

Scheduling Wheels in EDAC

Settlements Design Working Group Meeting
June 4, 2009

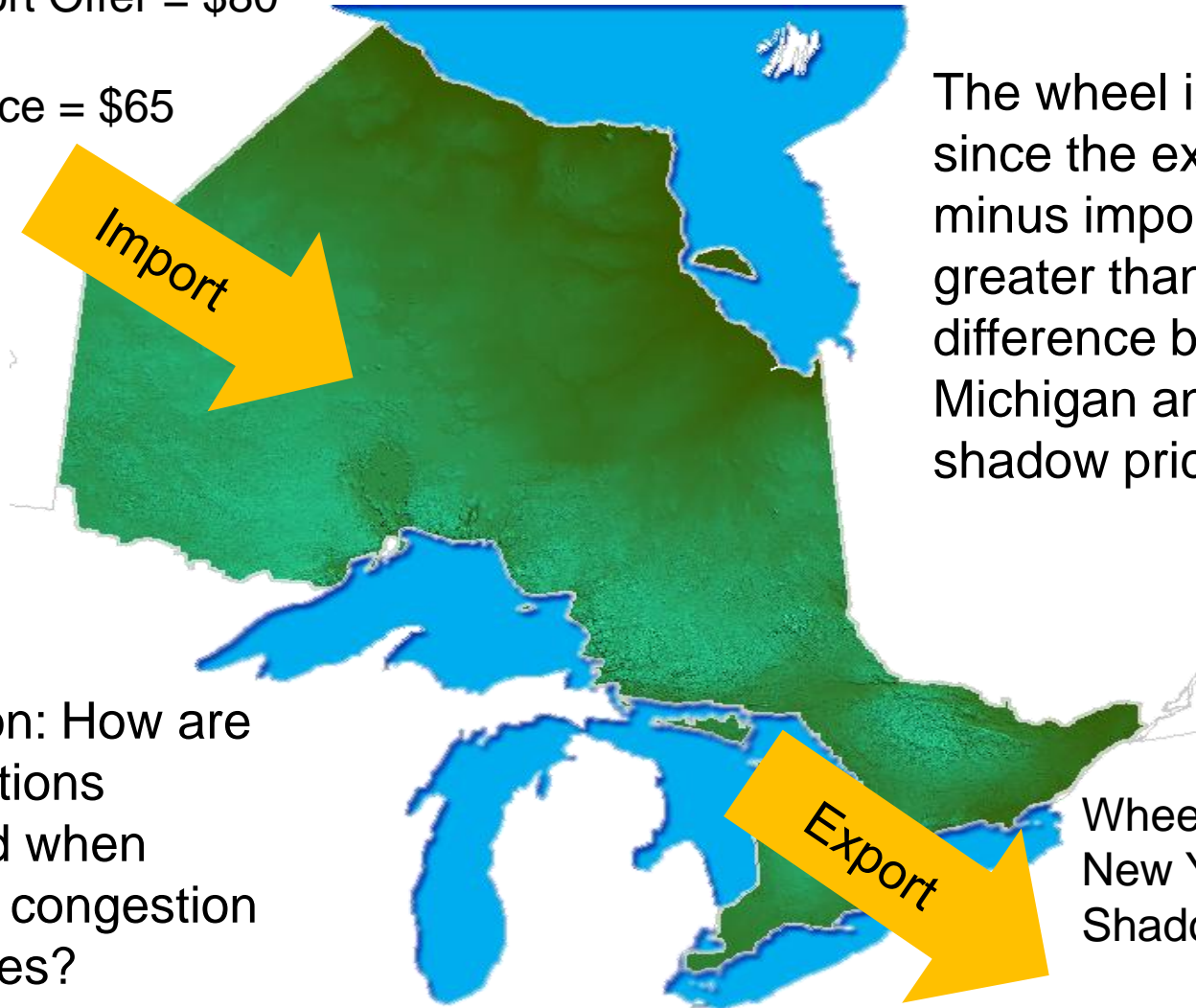


- Import offer and export bid are individually submitted
- The wheel is scheduled if:
DA Bid – DA Offer \geq Export Shadow Price – Import Shadow Price
- The wheel is scheduled based on the price difference between the export bid and import offer

Wheel Import Offer = \$80

Michigan

Shadow Price = \$65



The wheel is scheduled since the export bid minus import offer is greater than the difference between the Michigan and New York shadow prices

Question: How are transactions handled when there is congestion at the ties?

