Coordinated Transactions Scheduling (CTS) Training

Using CTS as an ISO New England (ISO-NE) Market Participant

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Note this presentation was updated on 11/2/2015. Impacted slides are 15, 16, and 17.
Topics

• Background
• Summary and examples of CTS process
• Submitting external transactions
• Spread bid example
• Day-ahead market (DAM) impacts
• Forward Capacity Market (FCM) impacts
• Prices, Constraints, and Publishing
• Settlements
Background
Background

Coordinated Transaction Scheduling (CTS):  
• Result of joint New York and New England stakeholder process to improve the market efficiency of external transactions between the NY and NE regions  

• Inefficient scheduling root causes were identified:  
  – **Latency delay:** Time delay between when tie is scheduled and when power flows, during which time system conditions and LMPs may change  
  – **Non-economic clearing:** ISOs evaluate tie schedule requests without economic coordination, producing inefficient schedules  
  – **Transaction costs:** Fees and charges levied by each ISO on external transactions serve as a disincentive to engage in trade, impeding price convergence, and raising total system costs
Coordinated Transaction Scheduling (CTS):

- CTS features:
  - Scheduling every 15 minutes
  - New external transaction format, interface bid
  - Coordinated economic clearing
  - Eliminates fees and charges for interface bids

- To be implemented at NY Northern AC external interface (.I.ROSETON 345)
Background, continued

• Interface bid
  – “A unified real-time bid to simultaneously purchase and sell energy on each side of an external interface for which the enhanced scheduling procedures...” are implemented
  • Eliminates requirement for separate transactions to be submitted to each ISO in real time
  – Contains direction, bid quantity, and bid price
  – Bid price indicates the price between the two regions that the participant is willing to accept

• Coordinated economic clearing between the two regions
  – Facilitates flow of power from the region with the lower LMP to the region with the higher LMP
  – NYISO performs clearing of interface bids, which includes forecasted price of ISO-NE supply
• Whitepaper: Inter-Regional Interchange Scheduling: Analysis and Options

• Joint Stakeholder Meeting Materials
  – 2/14/2011
    • Examples of general concepts
    • Examples of DAM to RTM settlement
  – 3/7/2011
    • Examples of congestion between DAM to RTM
  – 4/28/2011
    • Examples of latency risk
Summary and Examples of CTS Process
General Iterative Process

NYISO (RTC) Sandy Pond proxy
- Clear bids
- Calculate External Interface Congestion
- Produce net interchange for future intervals

ISO-NE
- Calculate Supply Curves for future intervals
- Calculate Reliability Limits for future intervals

NY and NE Market Participants Submit bids

Each ISO operates in RT and produces RT prices
Each ISO performs independent settlement

RTC = Real-time commitment

- Relates to future time intervals
- Relates to real-time
- Relates to settlement
ISO-NE calculates and provides data every 15 minutes to NYISO including:

- Forecasted prices at Roseton representing the sensitivity to change in flow on the CTS interface
- Forecasted reliability limits representing constraints that cannot be modeled directly by NYISO
  - Indicates limit on ability to export, or a required import, considering reserve requirements
  - Indicates limit on ability to import considering back down room on internal generation
CTS Process, NYISO RTC Clearing

• NYISO RTC runs every 15 minutes for 2-1/2 hour duration (ten 15 minutes intervals)

• Optimizes economics combining CTS interface bids with ISO-NE forecasted supply prices

• Limitations on economic solution
  – Transfer limits considered are most restrictive of normal transfer limits and reliability limits sent by ISO-NE
  – Ramp limits
    • CTS interface limit = 200 MW every 15 minutes
    • NYISO system wide limit = 700 MW every hour
CTS Process General Example

ISO-NE Gen Stack

$S^{NE}$

NYISO Gen Stack

$+$ interface bid stack

$S^{NY}$

LMP$^{NY}$

LMP$^{NE}$

Intertie Schedule (MW)

