

Enhanced Interregional Transaction Coordination: *Concept Update*

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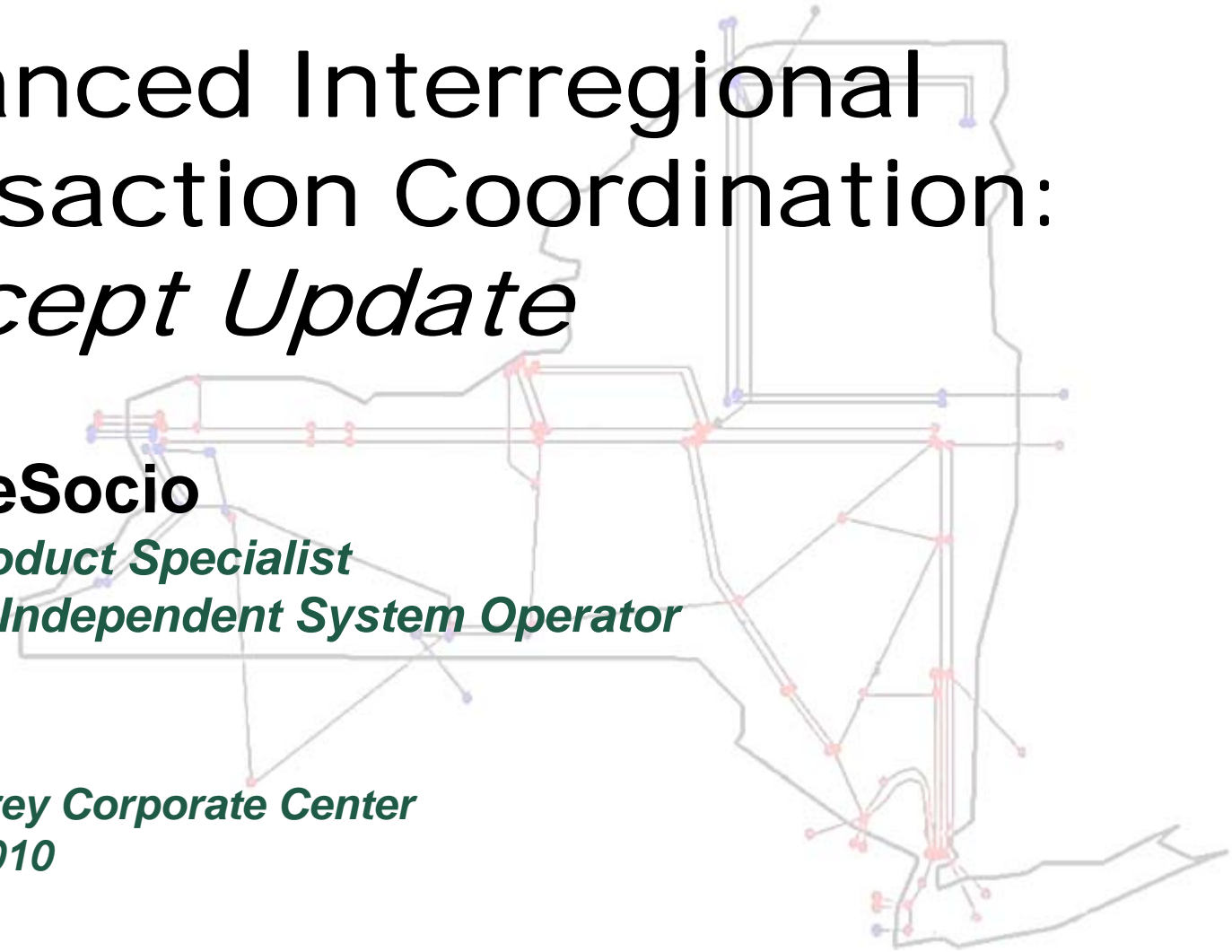
Market Product Specialist

New York Independent System Operator

MIWG

NYISO – Krey Corporate Center

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General Concept – Bidding & DAM

