Quick Takes

Intertie Offer Guarantee

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Introduction

From time to time, Marketplace Training issues ***Quick Takes*** to offer concise explanations of topics that are new or of current interest to market participants. This issue, our first ***Quick Takes*** article, offers a brief background on why the Intertie Offer Guarantee was added to the Market Rules, and several examples of how the Intertie Offer Guarantee works.

Background

Scheduling Interchange

The Ontario energy market has been designed to allow market participants to import power from and export power to other jurisdictions. Because the source (or destination in the case of exports) is outside the Ontario control area, imports and exports cannot be dealt with in the same way as internal supply and demand. These interjurisdictional transactions can have widespread impact, affecting more than just our immediately interconnected neighbours. Reliability standards must be maintained and adjacent market protocols followed, which results in a complex, time consuming coordination process.

Because of this process, imports and exports are scheduled an hour in advance. Also, they are scheduled for an hour at a time, rather than for the five-minute intervals used for internal dispatchable facilities. This means that an import that is to take place between 11:00 and 12:00 will actually be locked in shortly after 10:00, during the hour-ahead pre-dispatch run of the scheduling algorithm.

Settlement Pricing

The settlement price used for imports and exports is determined differently than the price used for internal transactions. While there is one uniform price used for all transactions inside the province (the Market Clearing Price for Ontario), the market design allows for different prices in the intertie zones (the connections to our neighbouring jurisdictions).

An hour beforehand, a projected price is determined for Ontario and all of the intertie zones with neighbouring jurisdictions. The price determined for an intertie zone is based on the offers and bids (supply and demand) within the intertie zone. To the extent that energy can flow to and from the intertie zone and Ontario, the price should be the same as the Ontario price. It is only when the capacity of the intertie is insufficient to meet all the economical offers and bids that the intertie zone price will be different than the Ontario price. When this happens, the intertie is “congested”. For example, if the intertie is import congested, this means there is low cost (relative to Ontario) energy available from the neighbouring jurisdiction that cannot be imported due to limitations on the intertie. In this case, the intertie zone price will be lower than the Ontario price. Conversely, export congestion means there is export demand for the relatively inexpensive power in Ontario that cannot be accommodated by the intertie. In this case, the price for the intertie zone will be higher than the Ontario price.

Any congestion and hence price differential between Ontario and the intertie zone is determined during this pre-dispatch run. The difference between the intertie zone price and the Ontario price is called the Intertie Congestion Price, or ICP. The ICP is zero if there is no congestion.

The price used to settle imports and exports in real-time is the sum of the real-time Ontario Market Clearing Price (MCP) and the Intertie Congestion Price (ICP) determined during the hour-ahead pre-dispatch run.

So, for an import occurring between 11:00 and 12:00, the price will be the sum of the ICP determined at 10:00 and the real-time price determined every five minutes in Ontario from 11:00 to 12:00.

Price Risk

The impact on importers and exporters is an extra price risk; they are locked-in based on hour-ahead pre-dispatch prices, but settled based on real-time prices, which may be different. The example below illustrates this point:

Participant „A“ offers to import 100 MWh of energy into Ontario for the hour 11:00 to 12:00 at a price of $50.

At approximately 10:00 a.m., the IESO will complete a pre-dispatch run of the scheduling algorithm. If the price in the intertie zone for the hour 11:00 to 12:00 is projected to be $60, the offer from Participant „A“ is economical and will be accepted.

Once the import offer is accepted at 10:00 and scheduled, it is locked in for the hour 11:00 to 12:00. This means that the supplier is committed to supply that energy. Once it has been scheduled, only the IESO can modify this transaction, and only for reliability reasons.

Assume the energy flows for the hour in question. The import will then be settled based on the real-time energy price for the intertie zone. If the real-time price averages to only $40 during the hour, the importer will receive substantially less than the expected price, and even less than the offer price. This represents a price risk for the importer.

Intertie Offer Guarantee

One of the market design principles is to ensure that the adequacy of supply to Ontario is not adversely affected by the market design. Acting on input from stakeholders, Ontario's IESO introduced Intertie Offer Guarantee (IOG) payments to reduce price risk for imports. These IOG payments will encourage imports, helping to ensure adequate supply in Ontario.