CTS Tie Schedule

0 MW

Westbound Flows

Eastbound Flows
Example considering one interval in time

- **Input:**
  - NYISO forecasted net interchange = -500 MW (into NE)
  - AT that net interchange, ISO-NE Total Operating Reserve surplus = 800 MW
    - where, Surplus = Total Operating reserve available - Total Operating reserve required
  - Reliability Limit = -500 + 800 = 300 MW
    - ISO-NE can support up to 300 MW of export to NYISO and still maintain Total Operating Reserve requirements

- **RTC solution range = 300 MW export to 1400 MW import**
External Interface Congestion

- If a constraint binds on the CTS interface in the NYISO RTC solution, the resulting congestion is split between the two ISOs depending on the constraint that is binding.

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal transfer limits</td>
<td>50/50</td>
</tr>
<tr>
<td>CTS interface ramp limit</td>
<td>50/50</td>
</tr>
<tr>
<td>NYCA ramp limit</td>
<td>100% NY</td>
</tr>
<tr>
<td>Reliability limits</td>
<td>100% NE</td>
</tr>
</tbody>
</table>

- ISO-NE incorporates this congestion into the final Roseton LMP.
Scenario: Price cannot be equalized at full TTC

RTC results:
- Scheduled flow = -1400 MW to NE
- Marginal interface bid = $4/MWh
- NYISO Sandy Pond LBMP = $61/MWh
- ISO-NE scheduling price = $65/MWh
- Assume external congestion due to flow limit = -$12/MWh
- With RTC result, NYISO internal scheduling price = $61 + (-$12) = $49

Settlement occurs at RT prices (assume consistent with RTC):
- NYISO RT Sandy Pond LBMP = 49 – (-$12/2) = $55/MWh
- ISO-NE RT LMP = $65 + (-$12/2) = $59/MWh
- All bids settle at $59 - $55 = $4/MWh

Note: External congestion is due to a normal transfer limit, split 50/50
External Interface Congestion, Reliability Limit Example

Scenario: ISO-NE sends a reliability limit for minimum generation with a maximum import to NE of -400 MW

RTC results:
- Scheduled flow = -400 MW to NE, constrained by reliability limit
- Marginal interface bid = $2/MWh
- NYISO Sandy Pond LBMP = $21/MWh
- ISO-NE scheduling price = $23/MWh
- External congestion due to flow limit = -$8/MWh
- With RTC result, NYISO internal scheduling price = $21 + (-$8) = $13

Settlement occurs at RT prices (assume consistent with RTC):
- NYISO RT Sandy Pond LBMP = $13 + 0 = $13/MWh
- ISO-NE RT LMP = $23 + (-$8) = $15/MWh

Note: External congestion is due to a reliability limit, 100% to ISO-NE
External Interface Congestion, Reliability Limit Example

Scenario: ISO-NE sends a reliability limit for 30 Min reserves requiring a minimum import to NE of -400 MW

RTC results:
- Scheduled flow = -400 MW to NE, constrained by reliability limit
- Marginal interface bid = $4/MWh
- NYISO Sandy Pond LBMP = $56/MWh
- ISO-NE scheduling price = $60/MWh
- External congestion due to flow limit = $22/MWh
- With RTC result, NYISO internal scheduling price = $56 + ($22) = $78

Settlement occurs at RT prices (assume consistent with RTC):
- NYISO RT Sandy Pond LBMP = $78 + 0 = $78/MWh
- ISO-NE RT LMP = $60 + ($22) = $82/MWh

Note: External congestion is due to a reliability limit, 100% to ISO-NE

Slide added on 11/2/2015
Questions
Submitting External Transactions
Day-Ahead Market Transactions

• Transactions are submitted to NY and NE separately

• All DAM transactions must continue to be submitted to Enhanced Energy Scheduling (EES)

• No change for transactions on non-CTS interfaces

• For CTS interface, DAM transactions now require:
  – eTag ID
  – Import resource, if applicable
Real-Time Market Transactions

• On CTS interface, all transactions must be submitted into NYISO Joint Energy Scheduling System (JESS)

• For imports and exports on CTS interface, transactions cannot be submitted into EES
  – One exception is for import capacity resources backed by generation wheeling through NYISO

