

Market Renewal – Intertie Trading Examples

May 24, 2018

Agenda

1. Recap of the SSM preliminary decision on Intertie Congestion Pricing
2. Stakeholder Feedback
3. Purpose of providing example trading scenarios
 - a) assumptions
4. Seven examples: 3 exports, 4 imports
5. Summary and Next Steps

Recap: Intertie Congestion Price Recommendation

Intertie settlement price to be based on final pre-dispatch congestion on the intertie.

Intertie settlement price will be:

- a) Equal to the real-time intertie price if there is no congestion
- b) The higher of the intertie price in real-time or pre-dispatch, if export congested
- c) The lower of the intertie price in real-time or pre-dispatch, if import congested

Rationale from Dec 21 SSM Presentation

- Current methodology for pricing intertie congestion creates incentives for intertie transactions to bid/offer to target scheduling outcomes
 - Bids/offers may not be in line with marginal benefit/cost
- The new proposal will determine intertie prices that are aligned with the cost of incremental exports and the value of incremental imports
- This will better encourage the submission of intertie bids and offers that reflect marginal value
 - Marginal cost bids/offers allow the IESO to minimize the cost of meeting Ontario load

Stakeholder Feedback

- Need more information on the availability of Transmission Rights (“TRs”) in the Day-ahead and/or Real-time market
 - How will they be settled?
- Intertie traders face different risks than internal resources
- Traders should be able to bid/offer in a manner that allows them to benefit from correctly forecasting real-time prices

IESO Responses

- The IESO will stakeholder FTRs after the finalization of the SSM and DAM high-level designs
- Option 2 will result in an intertie price in-line with the incremental cost of imports or exports.

Option 1 can result in the inefficient scheduling of resources and/or intertie counterflow
- If Pre-dispatch and RT prices are consistently biased resulting in RT inefficiencies, IESO would examine in more detail
 - Option 2 is still preferred

Today's Examples

- Intended to expand on ICP examples already presented to address request for fuller explanation of trading in the new market
- Includes basic examples covering:
 - imports and exports in DAM
 - DA intertie congestion and FTRs
 - RT-IOGs and pre-dispatch intertie congestion
- Not intended to cover all aspects of intertie trading. Additional detail and further examples will be covered in future sessions.

Purpose of Examples

- Highlight mechanisms to address the identified concerns about the recommendation
- Scheduling imports and exports in DAM can eliminate exposure to real-time intertie congestion and price risk
- DAM FTRs can provide a hedge against DA intertie congestion
- RT Import Offer Guarantee can help mitigate pre-dispatch to real-time price risk
 - RT IOGs support reliability

Assumptions for Examples

- Intertie FTRs are available for DAM but not Pre-dispatch
- Import Offer Guarantee is available for Imports scheduled in pre-dispatch that flow in RT

Exports – What we want to show

- Scheduling an export in DAM and maintaining that schedule in RT removes exposure to RT price and RT intertie congestion
- DAM FTRs can hedge DA intertie congestion
- Export congestion in pre-dispatch creates a price floor equal to the pre-dispatch intertie price (and to the incremental cost of exports)

Export Example 1 – no DA MW, Pre-dispatch Congestion

DAM:

- 100 MW export bid does not clear in DAM.
- No DA intertie congestion.

Pre-dispatch:

- Export scheduled at -100 MW in pre-dispatch.
- Intertie zonal price clears at \$50 with \$10 of export congestion.

Real-time:

- Export scheduled at -100 MW in real-time

Example 1 – Three Real-time Cases

Summary: 0 MW scheduled in DAM, 100 MW export in RT, \$50 pre-dispatch intertie price with export congestion.

Case	PD Intertie Price	RT Intertie Nodal Price	RT Intertie Settlement Price	RT Intertie Congestion Price	2-Settlement Energy Charge(\$)	RT Intertie Price with Current Design
A	\$50	\$30	\$50	\$20	-\$5,000	\$40
B	\$50	\$50	\$50	\$0	-\$5,000	\$60
C	\$50	\$70	\$70	\$0	-\$7,000	\$80

Export Example 2 – DAM MW & DA congestion

DAM:

- 100 MW export clears at Intertie Price of \$50/MWh
- Intertie Zone export congested by \$20/MWh
- Trader owns 100 MW of Export FTRs

Pre-dispatch:

- Intertie zone export congested by \$10
- Export scheduled at -100 MW

Export Example 2 - continued

Real-time:

- Export is scheduled at -100 MW in real-time

Settlement:

- DA energy charge is $\$50 * -100 = -\$5,000$
- FTRs pay $\$20 * 100 = \$2,000$. Settlement = $-\$3,000$
- DAM FTRs offset DAM intertie congestion
- Because RT schedule = DA schedule, there is no exposure to RT price or congestion

Export Ex 3 - DAM MW, no DA Congestion

DAM:

- 100 MW export clears at Intertie Price of \$30/MWh with no intertie congestion

Pre-dispatch:

- Intertie zone is export congested by \$10
- Export scheduled at -100 MW in pre-dispatch

Real-time:

- Export scheduled at -100 MW in real-time

Export Example 3 – continued

Settlement:

- Energy charge is $\$30 * -100 = -\$3,000$
- Since no DA intertie congestion, no FTR payment
- Not affected by pre-dispatch intertie congestion
- Because RT schedule = DA schedule, there is no exposure to RT price or congestion

