Coordinated Transaction Scheduling (CTS) between NYISO & PJM - Third Joint Meeting

Joint NYISO-PJM Meeting

April 2, 2013

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CTS Background

- The objective of CTS is to improve interchange scheduling efficiency.
- This presentation provides more information about the market design for CTS between the PJM and NYISO market.
- The proposal is to add options for transactions: Market Participants would have the option to use either the existing economic evaluation process (LBMP Bid/Offer) or CTS (CTS Interface Bid/Offers). Both scheduling mechanisms (LBMP Bid/Offers and CTS Interface Bids) would coexist.
- All intra-hour scheduling of external transactions will be accelerated by 15-minutes
- The plan is to implement in 2014.

Proposed Stakeholder Meetings and Agendas

- **Today**
  - *Overview of the proposal*
    - Feedback loop
    - Expanded example with timeline
  - *Price formation*
  - *Look-ahead price analysis*
  - *Production Guarantees/Make Whole Payments*
  - *Expected Credit Changes*
  - *Existing fees and charges for Imports and Exports*
  - *Next Steps*
- **June 25th at PJM's CTC in Valley Forge**
  - *Final proposal and additional details as required*
  - *Data transparency*
  - *List of Expected Tariff Revisions – PJM & NYISO*
  - *Q&A on proposal*

PROPOSAL

Proposal Summary

- **Bidding: Multiple bidding/scheduling options:**
  - ***Hourly evaluations of traditional wheel-through transactions (existing)***
  - ***Intra-hour evaluations of traditional LBMP Bid/Offers (existing)***
  - ***Intra-hour evaluations of CTS Interface Bid/Offers (new).***
- **Bidding: Intra-hour LBMP Bids and Intra-hour CTS Interface Bids may have up to four distinct bid $/MW pairs, one for each 15-minute scheduling interval of the hour.**
- **Scheduling: Intra-hour schedules established 15-minutes sooner than current intra-hour scheduling process.**
- **Scheduling: CTS Interface bids will be scheduled based on the projected price difference between PJM and NYISO at the interface.**

Incorporate PJM's Supply Curve

- **In Real Time, NYISO will use the PJM's proxy bus process and resulting real-time and look-ahead prices to determine which CTS Interface bids should be scheduled.**
  - ***The NYISO economic evaluation would schedule CTS Interface bids/offers that would be in the money given the projected prices at the interface.***
  - ***In practice, that means that each CTS Interface bidder identifies the price difference between PJM and NYISO's projected prices above which the transaction is willing to flow.***
  - ***To accomplish this evaluation, the CTS Interface bid/offer will be converted into a traditional LBMP bid (by adding/subtracting the CTS Interface bid/offer to PJM's projected proxy bus price) for consideration in NYISO's current economic scheduling software along with other, non-CTS Interface bids***

Bidding

Current:

- Import/export LBMP Bid: hourly
- Import/export LBMP Bid: 15 minute using "second time step"
- Wheel Bids : hourly

Proposed:

- Import/export LBMP Bid: 15 minute using "first time step"
- Import/export CTS Interface Bid: 15 minute using "first time step"
- Wheel Bids: hourly

- **With CTS we will be able to offer an earlier evaluation of LBMP Bids because we will use the "first time step" rather than the "second time step" of the NYISO RTC**
- **CTS interface bids/offers allow schedules to be based on the price differences projected by PJM and NYISO instead of relying on the marketer's assumptions about market conditions in the neighboring control area to provide an LBMP bid/offer.**

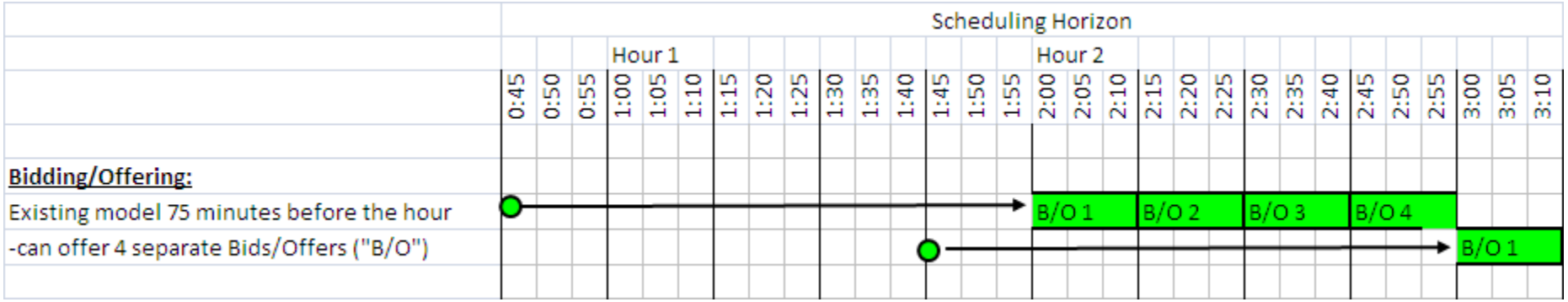
Bidding (cont)