The IOG ensures that, over the course of the hour, an importer will receive at least the average price of their offer, i.e., they will not suffer a negative Operating Profit (OP). Please note this holds true even if the real-time intertie zone price is negative.

IOG payments are never negative.

We can illustrate how IOG works with some examples.

Example One:

Assume Transbord makes an offer to import 120 MW for the hour at $20.

In pre-dispatch, the intertie zone price is expected to be $24 therefore

Transbord is scheduled for the import and contemplates the following Operating Profit:

$$OP = 120 \text{ MWh} \times \$(24 - 20)/\text{MWh} = \$480$$

However, in real-time the intertie zone MCP (Market Clearing Price) turns out to be $15.

A price of $15 means a negative Operating Profit for Transbord

$$OP = 120 \text{ MWh} \times \$(15 - 20)/\text{MWh} = -\$600$$

An IOG payment will be made to return Transbord to a zero Operating Profit - not the Operating Profit of $480 anticipated from the pre-dispatch results.

The IOG payment will be $600. The total of the energy payment and the IOG payment together means that Transbord effectively received their offer price of $20 per MWh.

In this example, the price was constant during the dispatch hour. The calculation is the same when price fluctuates in real-time, as the following example demonstrates.

Example Two:

In this example, assume Transbord offers to import 120 MWh at $20.

In pre-dispatch, the intertie zone price is $24
In real-time, the intertie zone MCP is:

- $26 for the first 6 intervals of the hour
- $18 for the remaining 6 intervals of the hour

Once again, Transbord is scheduled and contemplates an Operating Profit of $480 based on the pre-dispatch results:

$$OP = 120 \text{ MWh} \times \$(24 - 20)/\text{MWh} = \$480$$

In real-time, their Operating Profit will vary as the intertie zone MCP varies.

Interval	Zone Price ($)	Offer ($)	Operating Profit/MWh ($/MWh)	Energy (MWh)	Operating Profit ($)
1	26	20	6	10	60
2	26	20	6	10	60
3	26	20	6	10	60
4	26	20	6	10	60
5	26	20	6	10	60
6	26	20	6	10	60
7	18	20	-2	10	-20
8	18	20	-2	10	-20
9	18	20	-2	10	-20
10	18	20	-2	10	-20
11	18	20	-2	10	-20
12	18	20	-2	10	-20
Totals				120	240

Total Operating Profit = $240

An IOG payment is only made if the total Operating Profit for the hour is negative; not if it is lower than what was calculated in pre-dispatch. In this case, there is a positive Operating Profit because of the prices in the first six intervals, so there is no IOG payment.

The participant will receive the following for the energy supplied:

(6 x 10 MWh x $26/MWh) + (6 x 10 MWh x $18/MWh) = $2640

This works out to an average price of $2640/120 = $22. While this average price is lower than the pre-dispatch price of $24, it is still higher than the offer price of $20, so no IOG payment is required.

Example 3:

So far we have only dealt with situations where the offer was for a set quantity at one price. Transbord can, however, submit price-quantity pairs. This will affect the Operating Profit and therefore IOG payments.

