

Executive Summary

Ontario's wholesale electricity spot market once again performed reasonably well according to its design over the six-month period May 2007 to October 2007. Spot market prices generally reflected demand and supply conditions. The Market Surveillance Panel (MSP) found no evidence of gaming, abuse of market power or other inappropriate conduct by market participants or the market and system operator, the Independent Electricity System Operator (IESO). However, as in previous reports, the MSP identified several potential opportunities to improve the efficiency of the market which are reflected in the 13 recommendations summarized below.

Market Prices and Uplift

The average Hourly Ontario Energy Price (HOEP) for the period May 2007 through October 2007 increased by 1 percent compared to the same period in 2006 (although prices were generally lower in the beginning and higher in the final two months of the period). The effective load-weighted HOEP, which provides a more accurate reflection of what Ontario load pays for energy after accounting for the Global Adjustment and OPG Rebate, increased by \$1.20/MWh or 2.3 percent in the summer of 2007 compared to 2006. Total hourly uplift payments charged to market participants increased by \$16 million or 10 percent during the current period compared to the same period in 2006.

Energy prices were more dispersed relative to last year, with more hours above \$70/MWh and more below \$20/MWh. There were 4 hours when the HOEP was above \$200/MWh, down from 6 a year ago, while the number of hours when the HOEP fell below \$20/MWh increased by 122 percent to 331 hours.

Demand and Supply Conditions

Total Market Demand fell by 0.39 TWh or 0.5 percent during May through October 2007 compared to the same period last year. Wholesale load levels continued to decline,

particularly in the Northwest. Although Market Demand fell, total exports increased by over 3 percent.

Net exports (total exports less total imports) declined by 640 GWh or 19 percent relative to last summer. The majority of the decline in net exports occurred in the last three months coinciding with the rapid appreciation of the Canadian/US dollar exchange rate and the increased imports that occurred.

Planned outage rates have been fairly constant since late 2003. However, forced outage rates increased in September and October to rates not seen since 2005. These high rates were primarily a result of outages at two nuclear generating stations during the second half of the summer.

High and Low HOEP

We assessed the four hours during May 2007 through October 2007 period when the HOEP was greater than \$200/MWh and the one hour when the HOEP was negative. The highest priced hour occurred on June 12, 2007 in Hour Ending 15 when the HOEP reached \$436.53/MWh. We provide a detailed assessment of the conditions contributing to this price. The IESO used almost all available tools to maintain reliability including cutting exports, purchasing emergency energy, curtailing dispatchable loads, activating Operating Reserve, and eventually implementing a 5 percent voltage cut.

Operational Issues & Recommendations

The Panel has made several suggestions for potential changes to the present IESO-administered market based on its analysis of observed market outcomes over the past six months.

Recommendation 1-1 (Chapter 1 Section 2.4.3)

Over the next few years, various new wind projects are scheduled to connect to the IESO's energy grid. Currently, wind generators submit forecasts to the IESO indicating how much energy they will provide on an hourly basis. The discrepancy between forecasted and delivered energy can cause significant differences between pre-dispatch and real-time prices as well as potential reliability issues for the IESO. There has been an increase in the absolute average forecast error since early 2006, coinciding with the introduction of new wind projects in Ontario. Expected new wind generation will increase the magnitude of the overall error and potentially reduce the predictability of real-time prices.

The Panel encourages the IESO to continue to review the forecasting process with wind generators and determine methods to reduce forecast errors. Such generators should have incentives (positive or negative) to encourage accurate forecasting.

Recommendation 2-1 (Chapter 2 Section 2.1.2.3)

After the final pre-dispatch run, the IESO can curtail exports for 'security' or 'adequacy' reasons. The 'security' code is used when an internal or intertie transmission limitation requires the IESO to cut the export. The 'adequacy' code is used to cut an export when there are insufficient internal resources to meet the Market Demand. Adequacy curtailments are removed from both the constrained and unconstrained sequences while security curtailments are only removed from the constrained sequence. Removal from the unconstrained sequence has the effect of lowering demand and suppresses the market price during times of scarcity. This may undermine efficient responses by market participants. For example, the resulting lower HOEP may have the effect of encouraging traders to continue seeking exports from the IESO in the next hours in spite of the potential scarcity situation.

Export curtailment due to 'adequacy' has an effect of suppressing the market price during times of serious scarcity since the curtailed amount is removed from the market schedule, thus distorting the market price signal. The Panel recommends that the IESO not remove the curtailed amount due to 'adequacy' from the market schedule.

Recommendation 3-1 (Chapter 3 Section 2.3)

In the July 2007 MSP Report, the Panel identified that the consumption deviation of dispatchable load can be a source of forecast error. The IESO's forecast model counts the deviation as a portion of forecast demand of non-dispatchable load. The Panel recommended that the IESO should explore possible improvements to the load predictor tool to reduce dispatch inefficiencies from forecast errors arising from changes in dispatchable load consumption

In this report, the Panel identifies another issue that might be resolved by an improvement in the load predictor tool. Given that the constrained sequence uses a ten-minute-ahead demand forecast and the unconstrained sequence uses actual demand,¹ we find that demand has been persistently under-forecasted since early 2005.