- **All Bids/offers will continue to be provided no later than 75 minutes before the market hour.**
- **Intra-hour LBMP Bids and Intra-hour CTS Interface Bids may have up to four distinct bid curves (each with up to eleven $/MW pairs), one curve for each 15-minute scheduling interval of the market hour. Each bid curve must be submitted by 75-minutes prior to the scheduling hour.**
  - ***Participants who do not want to be price sensitive can use their bids/offers to make their transactions appear more like price takers.***

Maintaining the Existing Bid Window

- CTS Interface bids allow schedules to be based on price differentials instead of relying on the Marketer's assumptions about market conditions in the neighboring control area to inform an LBMP bid/offer.
- CTS Interface bids will be evaluated 15 minutes in advance of the scheduling period.
- Participants may provide a distinct bid curve for each 15-minute scheduling interval.
- The 75 min bid window allows for the consolidated input of all relevant bid/offer information for the forward looking energy and ancillary service co-optimization. Developing schedules based on the co-optimized procurement of energy and ancillary services helps ensure a least-bid cost solution, as well as consistent schedules and prices, minimizes uplift, and provides time to implement needed market power & manipulation protections.
- Note: The February 20 meeting covered more information about why we are maintaining the existing bid window.

Bidding Time Line



PJM Transmission and Ramp Reservations

- **Current PJM Timing Requirements (Transmission Service):**
  - ***Hourly Transmission Service***
    - **Earliest Request 08:00 day-ahead (09:00 Spot-In)**
    - **Latest Request 0 minutes ahead**
    - **Provider Response within 15 minutes (automated – done in seconds)**
    - **Customer Confirmation within 15 minutes**
    - **Automated "Release" or "Annulment" of Spot-In service (30 minutes after 'queued' if no valid Tag)**
      - Assumes same day request. Day ahead requests annulled within 2 hours of queue
  - ***Aligns with NAESB Wholesale Electric Quadrant (WEQ) 001-4.13***

PJM Transmission and Ramp Reservations (cont)

- **Current PJM Timing Requirements (Ramp Reservations and Energy Scheduling):**
  - ***Ramp Reservations and Expirations***
    - **Latest request 30 minutes ahead**
    - **Pending status maintained**
      - 10 minutes if queued within 1 hour of start-time
      - 15 minutes if 1 hour < queued < 4 hours
  - ***Hourly Energy Scheduling***
    - **No earliest submittal requirement**
    - **Latest Schedule 20 minutes ahead**
  - ***Aligns with NAESB WEQ 004-D and NERC INT-006-3***

Scheduling

- **Real Time scheduling determination.**
  - ***Looking to maintain NYISO's economic schedule market design & potentially leverage existing NYISO software capabilities and look ahead features.***
  - ***Looking to maintain PJM's market evaluation, leverage PJM's existing software and minimize any build out of the software.***
- **No changes expected to Day Ahead Scheduling**
  - ***As the Real Time market outcomes change we expect existing/proposed arbitrage mechanisms to be effective in arbitraging the Day Ahead and Real Time markets.***