• No change for transactions on non-CTS interfaces

• No change for transactions wheeling through ISO-NE
## Transaction Submittal Software

### CTS Interface
- **ALL**, **Add: eTag ID, Import Capacity Resource ID**
- **ONLY:**
  - a) Wheeling through ISO-NE
  - b) Import Capacity Resource that is wheeling through NYISO

### Non-CTS Interface
- **ALL**

### EES
<table>
<thead>
<tr>
<th>DAM</th>
<th>RTM</th>
</tr>
</thead>
</table>
| ALL | ONLY:
  - a) Wheeling through ISO-NE
  - b) Import Capacity Resource that is wheeling through NYISO |

### JESS
<table>
<thead>
<tr>
<th>RTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
</tr>
</tbody>
</table>

**Non-CTS Interface** not applicable
Access to JESS

• NYISO hosting the JESS bidding platform

• ISO-NE digital certificate provides comparable access to JESS
  – No separate NYISO JESS application access is required in CAMS

• NYISO JESS access is determined from EES role in CAMS
  – 10 digit phone number (no extension) required to setup NYISO JESS password

• User must establish a password upon initial entry into NYISO JESS
High Level JESS Features

• Either ISO-NE or NYISO participant can create/modify bid

• All submittals require confirmation by other company
  – If confirmation not received the Bid is not evaluated

• Trust Relationships can be setup between ISO-NE or NYISO companies to ‘auto confirm’
## Actions Required Today vs. Tomorrow

<table>
<thead>
<tr>
<th>Task</th>
<th>Today</th>
<th>Tomorrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>eTag</td>
<td>NE or NY FRP create eTag</td>
<td>no change</td>
</tr>
<tr>
<td>DA NY</td>
<td>NY FRP submit in JESS</td>
<td>no change</td>
</tr>
<tr>
<td>DA NE</td>
<td>NE FRP submit in EES</td>
<td>no change</td>
</tr>
<tr>
<td>RT NY</td>
<td>NY FRP submit in JESS</td>
<td>NY FRP, no change OR NY FRP confirms*</td>
</tr>
<tr>
<td>RT NE</td>
<td>NE FRP submit in EES</td>
<td>NE FRP confirm in JESS* OR NE FRP submits in JESS</td>
</tr>
</tbody>
</table>

*Confirmation can occur through one-time setup of Trust Relationship
RTM Bids in JESS

- JESS bid types

<table>
<thead>
<tr>
<th>Bid Type</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Min CTS</td>
<td>NY ➔ NE, NE➔NY</td>
</tr>
<tr>
<td>Hourly CTS</td>
<td>NE Wheel</td>
</tr>
<tr>
<td>Hourly LBMP</td>
<td>NY Wheel</td>
</tr>
</tbody>
</table>

- 15 minute CTS bids must be one hour long
  - MW and price may vary at 15 minute level
  - Normally evaluated every 15 minutes

- Hourly CTS, hourly LBMP must be one hour long
  - MW and price must be constant over the hour
  - Evaluated once an hour
RTM Bids in JESS, continued

• Price for all bids in JESS must be between -$1000 and $1000

• Generation Information System (GIS) ID field in JESS allows entry of GIS ID
  – Comparable to special exception option “Generation Information System” in EES

• Submittal deadline for all bids in JESS is 75 minutes prior to the start of the hour
• Bids submitted into NYISO JESS will not be visible in ISO-NE EES software
• Bids and resulting schedules can be downloaded directly from JESS
  – Information available in JESS for 10 days
There are no changes to the EES file upload/download format.

