectives are inconsistent with the Government of Ontario's policy commitment to make "demand response strategies a cornerstone of Ontario's long-term energy future".

Therefore we recommend that the objective of the IMO's DR programme should be to help Ontario meet its electricity service needs reliably and at least-cost by:

- reducing the spot price of electricity;
- reducing the risk of blackouts and brownouts; and
- reducing the need for new generation and transmission infrastructure.

Demand Response Price and Term

According to the IMO it will purchase load reductions, on an hourly basis, in one-hour blocks for delivery three hours in advance at its three hour in advance pre-dispatch price for power.

The very short-term nature of the IMO's proposed DR purchases will needlessly restrict the amount of DR that will be offered to the IMO, especially by industrial customers who will be able to offer much large quantities of DR if they have time to re-schedule their production processes.

At noon of each day, the IMO posts pre-dispatch electricity prices 36 hours in advance. Therefore, the IMO has the capability to contract for DR for up to at least 33 hours in advance based on its pre-dispatch prices.

Therefore we recommend that market participants should be allowed to offer load reductions, of up to 33 hours in duration, based on the IMO's pre-dispatch prices for electricity. For example, a load reduction for the period 12 to 17 hours in advance should be purchased at the IMO's 12 to 17 hour in advance pre-dispatch prices.

Eligibility

According to the IMO, a market participant can participate in the programme only if it can show how its participation in the programme "overcomes a barrier". However, in its list of barriers the IMO fails to include the most profound barrier to DR, namely, the IMO's historic failure to pay for DR.

Therefore we recommend that all market participants should be allowed to sell DR to the IMO.

Thresholds

The IMO is proposing to only purchase DR during hours 7 through 23 on weekdays when the pre-dispatch price is 12 cents per kwh or greater.

The IMO's thresholds are inconsistent with the Government's policy commitment to make "demand response strategies a cornerstone of Ontario's long-term energy future" and our proposed objectives for the IMO's programme.

Therefore we recommend that, during the first stage of the programme, the IMO should purchase DR whenever the pre-dispatch price is 7 cents per kwh or higher or the pre-dispatch demand is 20,000 MW or higher.

Participant Bid Size

The IMO is proposing that its maximum DR purchase, per market participant, should be capped at 5 MW.

The IMO's proposed cap is inconsistent with the Government's policy commitment to make "demand response strategies a cornerstone of Ontario's long-term energy future" and our proposed objectives for the IMO's programme.

Therefore we recommend that there should not be a MW cap per market participant.

Market Bid Size

The IMO is proposing to cap its aggregate DR purchases at 100 MW during the "first stage" of the programme.

Once again, the IMO's proposed cap is inconsistent with the Government's policy commitment to make "demand response strategies a cornerstone of Ontario's long-term energy future" and our proposed objectives for the IMO's programme.

Therefore we recommend that, during the first stage of the programme, the IMO should purchase all the DR offered subject only to the following constraint: the aggregate DR purchases should not simultaneously reduce the actual system demand below 18,000 MW and the actual price of electricity below 6 cents per kwh.

Duration of Programme

The IMO is proposing that its DR programme should have a two to three year term.

The IMO's belief that its DR programme should be transitory reflects its failure to accept that: a) the most significant barrier to DR in Ontario has been its historic refusal to purchase DR; and b) the new Government of Ontario is committed to making DR "a cornerstone of Ontario's long-term energy future".

Therefore we recommend that the DR programme:

- a) should be permanent;

- b) at the end of each six month period the IMO should review the programme's net economic benefits in terms of: a) reducing the spot price of electricity; b) reducing the need for new generation and transmission infrastructure; and c) reducing the risk of blackouts and brownouts; and
- c) at the end of each six month period the IMO should review whether some or all of the programme's parameters should be changed in order to increase the programmes' net benefits for Ontario's electricity consumers and the Government of Ontario.