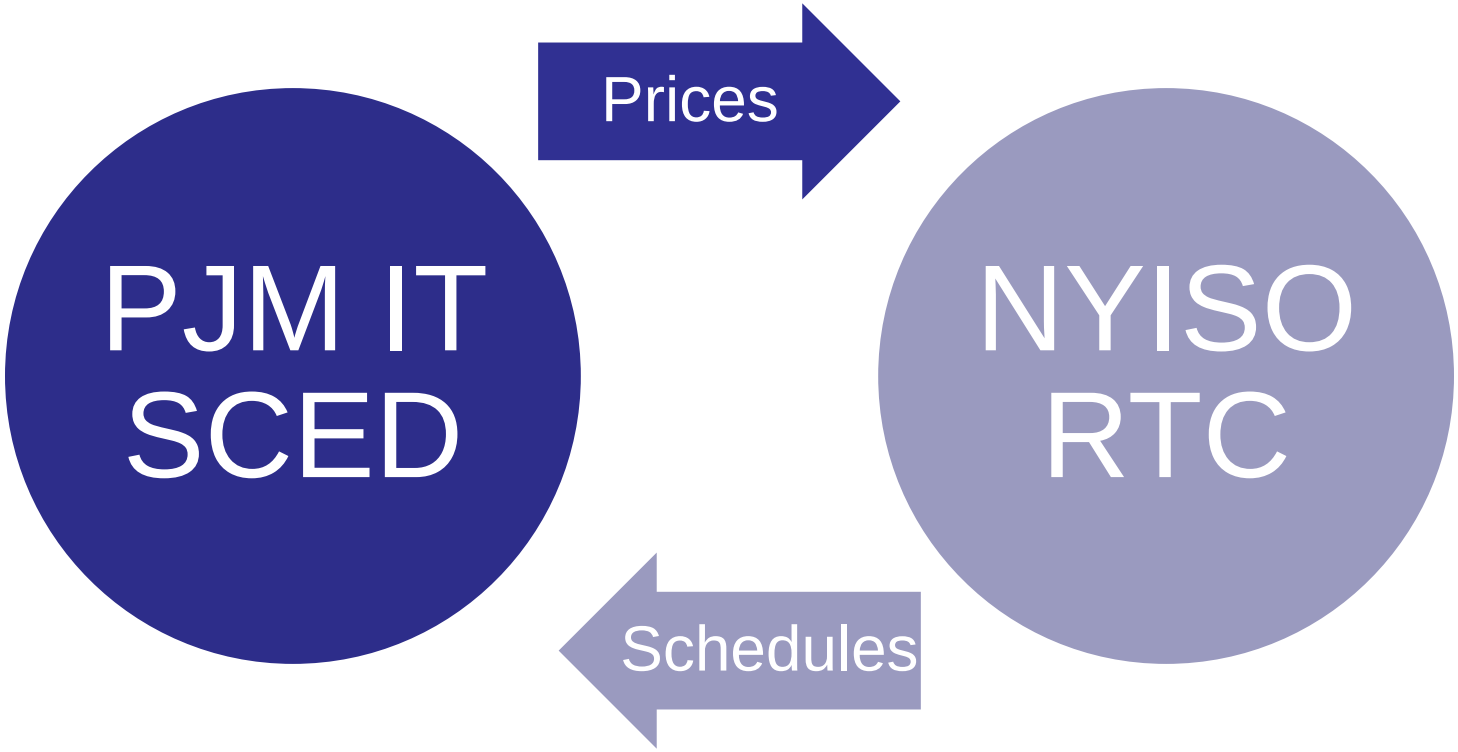
Scheduling Process

- **Proposing to set schedules every 15 minutes for the period of time 30 to 45 minutes out from when the system information is gathered by the dispatch software ("initialization").**
  - ***This is referred to as "First Time Step"***
  - ***The current intra-hour scheduling of LBMP bids/offers with PJM sets schedules 45 to 60 minutes from initialization ("Second Time Step").***
- **Implications**
  - ***Wheel-though transactions will continue to only be scheduled hourly (They will be the only transactions with hourly scheduling at the NYISO/PJM interfaces)***

Scheduling Process (cont)

- The scheduling process will leverage PJM's existing Intermediate Term Security Constrained Economic Dispatch (IT SCED) that has a 2 hour look-ahead capability.
- The most recently available information on prices from IT SCED will be used by the Real Time Commitment (RTC) in the "first time step" as well as in the advisory schedules.
- Each RTC will also provide information on expected schedules to PJM and that information will be used in subsequent IT SCED runs.