Existing file upload format supports the inclusion of the eTag ID and import resource special exception on DAM transactions:
- ISO-NE validations of the file upload document are modified accordingly.
Questions
Interface Bid Example
**Interface Bid Example**

**Scenario: Transaction from NYISO to ISO-NE only in RTM**

<table>
<thead>
<tr>
<th>Pre-CTS</th>
<th>Post-CTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants submit:</strong></td>
<td><strong>Participants submit:</strong></td>
</tr>
<tr>
<td>• ISO-NE participant submits fixed export to ISO-NE RTM</td>
<td>• CTS Interface Bid NE→ NY at price = $3</td>
</tr>
<tr>
<td>• NYISO participant submits priced import to NYISO RTM, say $28</td>
<td></td>
</tr>
<tr>
<td><strong>RTC results:</strong></td>
<td><strong>RTC results:</strong></td>
</tr>
<tr>
<td>• Forecasted NYISO price = $30, transaction clears, scheduled in RT</td>
<td>• Forecasted ISO-NE price = $26</td>
</tr>
<tr>
<td>• Forecasted NYISO price = $20</td>
<td>• Forecasted NYISO price = $20</td>
</tr>
<tr>
<td><strong>Possible financial outcome:</strong></td>
<td><strong>Outcome:</strong></td>
</tr>
<tr>
<td>• ISO-NE RTM price = $34</td>
<td>$20-$26 = -$6 &lt; $3</td>
</tr>
<tr>
<td>• NYISO RTM price = $30</td>
<td>Transaction would not be cleared by NYISO RTC</td>
</tr>
<tr>
<td>• Net = -$4 [NYISO clearing does not take into account ISO-NE prices]</td>
<td></td>
</tr>
</tbody>
</table>
Interface Bid Scenario

Scenario: CTS bids from NYISO to ISO-NE only in RTM

Participants submit:
- CTS Interface Bid NY → NE at price = $3/MWh

RTC results for one interval:
- Forecasted NYISO price = $20/MWh, forecasted ISO-NE price = $25/MWh
  - Forecasted price difference = $25 − $20 = $5/MWh
- Transaction is cleared by NYISO RTC

Settlement outcome examples:
- Settlement based on final RTM prices in both ISO-NE and NYISO

<table>
<thead>
<tr>
<th></th>
<th>RTM Prices as Forecasted</th>
<th>RTM Prices Not as Forecasted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15 Minute LMP ($/MWh)</td>
<td>15 Minute LMP ($/MWh)</td>
</tr>
<tr>
<td>NYISO RTM prices</td>
<td>$20</td>
<td>$24</td>
</tr>
<tr>
<td>ISO-NE RTM prices</td>
<td>$25</td>
<td>$25</td>
</tr>
<tr>
<td>Net</td>
<td>25 − 20 = $5</td>
<td>25 − 24 = $1</td>
</tr>
</tbody>
</table>
Questions
Day-Ahead Market (DAM) Impacts
Submitting External Transactions

- Transactions on CTS interface continue to be submitted to NYISO and ISO-NE separately
- ISO-NE DAM transactions on CTS interface now require:
  - eTag ID
  - Import Resource ID, if applicable
DAM Clearing

- NYISO and ISO-NE continue to clear DAM independently
- Clearing at the CTS interface, Roseton PNode is modified to allow congestion due to external interface constraints
  - Congestion due to bids and offers at external node will be reflected in DAM clearing when the external interface constraint is binding
**DAM Clearing Import Example**

- Import transfer limit 800 MW
- System LMP (no internal constraints) = $40 /MWh

**Settlement MIS Report Sign Convention**

<table>
<thead>
<tr>
<th>Import = + MWh</th>
<th>Export = - MWh</th>
<th>Payments = + $</th>
<th>Charges = - $</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pre-CTS

<table>
<thead>
<tr>
<th>Submitted to DAM (MW)</th>
<th>Cleared MW</th>
<th>Roseton LMP $/MWh</th>
<th>Energy Settlement</th>
<th>NCPC Settlement</th>
<th>Total Energy + NCPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fixed Imports</td>
<td>1000</td>
<td>40</td>
<td>$40,000</td>
<td>$(28,000)</td>
<td>$12,000</td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counterflow Export</td>
<td>-200</td>
<td>40</td>
<td>$(8,000)</td>
<td>28,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>-200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Post CTS Implementation