Bidding

- ◆ Intra-hour import/export transactions will be bid into the MIS similarly to the way hourly import/export transactions are bid
 - MPs shall indicate on each offer whether the transaction should be treated as an hourly or intra-hour transaction in the Real-Time Market
 - Wheel-through transaction offers will not have the option to be treated as an intra-hour transaction
- ◆ All transactions will have the ability to provide an 11 point incremental/decremental cost curve and energy MW offer
 - Today, transactions are only able to provide a single incremental/decremental cost and energy MW
- ◆ The Real-Time Market bidding window will remain the same for hourly and intra-hour transactions
 - All offers are still required to be submitted for evaluation by RTC and/or RTD no later than 75 minutes before each hour
 - For Proxy Generator Buses that allow scheduling of intra-hour transactions on a 15 minute basis, the NYISO intends to offer a mechanism for market participants to reduce/reinstate the schedule of their transactions within the dispatch hour

Day-Ahead Market (DAM) Scheduling & Settlement

- ◆ No changes expected to the treatment of transactions in the Day Ahead Market
- ◆ Continue to allow external DAM Market transaction bids to be evaluated by SCUC on an hourly basis
- ◆ The evaluation of all transactions will continue to be based on the NYISO ex-ante LBMPs
- ◆ External DAM LBMP Market transactions will continue to be settled based on DAM LBMPs and DAM Schedules

General Concept – Bidding (cont.)

TRANSACTION BIDDING OPTIONS

	OFFER OPTIONS					
	DAY AHEAD	REAL-TIME	OFFER LIMITS (\$/MWh)	OFFER SEGMENTS	MWs	MIN RUN
MULTI-HOUR BLOCK TXNS	YES	NO	-\$999.70 to \$999.70	11 point inc/dec curve	1 MW MIN	No. of HOURS
HOURLY TRANSACTIONS	YES	YES	-\$999.70 to \$999.70	11 point inc/dec curve	1 MW MIN	N/A
INTRA-HOUR TRANSACTIONS	NO	YES	-\$999.70 to \$999.70	11 point inc/dec curve	1 MW MIN	N/A

ALLOWABLE REAL-TIME TRANSACTION TYPES BY DAY AHEAD SCHEDULE			
DAY AHEAD TRANSACTION SCHEDULE	REAL-TIME TRANSACTION OFFERS		
		HOURLY TRANSACTIONS	INTRA-HOUR TRANSACTIONS
	MULTI-HOUR BLOCK TRANSACTIONS	✓	✓
HOURLY TRANSACTIONS	✓	✓	
NOT SCHEDULED	✓	✓	

General Concept – NERC e-Tag Requirements

- ◆ The NERC e-Tag duration must be at least one hour
- ◆ The NERC e-Tag start/stop time must be the beginning of an hour
 - For example, the start time must be XX:00
 - This means a start or stop time of anything other than XX:00 will not be approved
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 15 minute basis:
 - The NERC e-Tag should have its Transaction Type set to ‘Normal’
 - This is no different than today
 - The NERC e-Tag Energy Profile MW may be updated on a 15 minute basis, where the NERC Security Coordinators must approve the NERC e-Tag prior to implementation of the interchange
 - This will be accomplished through a Transaction Checkout process that occurs on a 15 minute basis
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 5 minute basis:
 - The NERC e-Tag should have its Transaction Type set to ‘Dynamic’
 - The maximum expected energy should be set equal to the Energy Request (MW) bid into the MIS
 - The actual interchange value will be updated as soon as possible after the dispatch hour is complete

General Concept – RTM Scheduling

Transaction Scheduling

- ◆ Allow external hourly transaction bids to be economically evaluated by RTC₁₅ on an hourly basis, as is currently done
 - Wheel-through transactions will only be evaluated by RTC₁₅ on an hourly basis
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on either a 5 or a 15 minute basis, external intra-hour transaction bids will be economically evaluated by RTC on a 15 minute basis
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 5 minute basis, external intra-hour transaction bids will be economically evaluated by RTD on a 5 minute basis
 - RTD-CAMs could also evaluate intra-hour transaction bids when a CAM is requested

