

Issue #30: Forecast of Real-Time Prices Comments from Optimal Technologies

Please find attached some comments outlining Optimal's views on the value of Real Time Price Forecasting. There may really be two issues for consideration:

- 1) An improved 3-hour price forecast;
- 2) Provision of future 5-minute prices.

The 3-hour price is used by the OPA to activate gas generation and DR projects pending a DAM.

The 5-minute prices can be used to activate short-term load deferral programs (cycle A/C, water heaters, etc.). Top of the hour price volatility appears to value a 15 minute time shift by \$4 - \$8 per MW. I've been working with Brian to get a clearer quantification of these values. Numbers to date suggest \$80 - \$100 million of annual costs can be achieved by communication and activation of appropriate load response. A reasonable quantity of this savings may be achieved with effective communication of the systematic price changes.

Of course, the remaining load response would need automated DR which could be time based to catch the normal volatility or use a price signal based to optimize load response over the next 6 price intervals. A price response mode would activate for any 3 intervals where the following 3 intervals are sufficiently below the top of the hour interval. This approach increases the value of DR to manage volatility especially in reducing the number of very high price volatility intervals.

Pricing Issue 30 – Forecast of Real Time Prices

The Market Pricing group role is to consider changes to market rules and providing information to stakeholders to increase economic efficiency of the Ontario market. The potential to increase market efficiency by improving price forecast accuracy is the point under consideration. The value of improve price forecasting also should be considered where it impacts other market evolution items.

Comments from various stakeholder interests are:

Generators and Traders:

Both of these sectors already devote substantial resources to price forecasting for Ontario as well as adjacent markets. They do not see Real Time Price forecasting as a suitable role for the IESO.

Dispatchable Loads:

Large customers have limited sensitivity for relatively small price variations, in the \$10 range. They are unlikely to shift production schedules to achieve minor savings on the dispatchable component of their load. Loads also need to consider uplift costs as these can also have a material impact of consumption.

Market Surveillance Panel (MSP):

The MSP has outlined a general comment of market efficiency that the customer should consume electricity when the value received exceeds the cost of the production. In a related topic considered later, the MSP has also expressed concerns about the accuracy of the 3-hour ahead price as a predictor of HOEP. A recent IESO report has shown that while the relationship between the 3-hour ahead price and HOEP has become closer the 3-hour ahead price was still an approximate 10% over-estimate of HOEP in 2006.

Comments of Optimal Technologies:

As a proponent of demand response Optimal sees a very crucial role for price forecasting closer to real time and also the communication of prices in an effective manner to assist market participants and others to improve market efficiency. Optimal's technology can integrate residential and commercial loads into the IESO market by location and timely dispatch. The goal is to achieve market efficiency without impacting customer value of electricity.

Many residential and commercial applications tend to be cyclical based on temperature (space and water heating) or level control ([de] humidification and pumping). These applications can run over relatively short cycles creating multiple oppourtunities to limit short-term consumption. The MSP comments on market efficiency don't appear to consider the interval volatility every 5 minutes. These prices can be quite variable

especially during high ramp periods. The ability to react to sudden price increases is limited unless automated. Sufficient response from customers will enable the HOEP to avoid that high price interval, as that last generation supply source will not need to be dispatched.

This creates a new potential definition for market efficiency where demand response: Consumption that can be shifted from an expensive 5-minute interval to a less expensive interval. High ramp periods have an inherent bias to encourage load shifting. During ramp up periods each morning shifting discretionary loads from before the hour to post the hour will lower costs. In the same manner, delaying load from the top of the hour for as long as possible will reduce peak load and the highest cost production. Quantification of this benefit can be accomplished using historical 5-minute price information. On a go-forward basis the IESO could provide forecasts of 5-minute interval volatility as part of this Real Time Price forecast.

The market efficiency gain from providing real time prices should be mostly targeted around top of the hour changes in dispatch plus import and export changes. A program to identify 5, 10 or 15 minute time shift valuations would be of immediate value to market participants that have short term discretionary load (pumping, grinding, etc.) that can be delayed for defined periods. Consumer education on preferred times to start or stop timed applications (A/C, pool pumps, lights, etc) would also capture the inherent load flexibility not considered by current IESO, OPA or LDC communications. The need and value to implement high technology control on load can then be considered with a clearer understanding of market efficiency that could be achieved with timely demand response.

Consideration of other Market Pricing Issues:

The matching of supply and demand crosses a number of Market Pricing issues. Clearly, implementing a demand response price signal during high ramp periods will reduce the need to dispatch some generation. This will impact:

Issue 9 – Use of peak versus average demand in the load forecast

Issue 4 – Use of 12 X ramp rate in the dispatch unconstrained algorithm

Other issues are also likely to be impacted based on the integration of real load response to price volatility.