<table>
<thead>
<tr>
<th>Cleared MW</th>
<th>Roseton LMP $/MWh</th>
<th>Energy Settlement</th>
<th>NCPC Settlement</th>
<th>Total Energy + NCPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>-100</td>
<td>$(100,000)</td>
<td>$ -</td>
<td>$(100,000)</td>
</tr>
<tr>
<td>-200</td>
<td>-100</td>
<td>$20,000</td>
<td>$ -</td>
<td>$20,000</td>
</tr>
</tbody>
</table>

- Fixed imports are treated as -$150/MWh in DAM clearing
DAM Clearing Export Example

- Export transfer limit 700 MW
- System LMP (no internal constraints) = $50 /MWh

<table>
<thead>
<tr>
<th>Submitted to DAM (MW)</th>
<th>Pre-CTS</th>
<th>Post CTS Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cleared MW</td>
<td>Roseton LMP $/MWh</td>
</tr>
<tr>
<td>Total Fixed Exports -1000</td>
<td>-1000</td>
<td>50</td>
</tr>
<tr>
<td>Counterflow Import 300 @ $500/MWh</td>
<td>300</td>
<td>50</td>
</tr>
</tbody>
</table>

- Fixed exports are treated as $1000/MWh in DAM clearing

<table>
<thead>
<tr>
<th>Settlement MIS Report Sign Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import = + MWh</td>
</tr>
<tr>
<td>Export = - MWh</td>
</tr>
<tr>
<td>Payments = + $</td>
</tr>
<tr>
<td>Charges = - $</td>
</tr>
</tbody>
</table>
Questions
Forward Capacity Market (FCM) Impacts
Import Capacity Resource with Capacity Located in NYISO

Obligations

• Obligation to submit ISO-NE DAM transaction in EES continues and must now include reference to:
  – eTag
  – Import Capacity Resource ID

• Obligation to submit ISO-NE RTM transaction in EES is eliminated
  – No RTM External Transaction required or accepted in EES

• Generator supporting the import capacity resource maintain obligation in NYISO as if it is a capacity resource in NYISO
Import Capacity Resource with Capacity Located in NYISO

Evaluation of Obligations

- Failure to Offer evaluation in DAM unchanged
- Failure to Offer evaluation in RTM no longer applicable
- Failure to Deliver evaluation triggered if RT net interchange less than capacity requested by ISO
  - ISO-NE does not request capacity from NYISO unless system needs to be importing to maintain Total Operating Reserves
- Shortage event trigger is unchanged
Import Capacity Resource with Capacity Wheeling through NY

- Obligation to submit DAM and RTM transactions to EES is unchanged
  - Must submit NY Wheel transaction into JESS, same as today
- Failure of Offer evaluation in DAM and RTM is unchanged
- Failure to Deliver evaluation is unchanged
- Shortage event evaluation is unchanged
Questions
Prices, Constraints, and Publishing
Roseton price will be available for three types of intervals:

- 5-minute
- 15-minute
- Hourly
Roseton RT Price Calculation and Finalization, continued

• **5-minute price** comes from the ISO-NE LMP calculator and does not include the CTS congestion

• **Hourly** and four, 15-minute prices are calculated after the hour is passed and will include CTS congestion

• **15-minute price** is calculated in two steps:
  – Use time-weighted formula to calculate a base LMP, by using the three, 5-minute LMPs calculated by ISO-NE LMP Calculator for this interval
    • Similar to current method of calculating hourly real-time LMPs
  – Apply the external congestion adder that is applicable to this 15-minute interval to calculate the final LMP

*Hourly and 15-minute prices are reviewed and finalized in accordance with Market Rules*
Web Publishing of *Preliminary* External Constraints and Roseton Prices

- Preliminary external constraints, including constraint name and shadow prices, are published as soon as they are received from NYISO, usually before the interval begins
  - If shadow price exceeds the ISO-NE established thresholds, no constraint information is published for that interval
- Preliminary Roseton 5-minute, 15-minute, and hourly prices are published shortly after they are calculated
  - Preliminary data may not be published if the calculated values exceed ISO-NE established thresholds
- Preliminary external constraint, Roseton 5-minute, 15-minute, and hourly prices are available from both ISO Express and web services
Web Publishing of *Final* External Constraints and and Roseton Prices