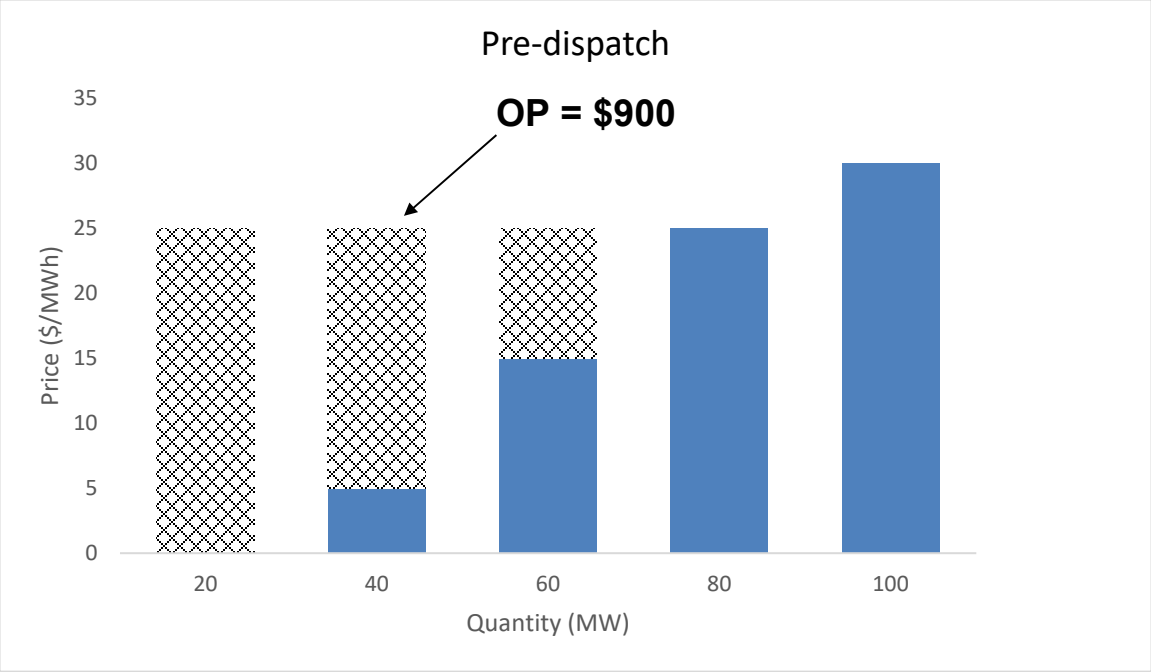
In this case, assume that the 120 MWh is not all offered at the same price. Rather, the offer is for the following:

- First 20 MW at $5
- Next 20 MW at $10
- Next 20 MW at $15
- Next 20 MW at $25
- Next 20 MW at $30
- Next 20 MW at $35

In pre-dispatch, the intertie zone MCP is $25 and Transbord is scheduled for 80 MW of their offer.

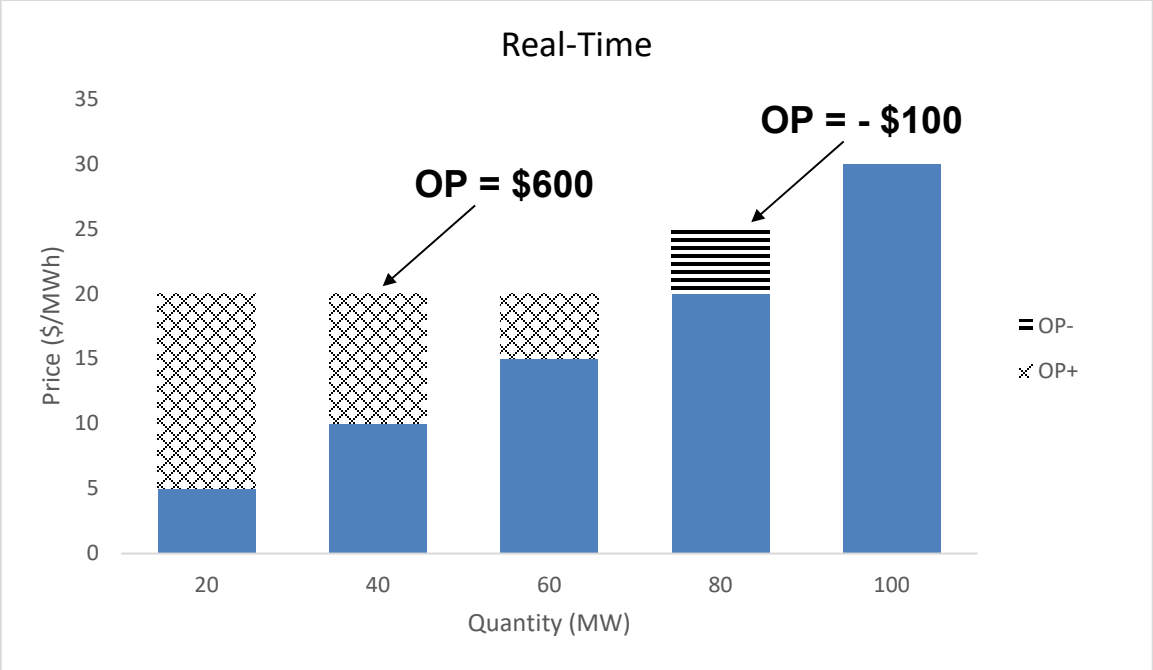
Recall that the offer price is deemed to be the marginal cost of the energy. So, in pre-dispatch, Transbord contemplates an Operating Profit of $900