Consistent with prior recommendations directed at improving the IESO load predictor, whose algorithm imputes changes in non-dispatchable load that can induce consumption inefficiency and forecast errors, the Panel recommends that the IESO review its load predictor methodology to determine if it is a source of persistent under-forecasting of demand.

Recommendation 3-2 (Chapter 3 Section 2.5)

In our December 2005 Monitoring Report, the Panel discussed an issue involving Phase Angle Regulators (PARs) between Ontario and Michigan. These PARs, first placed in

¹ Plus adjustments when certain control actions such as voltage reductions and manually constraining-off dispatchable load have been taken

service in March 2005, were intended to limit inadvertent parallel loop flow through Ontario between New York and Michigan in order to increase effective import/export capability on the Michigan and also the New York interfaces. However, the Panel noticed an increase in the amount of import congestion and a reduction in import capability (by about 400 MW) at the Michigan intertie, which coincided with and was the result of placing the Lambton PARs in service. Though the PARs were placed in service, they could not be operated until agreements were negotiated among Hydro One, ITC Transmission (ITC), the IESO and the Midwest ISO (MISO). To restore interchange capability, the PARs were removed from service in June 2006.

Since June 2006, many of the Panel's concerns have been resolved. The IESO has indicated that it places a high priority on developing Operating Agreements with MISO, Hydro One and ITC and is targeting implementation and reconnection of the PARs by the spring of 2008.

Hydro One has indicated that the units must be operated in a conservative manner for a number of months until sufficient experience had been gained to allow it to determine if the originally anticipated limits can be achieved in order to maximize the Ontario-Michigan intertie capacity. This is expected to require several months. But even in the interim, the PARs will improve import/export capability substantially.

(1) The IESO should expedite completion of the necessary agreements with Hydro One, the Midwest ISO and ITC Transmission for operation of the Phase Angle Regulators on the Michigan intertie. The IESO (and Hydro One) should also complete necessary staff training as soon as possible. Any improvement on the spring 2008 target would have positive efficiency (as well as reliability) effects on the Ontario (and Midwest ISO) system and any slippage would have the opposite effects.

(2) Hydro One should work towards developing ratings that will safeguard the Phase Angle Regulators and provide operationally useful Limited Time Ratings as soon as possible.

Recommendation 3-3 (Chapter 3 Section 3.1)

In previous reports, the Panel has discussed the issue of the volatility of dispatch instructions. Although the IESO has undertaken measures to minimize the effect of this volatility on generators, it has not addressed the root causes of either dispatch volatility or interval-to-interval price volatility.

Market Demand (Ontario demand plus exports) and market supply (available generation plus imports) exhibit abrupt hourly changes for two main reasons: the coordinated change in exports and imports made on the hour and the arrival or departure of hydroelectric generation on the hour. The current fixed one hour bid window combined with the present methodology of scheduling interties is creating inefficiencies.

A potential market design change would be to adopt a 15-minute dispatch algorithm for both generation and imports/exports. We understand that the New York ISO already has a 15 minute dispatch algorithm to allow better scheduling of internal resources. Allowing imports, exports and domestic generation to change on the quarter hour reduces the extent to which domestic generation would be obliged to inefficiently ramp up or down to accommodate changes in imports and exports. Rescheduling within the hour could also provide better response to supply problems that may emerge during the hour.

The MSP recommends the IESO begin investigation of a 15 minute dispatch algorithm to enhance the efficiency of the market.

Recommendation 3-4 (Chapter 3 Section 4.1)

On August 12, 2007, a market participant requested that the IESO constrain on various hydroelectric units for regulatory reasons. In this case, river flows had to be maintained in order to respect agreed water levels. The Market Rules allow variances from dispatch instructions for safety, legal, regulatory and environmental reasons. In the months of August and September 2007, the Market Assessment Unit identified approximately

\$150,000 of constrained on payments to a market participant that requested various hydroelectric units be constrained on to maintain required water levels. While such 'self-induced' payments may be addressed through discussions leading to voluntary repayments, it would be useful to have rule-based authority to recover such payments.

The IESO should initiate a rule change to allow the recovery of self-induced congestion management settlement credit payments which are made to generators when they are unable to follow dispatch for safety, legal, regulatory or environmental reasons.

Recommendation 3-5 (Chapter 3 Section 4.2)

Import Offer Guarantees (IOG) are intended to assist the reliability of the Ontario market by attracting efficient imports. IOGs are offered to help manage the pricing risk to traders on an hourly basis by paying them based on the higher of their offers and the real-time MCP. Wheel-through transactions, both linked and implied, are not eligible for IOG payments. Such payments are automatically recovered by an IOG offset since there is no net import (i.e., reliability benefit) to Ontario.