- Final external constraints, Roseton 15-minute and hourly prices are published as soon as they are approved
- Final external constraints, Roseton 15-minute and hourly prices are available from both ISO Express and web services
Settlements

Jin Thian
Supervisor, Monthly Markets
Two broad categories of real-time transactions at CTS location:

1. Coordinated External Transaction (CET)
2. Non-CET

Please note that all information contained within this presentation relates to Roseton.
Coordinated External Transaction (CET)

CET in RTM is an interface bid between NYISO and ISO-NE energy markets

New York Export & New England Import

New England Export & New York Import
Non-CET: A wheeling transaction through one or more control areas

- New England may be source, sink, or “in the middle”

Examples:
1. NE→NY→PJM
2. HQ→NY→NE
3. NB→NE→NY
Real-Time Energy Settlement Changes for CTS

CTS location settlement interval will be 15 minutes

• 15 minute settlement interval at the CTS interface will be reported in a dedicated section of the *Real-Time Energy Market Locational Summary* report
• All real-time transactions at the CTS interface will be presented in this 15-minute reporting section: both CETs and non-CETs
• 15 minute data will be “rolled up,” and presented at the standard hour interval in the *Real-Time Energy Market Locational Summary* report
### 15 Minute Reporting

| Interval | DA MW | RT CET MW | Deviations MW RT - DA | 15 min. LMP $/MWh | $ for Interval
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7:15</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>$50</td>
<td>$1250</td>
</tr>
<tr>
<td>7:30</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>$60</td>
<td>$1500</td>
</tr>
<tr>
<td>7:45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>$70</td>
<td>$0</td>
</tr>
<tr>
<td>8:00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>$80</td>
<td>$0</td>
</tr>
</tbody>
</table>

Note: This is a conceptual representation of the settlement report.

### Hourly Reporting

<table>
<thead>
<tr>
<th>Hour Ending</th>
<th>DA</th>
<th>RT CET</th>
<th>Deviation</th>
<th>LMP</th>
<th>$ for Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>0</td>
<td>50</td>
<td>50</td>
<td>$65</td>
<td>$2750</td>
</tr>
</tbody>
</table>

**Note:** This is a conceptual representation of the settlement report.
Real-Time Example – **With** Day-Ahead Activity

### 15 Minute Reporting

<table>
<thead>
<tr>
<th>Interval</th>
<th>DA MW</th>
<th>RT CET MW</th>
<th>Deviations $\text{MWRT-DA}$</th>
<th>15 min. LMP $/\text{MWh}$</th>
<th>$\text{for Interval}$ Deviations x 15 min. LMP / 4 $/\text{MWh}$ $/\text{for Interval}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:15</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>$50</td>
<td>$0</td>
</tr>
<tr>
<td>7:30</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>$60</td>
<td>$0</td>
</tr>
<tr>
<td>7:45</td>
<td>100</td>
<td>0</td>
<td>-100</td>
<td>$70</td>
<td>-$1750</td>
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<tr>
<td>8:00</td>
<td>100</td>
<td>0</td>
<td>-100</td>
<td>$80</td>
<td>-$2000</td>
</tr>
</tbody>
</table>

**Sum / 4**

### 0 MW – 100 MW

$\text{RT CET DA Deviations}$

$\text{-100 MW x $70/MWh = -$7000 Deviations LMP $/hour}}$

$\text{-$7000 / 4 = -$1750 / MWh \$ for Interval}$

**Sum**

### Hourly Reporting

<table>
<thead>
<tr>
<th>Hour Ending</th>
<th>DA</th>
<th>RT CET</th>
<th>Deviation</th>
<th>LMP</th>
<th>$\text{for Hour}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>100</td>
<td>50</td>
<td>-50</td>
<td>$65</td>
<td>-$3750</td>
</tr>
</tbody>
</table>

*Note: This is a conceptual representation of the settlement report.*
ISO-NE Settlement is for New England Activity Only