Transaction Checkout & Curtailments

- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 5 minute basis, intra-hour transactions will be subject to an hourly checkout
 - This Checkout (from xx:30 – xx:40) will (1) adjust hourly transactions and commit the schedule for the hour, and (2) for proxy generator buses that allow scheduling of intra-hour transactions on a 5 minute basis, cap the max energy profile for intra-hour transactions where the new limit would be used by RTC and RTD going forward
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 15 minute basis, intra-hour transactions will be subject to a 15 minute checkout
 - The 15 minute checkout would occur at least 20 minutes before the quarter hour in which schedule is implemented
 - The RT Checkout from xx:30 – xx:40 will (1) adjust hourly transactions and commit for the hour, and (2) adjust the intra-hour transactions and commit for the next 15 minute period
 - The RT Checkout from xx:45 – xx:55, xx:00 – xx:10, xx:15 – xx:25 will only adjust the intra-hour transactions and commit for the next 15 minute period
- ◆ All external transactions (hourly and intra-hour) will be subject to an hourly checkout
- ◆ All Real-Time Market transactions are subject to reliability curtailments

General Concept – RTM Scheduling

EVALUATION OF EXTERNAL TRANSACTIONS

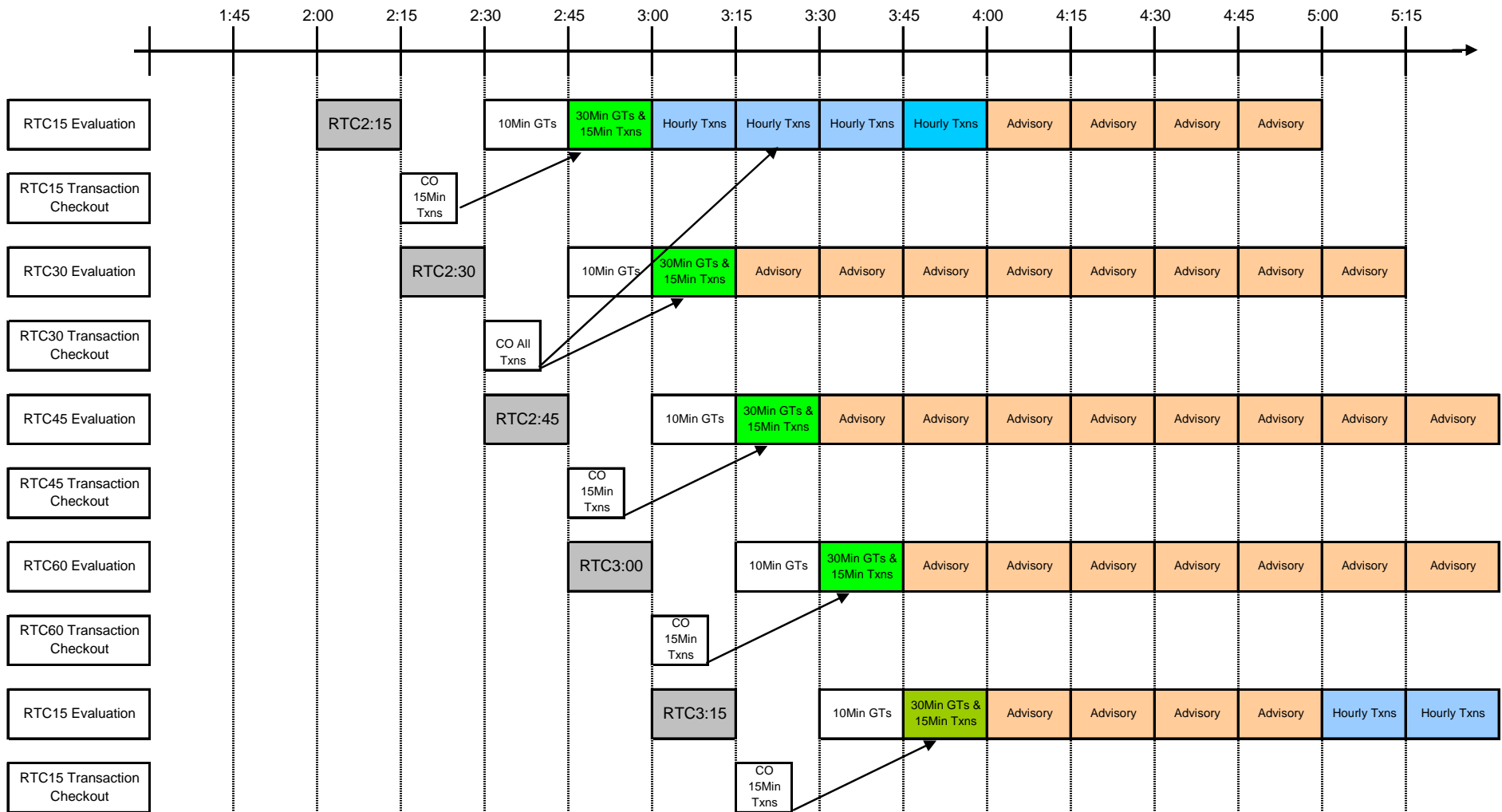
	DAY AHEAD	REAL-TIME	
	SCUC	RTC	RTD
MULTI-HOUR BLOCK TRANSACTIONS* (IMPORT/EXPORT/WHEEL-THROUGH)	Block Schedule for a Minimum Run Time	Treated as hourly or intra-hour dispatchable depending on MP preference	Treated as hourly or intra-hour dispatchable depending on MP preference
HOURLY TRANSACTIONS* (IMPORT/EXPORT/WHEEL-THROUGH)	Schedule does not vary within the hour, and may change from hour to hour	Schedule does not vary within the hour, and may change from hour to hour	Schedule does not vary within the hour, and may change from hour to hour**
INTRA-HOUR TRANSACTIONS* (IMPORT/EXPORT ONLY)	Not Applicable	Schedule may change every fifteen minutes	Schedule may change every five minutes**