NYISO/PJM Information Flow

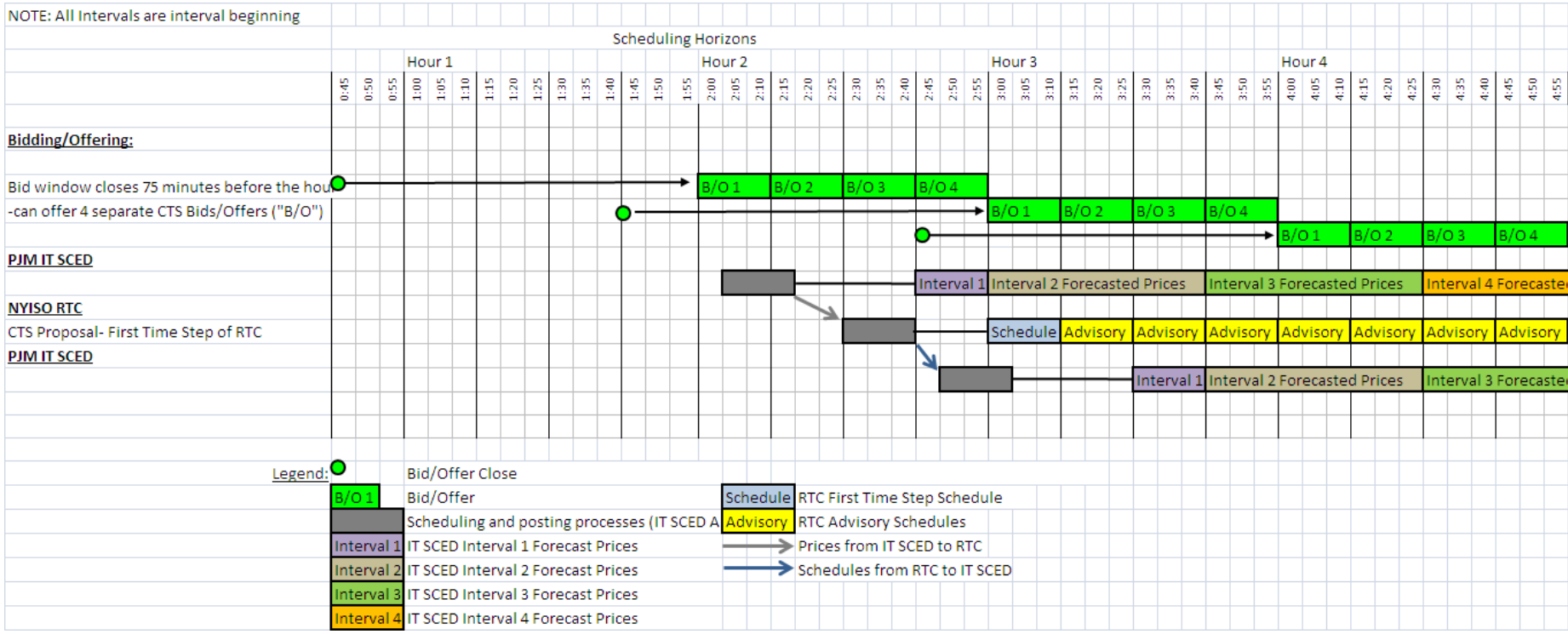


FEEDBACK LOOP

Feedback loop

- At the last stakeholder meeting there was a request for more information about the feedback loop between PJM's IT SCED and the NYISO's RTC.
- The next slide shows a single loop from IT SCED to RTC and back again to IT SCED. The Appendix includes an illustration of multiple loops.

Information flow from PJM's IT SCED to NYISO's RTC to PJM's IT SCED



EXPANDED EXAMPLE WITH TIMELINE

Example with Timeline

- **At the February meeting there was a request to add a timeline to an example. This is an expansion of the first example presented at the last joint Stakeholder meeting.**
- **This example includes the following simplifying assumptions:**
  - ***The marketer is assumed to be purchasing in PJM at the PJM price, importing energy from PJM into NY and selling the energy in NY at the NY price.***
- **Note that in this example we are no longer assuming that the settlement price in NYISO is equal to the scheduling (RTC) price**
- **This example (in purple) focuses on scheduling a single 15 minute interval from T to T+15**
  - ***Every 15 minutes the NYISO provides RTC advisory schedules to PJM which are incorporated into the PJM ramp calculation and every 15 minutes RTC incorporates the expected prices from IT SCED. The example only includes time steps relevant to scheduling a transactions for the interval from T to T+15.***

Example with Timeline (2)