Recently, market participants who are business affiliates were identified as importing (and receiving the IOG payment) and exporting in the same hour. This effectively constitutes an implied wheel when the affiliation of the two businesses is considered. If one of these market participants had undertaken both transactions, the IOG payment would have been clawed back through the IOG offset. To date, the amount of money paid to affiliated entities that are importing and exporting power simultaneously has been small. However, it would be appropriate to automatically offset the IOG payments made to a market participant when it is identified as an affiliate in the same manner as for the implied wheel transactions undertaken by a single entity.

The IESO should initiate a rule change to make Intertie Offer Guarantee payments subject to offsets where affiliated market participants are simultaneously importing and exporting.

Recommendation 3-6 (Chapter 3 Section 4.3)

In October of 2004, Hydro One applied and subsequently obtained approval from the Ontario Energy Board for a construction of a new 76-kilometer double circuit 230 kilovolt (kV) transmission line to upgrade the capacity of the Queenston Flow West (QFW) transmission flowgate, as well as upgrades to the Middleport Transformer Station. Increasing the capacity (reducing congestion) of the QFW transmission flowgate will lead to several efficiency gains for the Ontario market including less constrained off generation in the Niagara area, reduced constrained on generation west of QFW, and reduced constrained off/on imports/exports on the New York interties (and the Michigan interties). The projects were expected to increase the rating of the QFW flowgate by 800 MW (44 percent). The projects were to be completed in the summer of 2007, however their completion has been significantly delayed. Hydro One has advised the Panel that although it is not a direct party to the dispute causing the delay, it has been providing input and supporting parties involved in the negotiations. Once the dispute is resolved the Panel anticipates that Hydro One will be ready to complete the project expeditiously.

It is important for the efficiency of the Ontario electricity market that Hydro One attempt to complete the Queenston Flow West transmission expansion as soon as practicable. The ability to fully utilize 'bottled' generation in the Niagara region and maximize economically viable imports with New York (and Michigan) will enhance the efficiency (and reliability) of the Ontario market.

Recommendation 3-7 (Chapter 3 Section 4.4.3)

The Ontario Power Authority (OPA) introduced a Renewable Energy Standard Offer Program (RESOP) in 2006 to help Ontario meet its renewable energy supply targets by

providing small renewable energy generating projects (less than 10 MW) with a standard pricing structure and simplified qualifying guidelines. Because of their small size and their connection within LDCs, there are few requirements for these facilities to provide ongoing production status or forecasts. Also because of the intermittent nature of their production, these generators could add uncertainty for the IESO operation and could in some situations lead to production inefficiencies. The Panel understands that the IESO has just initiated a stakeholder consultation to discuss the integration of these and other embedded generators into the reliable operation of the IESO-controlled grid and encourages the IESO to also consider opportunities to reduce potential inefficiencies.

To the extent possible in its stakeholder consultation on embedded generation, the IESO should consider opportunities to reduce inefficiency through the development of the capability for accurate forecasting of embedded generation production, which may require the provision of real-time production and related information (e.g. outages).

Recommendation 3-8 (Chapter 3 Section 4.4.6)

In light of the growing numbers of OPA contracts with energy suppliers in Ontario, we reviewed these contracts from an efficiency perspective. The Panel's view has always been that efficient contract structure is one that motivates generators to offer into the wholesale market at prices that reflect their incremental cost of production and that this helps to ensure efficient dispatch.

Our assessment found that the Clean Energy Supply (CES) type arrangements are the most efficient of the contract structures used by the OPA. Contracts for new supply would be more efficient if they reflected the same structure as the CES contract; an up-front payment of some kind and incentives for hourly decision-making related to the market price. A similar observation may apply for Ontario Electricity Financial Corporation for any new or renewed NUG (New Utility Generator) contracts it might arrange.

The Panel recommends that the Ontario Power Authority structure future contracts to maintain the energy market price as the driver for production decisions (for example, using a strike price structure similar to the payment provisions in the existing Clean Energy Supply contracts).

Recommendation 4-1 (Chapter 4 Section 2)

Aside from the Ontario Power Generation (OPG) Rebate, there is no publicly available disaggregation of the Global Adjustment into its various component programs: OPG's baseload generation (prescribed assets), the various Ontario Power Authority (OPA) generation procurement programs and demand management programs, Bruce generation and the NUG contracts. Data such as total monthly payments under each program as well as monthly energy delivered would allow for an assessment of the effectiveness and costs (in total and per MWh of supply or conservation) of these various programs. It could also be beneficial for market participants (and even retail customers) who may want to predict the expected future levels of such payments (which represented approximately \$370 million or about \$5/MWh for the current six month summer period), for example, when making investment or supply contract decisions. For OPA procurement programs, one possible approach is to aggregate information by program, for example, the Renewable Energy program, the Clean Energy Supply program, each of the corresponding Standard Offer Programs, Demand Management programs and Local Distribution Company energy conservation programs.

(1) The Ontario Power Authority should create more transparency regarding the ongoing monthly payments associated with each of its various procurement programs in order to promote a better understanding of the costs and effectiveness of these programs and to help market participants gain a better understanding of the component costs of the Global Adjustment.

(2) Similarly, the IESO should consider providing aggregate monthly payments associated with Ontario Power Generation's regulated baseload assets, as it currently does for the OPG Rebate.