*Schedules based on economic evaluation

**Subject to reliability curtailments in real-time

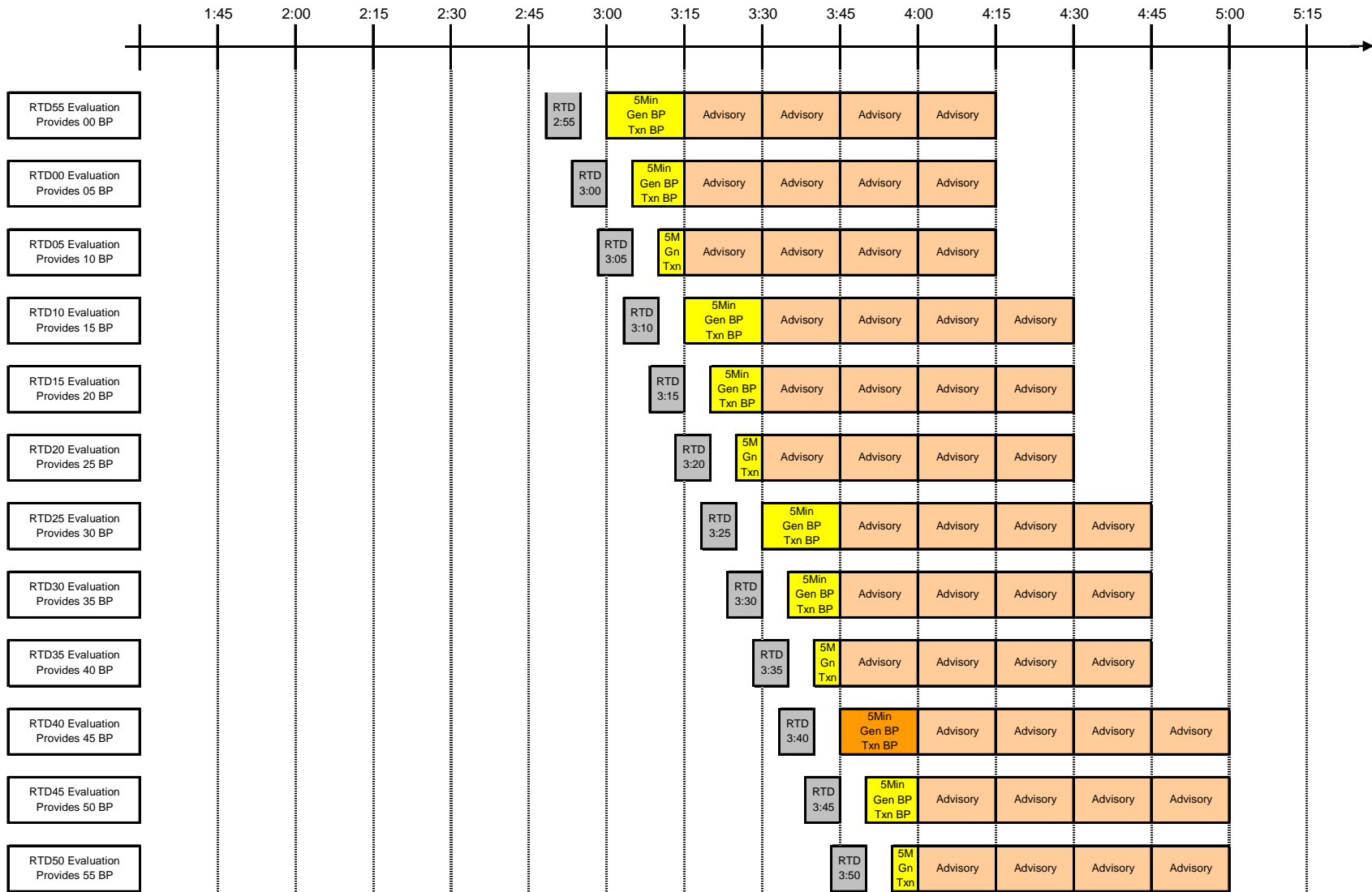
General Concept – RTM Scheduling

NYISO Transaction Evaluation Timing Diagram
(includes changes for Inter-Regional Transaction Coordination)



General Concept – RTM Scheduling

NYISO Transaction Evaluation Timing Diagram
(includes changes for Inter-Regional Transaction Coordination)



Enhanced Interregional Transaction Coordination

General Concept – RTM Pricing

- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled, external transactions that are economically evaluated by RTC_{15} are eligible to set price
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 5 or 15 minute basis, external intra-hour transactions that are economically evaluated by $RTC_{00, 30, 45}$ are eligible to set price
- ◆ At those Proxy Generator Buses where intra-hour transactions are allowed to be scheduled on a 5 minute basis, external intra-hour transactions that are economically evaluated by RTD are eligible to set price
- ◆ All transactions will settle using the RTD LBMPs when RTC does not have binding 'Proxy Generator Bus Constraints'
- ◆ Binding Proxy Generator Bus Constraints include:
 - NYCA Ramp Limited
 - Proxy Generator Bus TTC Limited
 - Proxy Generator Bus Ramp Limited