- **Before T-75:**
  - ***Marketer requests transmission, and ramp from PJM,***
  - ***PJM approves transmission reservation, ramp and eTags***
  - ***In the NYISO MIS the marketer enters an import (from PJM to NY) CTS Transaction bid of $5/MWh for the first fifteen minutes of hour T,***
  - ***The marketer also enters import CTS Transaction bids for the other three intervals in hour T***

Example with Timeline (3)

- **T-75:**
  - ***NYISO locks bids, removes bids with no eTags and curtails to zero eTags with no bids***
  - ***Marketers eTags requests after this point for hour T will not be approved.***
- **T-60:**
  - ***RTC sends schedules to IT SCED***
- **T-40:**
  - ***IT SCED sends prices for T to RTC:***
    - **IT SCED projects an Interval 2 price of $17/MWh**

Example with Timeline (4)

- **T-30 to T-15:**
  - ***Rolling RTC evaluates and posts, CTS schedules are established for first fifteen minutes of hour T,***
  - ***The RTC projects prices of $23/MWh for the first interval of hour T.***
  - ***Since PJM's IT SCED price projection was $17/MWh and RTC's projected price is $23/MWh, the CTS Transaction is scheduled ($17/MWh+$5/MWh= $22/MWH< $23/MWh).***
  - ***eTags updated with the RTC schedules***
  - ***RTC sends look-ahead schedules for the PJM interfaces to IT SCED***

Example with Timeline (5)

- **T-10 to T-5:**
  - ***Rolling RTD evaluates and posts for T-5 to T.***
  - ***T-5 NYISO Interchange Ramp Begins for T.***
- ***T-5 to T:***
  - ***Rolling RTD post and sets first 5 minute NYISO settlement price of $24/MWh.***
- ***T:***
  - ***PJM first 5 minute RT LMP price of $15/MWh.***

Example with Timeline (6)

- ***T to T+5:***
  - ***Rolling RTD posts second 5 minute NYISO settlement price for t+5 to t+10 of $19/MWh***
- ***T+5:***
  - ***PJM second 5 minute RT LMP of $20/MWh***
- ***T+5 to T+10:***
  - ***Rolling RTD post third 5 minute NYISO settlement price for t+10 to t+15 of $29/MWh***
  - ***T+10 NYISO Interchange Ramp Begins for T+15***
- **T+10:**
  - ***PJM third 5 minute RT LMP of $25/MWh.***

Example with Timeline (7)

- **Balance sheet:**
  - ***The CTS Transaction purchased energy at an average of $20/MWh in PJM.***
    - **PJM first 5 minute RT LMP price of $15/MWh.**
    - **PJM second 5 minute RT LMP of $20/MWh**
    - **PJM third 5 minute RT LMP of $25/MWh.**
    - **Average PJM price: ($15+$20+$25)/3= $20**

Example with Timeline (8)

- **Balance sheet (continued):**
  - ***The CTS Transaction was paid an average of $24/MWh in NY.***
    - **NYISO first 5 minute settlement price of $24/MWh.**
    - **NYISO second 5 minute settlement price for t+5 to t+10 of $19/MWh.**
    - **NYISO third 5 minute settlement price for t+10 to t+15 of $29/MWh.**
    - **Average NY price: ($24+$19+$29)/3=$24**
  - ***The final price difference was $4/MWh.***
    - **PJM Final Price= $20**
    - **NY Final Price= $24**