OP = $(25-5) x 20 + $(25-10) x 20 +$(25-15) x 20 +$(25-25) x 20 = $900



However, in real-time, the actual price in the intertie zone is $20. This means that Transbord will have a positive OP on the first 60 MW they supply to Ontario, but will have a loss on the last 20 MW supplied.

Once again, an IOG payment will be made only if the total of the transaction for the hour leads to a negative OP.



In this case, there is still a positive OP for the transaction, so no IOG payment is made.

OP = $(20-5) x 20 + $(20-10) x 20 + $(20-15) x 20 +$(20-25) x 20 = $500

Example Four:

In this example, assume there is congestion on the intertie in the import direction. Transbord offers to import 120 MWh at $100. In pre-dispatch, the projected prices are as follows:

Ontario price = $400

Intertie zone price = $150

Intertie Congestion Price (ICP) = -$250

Transbord is scheduled for the import and contemplates an Operating Profit of $6,000 based on the pre-dispatch results:

OP = 120 MWh x $(150 – 100)/MWh = $6,000

In real-time, assume the 5-minute Ontario price is lower than projected and varies according to the profile shown below. Transbord's Operating Profit will be negative for all intervals in which the intertie zone price is less than their offer; in this case the intertie zone price for all intervals is negative due to the effect of the ICP.

Interval	Ontario Price ($)	ICP ($)	Zone Price ($)	Offer ($)	Operating Profit/MWh ($/MWh)	Energy (MWh)	Operating Profit ($)
1	200	-250	-50	100	-150	10	-1500
2	200	-250	-50	100	-150	10	-1500
3	200	-250	-50	100	-150	10	-1500
4	200	-250	-50	100	-150	10	-1500
5	200	-250	-50	100	-150	10	-1500
6	200	-250	-50	100	-150	10	-1500
7	150	-250	-100	100	-200	10	-2000
8	150	-250	-100	100	-200	10	-2000
9	150	-250	-100	100	-200	10	-2000
10	150	-250	-100	100	-200	10	-2000
11	150	-250	-100	100	-200	10	-2000
12	150	-250	-100	100	-200	10	-2000
Totals						120	-21000

Total Operating Profit = -$21,0000

An IOG payment will be made to return Transbord to a zero Operating Profit - not the Operating Profit of $6,000 anticipated from the pre-dispatch results.

Due to the negative intertie zone price, the participant will owe the IESO for the energy supplied:

(6 x 10 MWh x -$50/MWh) + (6 x 10 MWh x -$100/MWh) = -$9,000

However, this will be offset by the IOG payment of $21,000 the IESO owes the participant, resulting in a net payment to the participant of $12,000.

The net payment ($12,000) divided by the energy supplied (120 MWh) means that Transbord effectively received their offer price of $100 per MWh.

All the examples assumed that Transbord was only importing power into Ontario during the hour. It is possible that Transbord will also export some or all of the power they import. The purpose of IOG payments is to encourage net imports, which helps Ontario meet its demand for electricity. A wheel-through of energy does not improve Ontario‟s reliability and is not eligible for an IOG payment.

Please note that settlement statements will show the amount owed to or by the IESO for energy charges separately from any IOG payments; both must be considered when determining if the correct payments were made.

Additional Information

Marketplace Training web pages:

- Introduction to Ontario's PhysicalMarkets
- IESO Charge Types and Equations (available on the Technical Interfaces page)

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