<table>
<thead>
<tr>
<th>NYISO Settlement</th>
<th>ISO-NE Settlement</th>
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<tbody>
<tr>
<td>New York export</td>
<td>New England import</td>
</tr>
<tr>
<td>New York import</td>
<td>New England export</td>
</tr>
</tbody>
</table>
Other Settlement Changes for CTS

- CETs not eligible for Net Commitment Period Compensation (NCPC) payments
- CETs exempt from cost allocation in the energy and ancillary services market
  - Day-ahead and real-time NCPC uplift
  - Regulation market charges
  - Inadvertent energy, marginal loss revenue, and emergency energy transactions
- CETs exempt from the cost allocators for ISO Self Funding Tariff Schedules 1-3, and from the cost allocator for Open Access Transmission Tariff (OATT) Schedule 2

For more detailed information, please refer to the appendix.
Before CTS, at Roseton node:
If a fixed transaction at Roseton exceeds the total transfer capability (TTC) in day-ahead, all transactions at Roseton pay the NCPC for counterflow

Under CTS, at Roseton node
If a fixed transaction at Roseton exceeds the total transfer capability (TTC) in day-ahead, the counterflow bids/offers set the LMP

All imports could clear as low as -$150 (import charged in energy market)

All exports could clear as high as $1000

See slides 36-38 for numerical examples.
FCM Settlement Changes for CTS

Forward Capacity Market (FCM) import resource backed by generation in New York with obligation at Roseton location

- FCM external transaction offer requirements

Day-Ahead Market

No change; note that EES submittal must include certain new information

Real-Time Market

- Real-time transaction requirement eliminated
- Generation in NY must be offered as a capacity resource in the NYISO market

- FCM external transaction delivery requirements
  - FCM settlement change, where failure to deliver penalty incurred only if total energy delivered by the NYISO to ISO-NE constrained

- Shortage event availability
  - FCM settlement change, availability will be determined based on operation of NY generation associated with the import
FCM import resources backed by generation wheeled from another control area through New York, with obligation at Roseton location, will be subject to requirements and settlement evaluation which are unchanged for CTS
Wrap-Up – Settlement Reporting Changes

• Real-Time Energy Market reporting will be updated for 15-minute settlement interval sections

• Other market service reports will be updated with additional columns to reflect the cost allocation determinants after exclusion of CETs

• Detail of all MIS report changes will be provided at least 30 days prior to implementation of CTS project
Questions
Appendix
CET exclusion from market cost allocations

- Energy Market
  - Inadvertent Energy, Marginal Loss Revenue, Emergency & Security Energy
- Net Commitment Period Compensation (NCPC)
  - Day-Ahead and Real-Time
    - Economic, Local Second Contingency Protection Resource, Voltage Support (VAR)
  - Posturing/Cancelled Starts/Hourly Shortfall
- Regulation
- MIS reports will have new columns for cost allocation determinants
CTS – Market Settlement Impacts
Cost Allocation Exclusion – Tariff Charges

CET exclusion from Tariff charges

- ISO Self Funding Tariff
  - Schedule 1, CET MW excluded from Through or Out (TOUT)
  - Schedule 2, CET hourly blocks excluded from Transaction Units
  - Schedule 2, CET import/export energy excluded from Volumetric charges
  - Schedule 3, CET MW excluded from TOUT

- Open Access Transmission Tariff (OATT)
  - Schedule 2, CET excluded from TOUT for VAR charges

- MIS reports will display determinants calculated with CET exclusion
Customer Support Information

**Ask ISO** (preferred)

- Self-service interface for submitting inquiries
- Accessible through the SMD Applications Homepage
- Requires a valid digital certificate with the role of Ask ISO/External User (Contact your security administrator for assistance)

<table>
<thead>
<tr>
<th>Other Methods of Contacting Customer Support</th>
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<tbody>
<tr>
<td><strong>Method</strong></td>
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<tr>
<td>Email</td>
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<tr>
<td>Phone*</td>
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<tr>
<td>Pager</td>
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*Recorded/monitored conversations*
Evaluations