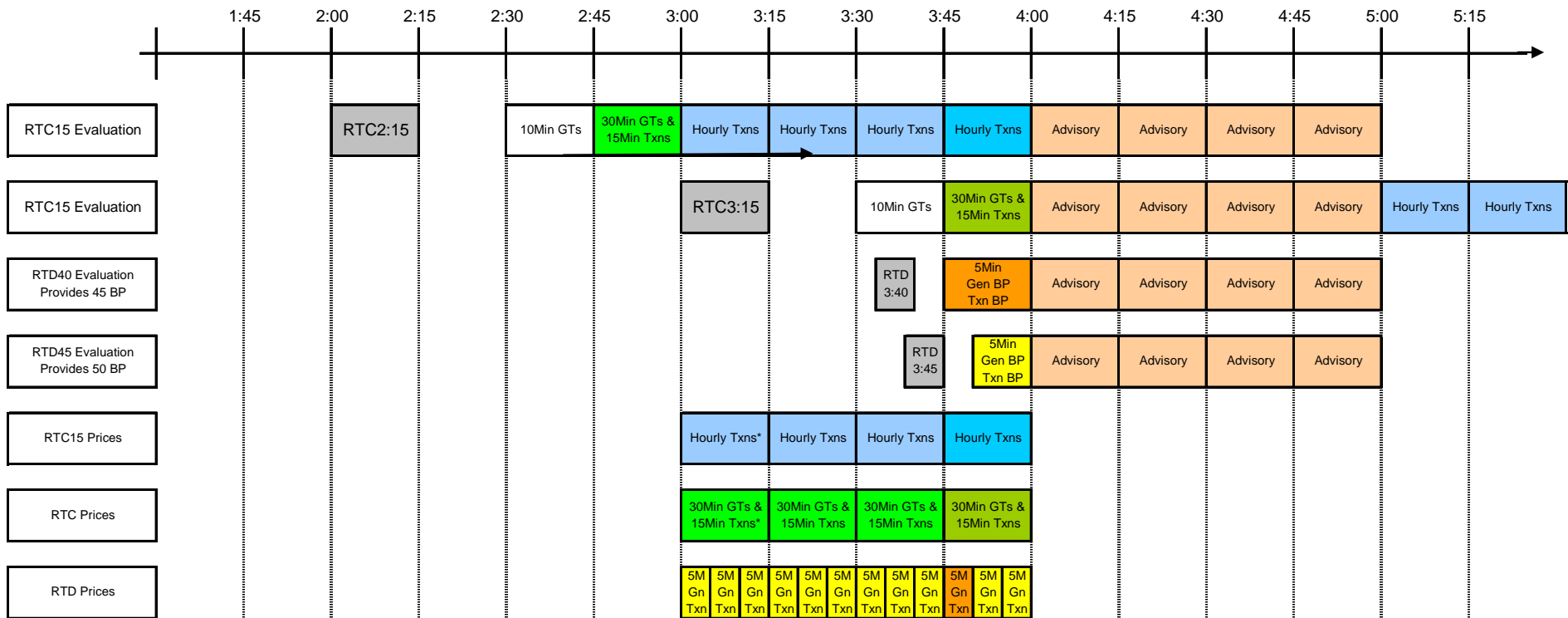
So, what to do if RTC has a binding Proxy Generator Bus Constraint . . . ?

General Concept – RTM Pricing (cont.)

- ◆ The RTC hourly LBMP averaging will be disabled for all external Proxy Generator Buses
- ◆ Proxy Generator Bus Pricing Rules with Enhanced Interregional Transaction Coordination are very similar to today's Proxy Generator Bus Pricing Rules
- ◆ When transactions at a Proxy Generator Bus are scheduled on a 5 minute basis, and
 - RTC has binding Proxy Generator Bus Constraints in the import direction:
 $RT\ LBMP = \text{Min}(RTC_{15}\ LBMP, RTD\ LBMP)$
 - RTC has binding Proxy Generator Bus Constraints in the export direction:
 $RT\ LBMP = \text{Max}(RTC_{15}\ LBMP, RTD\ LBMP)$
- ◆ When transactions at a Proxy Generator Bus are scheduled on a 15 minute basis, and
 - RTC has binding Proxy Generator Bus Constraints in the import direction:
 $RT\ LBMP = \text{Min}(RTC_{15}\ LBMP, RTC\ LBMP\ \text{from the binding schedule run}, RTD\ LBMP)$
 - RTC has binding Proxy Generator Bus Constraints in the export direction:
 $RT\ LBMP = \text{Max}(RTC_{15}\ LBMP, RTC\ LBMP\ \text{from the binding schedule run}, RTD\ LBMP)$

General Concept – RTM Pricing (cont.)

NYISO Transaction Evaluation Timing Diagram
(includes changes for Inter-Regional Transaction Coordination)



*Note: RTC15 and RTC Prices are the same for this 15 minute interval.

Assuming RTC15 was constrained...

If transactions were scheduled at the Proxy Generator Bus on a 5 minute basis, then the RTD3:40 would be compared to the RTC2:15 LBMP for 3:45-4:00.