Imports – What we want to show

- Imports scheduled in DAM and equally scheduled in RT have no exposure to RT price and RT intertie congestion.
- Import congestion in DAM can be offset by owning import FTRs
- Import congestion in pre-dispatch creates a price cap equal to the pre-dispatch intertie price (and to the incremental cost of imports)
- IOG can help import recover offer price

Import Examples

Common assumption to import examples:

- 100 MW import offered at \$100 and scheduled in pre-dispatch

Import Example 1 – no DA MW, High RT \$

DAM:

- Import not scheduled & intertie not congested

Predispatch:

- 100 MW import scheduled
- Pre-dispatch intertie price of \$120 with import congestion. Imports paid the lesser of \$120 or RT intertie price

Real-time:

- Price rises to \$200

Import Example 1

Interval	RT Intertie Nodal Price	RT Intertie Settlement Price	Implied RT Intertie Congestion Price	RT Energy Payment
1	200	120	-80	\$1,000
2	200	120	-80	\$1,000
3	200	120	-80	\$1,000
4	200	120	-80	\$1,000
5	200	120	-80	\$1,000
6	200	120	-80	\$1,000
7	200	120	-80	\$1,000
8	200	120	-80	\$1,000
9	200	120	-80	\$1,000
10	200	120	-80	\$1,000
11	200	120	-80	\$1,000
12	200	120	-80	\$1,000
	Avg \$200	Avg \$120	Avg -\$80	\$12,000

Import Example 1 – Continued

Settlements:

- Import paid \$12,000 or \$120/MWh on 100 MW scheduled as intertie was import congested.
- No IOG required as \$120 is greater than \$100 offer price
- If intertie was not congested imports would have been paid \$200/MWh
- Settlement is consistent with the incremental cost of imports on the congested intertie

Import Example 2 – DA Import, DA Congestion

DAM:

- 100 MW import clears at Intertie Price of \$115/MWh
- Intertie Zone is import congested by \$15/MWh
- Trader owns 100 MW of Import FTRs

Pre-dispatch:

- Intertie zone is import congested by \$15
- Import scheduled at 100 MW.

Import Example 2 continued

Real-time:

- Import scheduled at 100 MW in real-time

Settlement:

- DA energy payment is $\$115 * 100 = \$11,500$
- FTRs pay $\$15 * 100 = \$1,500$. Settlement = $\$13,000$
- DAM FTRs offset DAM intertie congestion
- Because RT schedule = DA schedule, there is no exposure to RT price or pre-dispatch congestion

Import Example 3 – no DA schedule no PD congestion

DAM:

- Import not scheduled in DAM & no DA intertie congestion

Pre-dispatch:

- Intertie not congested in pre-dispatch
- Import scheduled at 100 MW

Real-time:

- Real-time prices rises to \$130

Import Example 3 – No PD import congestion

Interval	RT Intertie Nodal Price	RT Intertie Settlement Price	RT Intertie Congestion Price	RT Energy Payment
1	130	130	0	\$1,083.33
2	130	130	0	\$1,083.33
3	130	130	0	\$1,083.33
4	130	130	0	\$1,083.33
5	130	130	0	\$1,083.33
6	130	130	0	\$1,083.33
7	130	130	0	\$1,083.33
8	130	130	0	\$1,083.33
9	130	130	0	\$1,083.33
10	130	130	0	\$1,083.33
11	130	130	0	\$1,083.33
12	130	130	0	\$1,083.33
Avg \$130		Avg \$75	Avg \$0	\$13,000

Import Example 3 - continued

Settlement:

- Import paid \$13,000 in RT energy payments.
- RT intertie price not capped at the pre-dispatch intertie price since the intertie is not congested
- No IOG required since import paid more than offer price of \$100

Import Example 4 – no DA, PD Import Congested

DAM: Import not scheduled in DAM & no DA intertie congestion

Predispatch:

- Import scheduled at 100 MW
- Predispatch Intertie Nodal Price clears at \$120/MWh and is import congested
- Import will be paid lesser of RT or pre-dispatch (\$120) Intertie nodal price

Real-time: prices decrease compared to PD

Import Example 4 – PD import congestion

Interval	RT Intertie Nodal Price	RT Intertie Settlement Price	Implied RT Intertie Congestion Price	RT Energy Payment
1	150	120	-30	\$1000.00
2	130	120	-10	\$1,000.00
3	100	100	0	\$833.33
4	90	90	0	\$750.00
5	80	80	0	\$666.67
6	70	70	0	\$583.33
7	60	60	0	\$500.00
8	60	60	0	\$500.00
9	50	50	0	\$416.67
10	40	40	0	\$333.33
11	35	35	0	\$291.67
12	35	35	0	\$291.67
Avg \$75		Avg \$72	Avg -\$3	\$7166.67

Import Example 4 - continued

Settlement:

- Import is paid \$7,167 in RT energy payments.
- IOG of \$2,833 also paid to keep import whole to offer price of \$100 on 100 MW scheduled.
- Total payments: \$10,000 which equal offered cost of 100 MW at \$100/MWh

Summary

- Participation in DAM offers opportunity to receive financially binding import and export schedules and avoid impact of pre-dispatch congestion
- DAM intertie FTRs provide means to hedge DA intertie congestion
- IOG can help imports recover offer price
- These mechanisms (DA participation, IOG, DA FTRs) help address concerns identified

Next Steps

- The IESO encourages stakeholders to provide feedback, including questions and concerns, on these and other potential trading scenarios
- Feedback is requested by June 21, 2018
- The IESO will also schedule a conference call in the near term to provide a forum for participants to discuss the topic with the IESO
- Additional intertie trading examples will also be brought forward at future SE sessions