Wheel Export Bid = \$90
New York
Shadow Price = \$70

Example – Congestion

Wheel Import Offer = \$80

Michigan

Shadow Price = \$65

Other
Import



Let's say the tie at Michigan is congested and there is also another import offer at that tie. How would the wheel be assessed against this other import?

Answer: By scheduling the wheel, there is a gain from trade of \$5/MW. In order for the other import to be scheduled, the gain from trade would have to be greater. It would have to be offered at least to the shadow price at the Michigan tie and offset internal generation that is \$5/MW more expensive than its offer.

Wheel Export Bid = \$90

New York

Shadow Price = \$70

- In real-time wheels are recognized by
 - Bidding export portion at +MMCP
 - Offering import portion between -\$50 and -MMCP
 - NERC tag ID with WI and WX prefixes for the import and export transactions respectively
- Since, in real-time, the import and export parts of the wheel are each assessed individually and not by the bid/offer difference, wheels will also be bid and offered in the same manner

Day Ahead Failure Charge for Linked Wheels



- DA linked wheels are not available today because exports are not scheduled in DACP
- Linked wheels for the real-time market are individually scheduled based on the respective bids and offers for export and import transactions of the wheel
- Individual failure charges are applied to each export and import transaction of the failed wheel that is not exempt from bona fide or legitimate reasons

- Failure charges for non-linked transactions are assessed based on prices
 - Since these failures of imports/exports scheduled in pre-dispatch may impact HOEP
- Failures of linked wheels do not directly impact the HOEP
 - However, indirectly these failures have the effect by displacing other transactions on the interties where the wheels were scheduled in EDAC
 - The day-ahead wheel could have created congestion that limited the scheduling of other transactions in EDAC
- The DA linked-wheel failure charge is assessed based on the cost of congestion between the interties where the wheeling transactions were scheduled

- DA price spread to measure congestion between the import source intertie and the export sink intertie in EDAC

$(\text{DA Shadow Price at Export Sink}) - (\text{DA Shadow Price at Import Source})$

- Pre-dispatch price spread to measure the same congestion at pre-dispatch

$(\text{PD-1 Shadow Price at Export Sink}) - (\text{PD-1 Shadow Price at Import Source})$

- If the price DA price spread is greater than the pre-dispatch price spread, congestion was created in EDAC that limited the scheduling of other transactions
 - The DA linked wheel failure charge then applies

- When the DA price spread is greater than the pre-dispatch price spread, the DA linked wheel failure charge is calculated as:

$$(\text{DA Price Spread} - \text{PD-1 Price Spread}) \times (\text{MW Deviation})$$

- Where the MW deviation is:

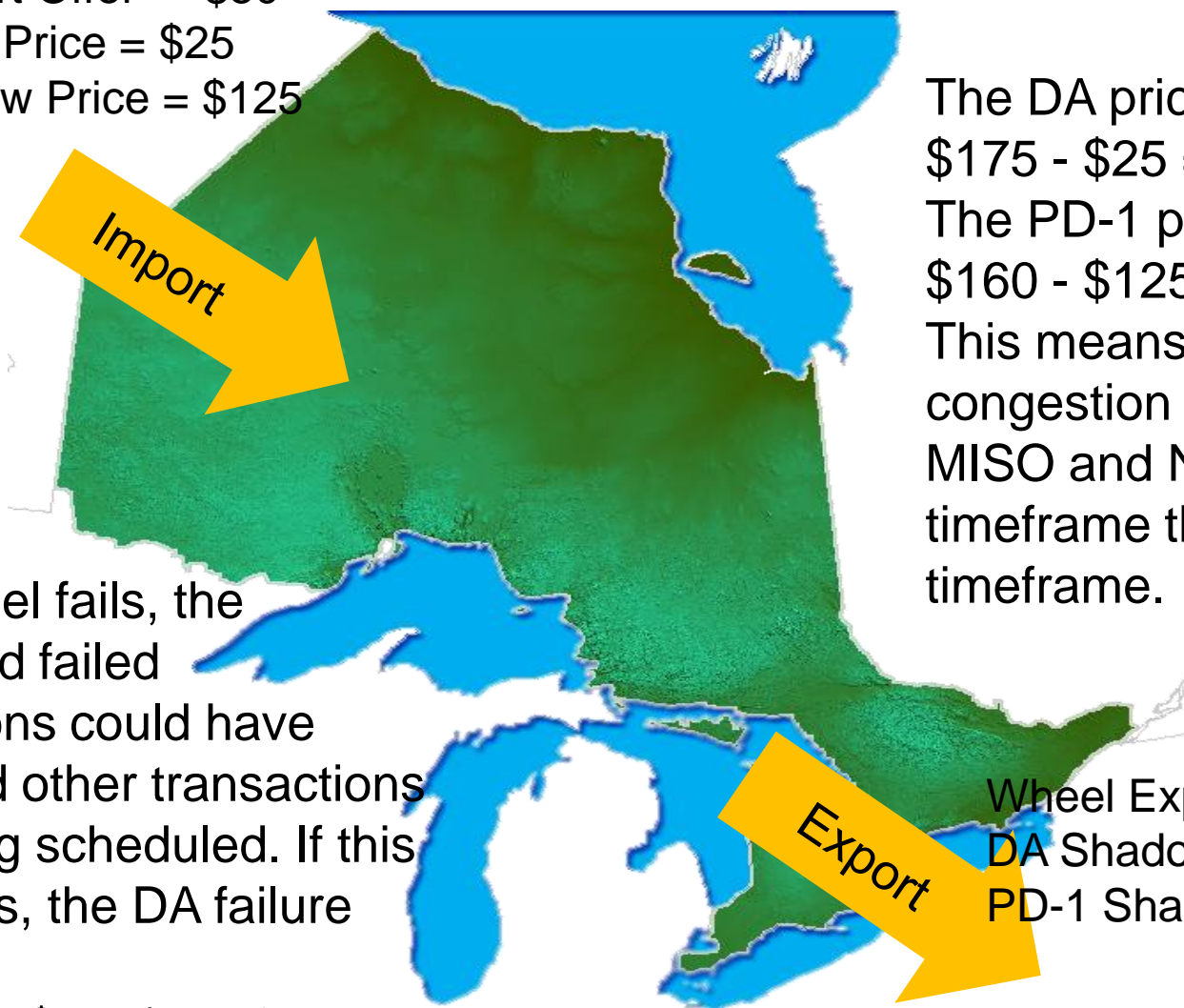
Maximum of

(DA import schedule – PD-1 import schedule)

and

(DA export schedule – PD-1 export schedule)

Wheel Import Offer = -\$50
DA Shadow Price = \$25
PD-1 Shadow Price = \$125



The DA price spread is
 $\$175 - \$25 = \$150$
The PD-1 price spread is
 $\$160 - \$125 = \$35$
This means there is more
congestion between
MISO and NY in the DA
timeframe than the PD-1
timeframe.

If the wheel fails, the
associated failed
transactions could have
prevented other transactions
from being scheduled. If this
wheel fails, the DA failure
charge is:

$\$150 - \$35 = \$115/\text{MW failed}$

Wheel Export Bid = \$2000
DA Shadow Price = \$175
PD-1 Shadow Price = \$160

- When the difference between a linked wheel's DA to PD-1 intertie price spread is positive, it is possible that a participant would have the incentive to allow the linked wheel transactions to fail in real-time, rather than in pre-dispatch as real-time failure charges would likely to be lower
- Transactions that fail in real-time could have a greater adverse impacts to reliability and the market because it is not possible to schedule other imports and exports in real-time
- To remove this incentive, there will be an upper bound on the DA linked wheels failure charge

- The DA linked wheel failure charge becomes:

Minimum of

(DA Price Spread – PD-1 Price Spread) × (MW Deviation)

and

Maximum of
(RT Import Failure Charge)
and
(RT Export Failure Charge)

Day-Ahead Linked Wheel Settlement Example

DA schedule	100
PD -1 schedule	0
Spread Price Difference	\$1,000
MWh deviation	100
DA preliminary Failure Charge	\$100,000
RT Import Failure Charge (RT_IFC)	\$20,000
RT Export Failure Charge (RT_EFC)	\$0
RT Failure Charge (max(RT_IFC, RT_EFC))	\$20,000
DA Failure Charge with CAP	\$20,000

- Failure charges will be applied to linked wheels when the following conditions are met:
 1. DA linked wheel schedules from EDAC calculation engine are received
 2. The corresponding PD-1 schedules are less than that for DA
 3. DA Price Spread > PD-1 Price Spread
 4. Transaction failures are not due to bona fide or legitimate reasons