If transactions were scheduled at the Proxy Generator Bus on a 15 minute basis, then the RTD3:40 would be compared to the RTC3:15 LBMP for 3:45-4:00 and the RTC2:15 LBMP for 3:45-4:00.

General Concept – RTM Pricing

For Non-Competitive Proxy Generator Bus

- ◆ Non-Competitive Pricing Rules for Enhanced Interregional Transaction Coordination are very similar to today’s Non-Competitive Proxy Generator Bus Pricing Rules
- ◆ Non-Competitive Proxy Generator Bus Constraints are expanded to include the NYCA Ramp constraint
- ◆ When transactions at a Non-Competitive Proxy Generator Bus are scheduled on a 5 minute basis, and
 - RTC has binding Proxy Generator Bus Constraints in the import direction:
Max(RT LBMP, Min(Unconstrained RTD LBMP, 0)) - RTD LBMP may be constrained
 - RTC has binding Proxy Generator Bus Constraints in the export direction:
Min(RT LBMP, Max(Unconstrained RTD LBMP, SCUC LBMP)) - RTD LBMP may be constrained
- ◆ When transactions at a Non-Competitive Proxy Generator Bus are scheduled on a 15 minute basis, and
 - RTC has binding Proxy Generator Bus Constraints in the import direction:
Max(RT LBMP, Min(RTD LBMP, 0)) - RTD LBMP is unconstrained
 - RTC has binding Proxy Generator Bus Constraints in the export direction:
Min(RT LBMP, Max(RTD LBMP, SCUC LBMP)) - RTD LBMP is unconstrained

General Concept – RTM Pricing

For Non-Competitive Proxy Generator Buses (cont.)

- ◆ The ‘unconstrained RTD LBMP’ is defined as the RTD LBMP for the Proxy Generator Bus with all congestion from the Proxy Generator Bus Constraints removed
 - The ‘unconstrained RTD LBMP’ for the Proxy Generator Bus may have congestion from internal constraints still reflected in it

General Concept – RTM Settlement

Real-Time Market (RTM) Settlement

- ◆ External hourly transactions will be settled based on Real-Time Market LBMPs and RTC Schedules
- ◆ External intra-hour transactions will be settled based on Real-Time Market LBMPs and RTD Schedules
- ◆ All intra-hour import transactions (5 minute or 15 minute scheduled transactions) will be eligible for RT BPCG
 - Hourly import transactions bid at a Proxy Generator Bus with intra-hour transaction scheduling capability will no longer be eligible for RT BPCG
- ◆ The Real-Time LBMPs for all Real-Time Market transactions will be based on the RTD LBMPs unless the Pricing Rules for Proxy Generator Buses are invoked
- ◆ For external import bilateral transactions that choose to schedule energy via an intra-hour transaction, the LBMP settlement will be based on the 5 or 15 minute intra-hour transaction scheduling outcome
 - The TUC settlement for an external import or export bilateral will not change
- ◆ The Financial Impact Charge (FIC) will continue to apply to Proxy Generator Buses with intra-hour transaction scheduling capability

General Concept - Credit Considerations

- ◆ Credit Coverage Requirements for all external transactions will remain in place through the operating hour
- ◆ There are two drivers for this requirement
 - With the new pricing rules, the real-time LBMPs are not known until the operating hour is complete
 - The real-time schedules for intra-hour transactions can be modified by RTC or RTD within the operating hour

HQ-NY Specifics

- ◆ Intra-hour transactions will be evaluated by the Real-Time Market on a 5 minute basis
- ◆ The 10 minute top of the hour (from xx:55 to x1:05) DNI ramp with HQ will continue to be 70MW/min (700MW total over 10 minutes),
- ◆ The rest of the hour DNI ramp with HQ (remaining 50 minutes from x1:05 to x1:55) would be limited to 20MW/min (100MW over 5 minutes) initially
- ◆ An additional quarter hour ramp constraint will be modeled in RTD to ensure feasibility with upcoming top of the hour ramp which has been set by RTC schedules from
 - The quarter hour DNI ramp with HQ would be limited to 350MW
 - This ramp start time will be anchored to the quarter hours
 - For example, the RTD that runs at 13:05, posts at 13:10 and provides 5 minute schedules for 13:15 will model a 350MW ramp constraint for the schedule difference between 13:00 and 13:15, which is in addition to the 100MW ramp constraint for schedule differences between 13:10 and 13:15
- ◆ The Desired Net Interchange (DNI) with HQ would be exchanged using automated ICCP communication
 - Similar to providing a Generator a 5 minute base point

PJM-NY Specifics & Status

- ◆ Specifics

- Intra-hour transactions will be evaluated by the Real-Time Market on a 15 minute basis

- ◆ Status

- PJM and NYISO will continue discussions on opportunities to achieve more efficient scheduling outcomes through increased coordination of, and greater frequency of, scheduling decisions
- Continue to further the PJM-NY specific concepts with the NYISO stakeholders throughout 2010

NE-NY & IESO-NY Status

◆ NE-NY

- Initiating discussions on opportunities to achieve more efficient scheduling outcomes through increased coordination of and frequency of scheduling decisions
- Begin developing the NE-NY specific concepts with the NYISO stakeholders Q4 2010

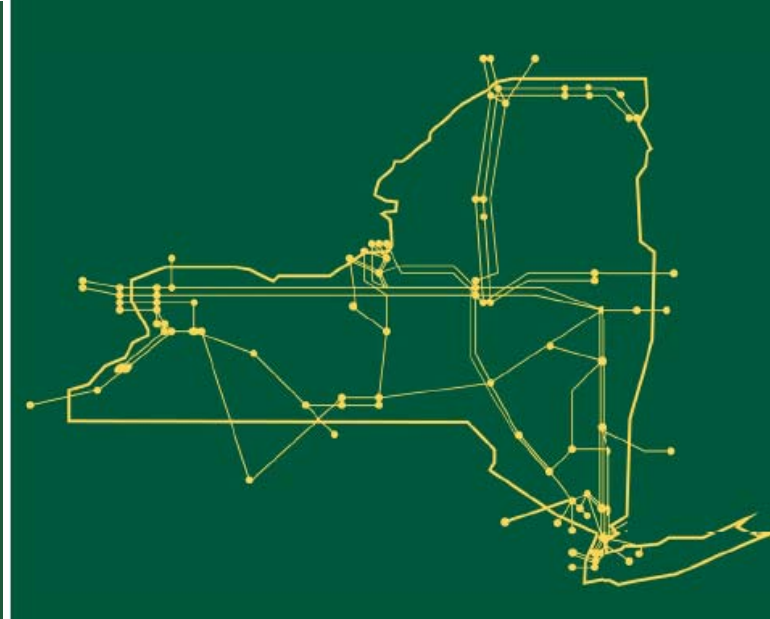
◆ IESO-NY

- Initiating discussions on opportunities to achieve more efficient scheduling outcomes through increased coordination of and frequency of scheduling decisions

Next Steps

- ◆ June 26, 2009 – Introduced the concept to MIWG
- ◆ September 1, 2009 – Presented proposal to MIWG
- ◆ September 29, 2009 – Presented proposal to SOAS
- ◆ October 21, 2009 – Presented proposal to the BIC for discussion
- ◆ December 10, 2009 – Presented proposal to the OC for discussion
- ◆ December 17, 2009 – Introduced PJM-NY Concept at MIWG
- ◆ January 5, 2010 – Presented proposal at MIWG
- ◆ January 26, 2010 – Presented proposal to SOAS
- ◆ March 9, 2010 – Continue discussions at MIWG
- ◆ 2010 – Stakeholder Approval Process, begin implementation of Phase 1
- ◆ Q1 2011 – Complete Implementation of Phase I

The New York Independent System Operator (NYISO) is a not-for-profit corporation that began operations in 1999. The NYISO operates New York's bulk electricity grid, administers the state's wholesale electricity markets, and conducts comprehensive planning for the state's bulk electricity system.



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