NYISO PRICE FORMATION

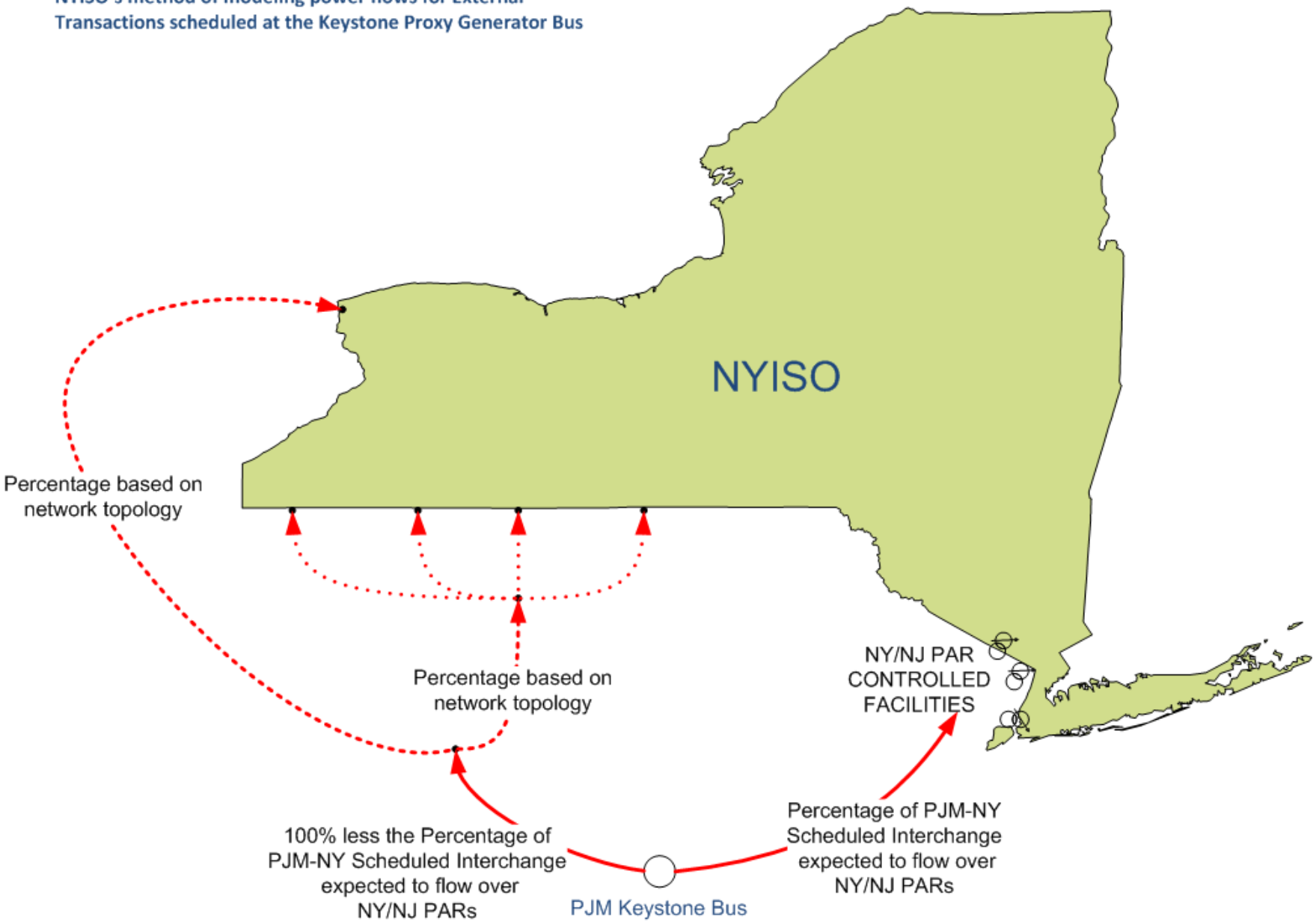
NYISO's Proxy Buses

Region	Interface / Line	Proxy Bus
PJM	A/C Interface – Keystone	PJM_GEN_KEYSTONE
	Neptune Scheduled Line	PJM_GEN_NEPTUNE_PROXY
	Linden VFT Scheduled Line	PJM_GEN_VFT_PROXY
	HTP Scheduled Line	PJM_HTP_GEN
Ontario	A/C Interface – Bruce	OH_GEN_BRUCE
New England	A/C Interface – Sandy Pond	NE_GEN_SANDY_POND
	Cross Sound Scheduled Line	NPX_GEN_CSC
	Northport Norwalk Scheduled Line	NPX_GEN_1385_PROXY
Hydro Quebec	Chateauguay	HQ_GEN_IMPORT HQ_GEN_WHEEL
	Cedars	HQ_GEN_CEDARS_PROXY

NYISO's Proxy Bus Pricing

- **PJM Proxy Bus:**
  - *Utilizes Keystone bus as representative of expected power flows resulting from interchange schedules*
  - *Fixed tie-line weightings on NY/NJ PAR controlled facilities. Weightings posted on NYISO OASIS.*
  - *Free flowing tie lines weightings determined consistent with transmission network connectivity*
- **Loop Flow Modeling:**
  - *Day-Ahead Market incorporate on-peak/off-peak forecast of expected unscheduled power flows (UPF) based upon nominal 30 day rolling average of observed loop flows*
  - *Real-Time Market incorporates expected UPF based upon currently observed loop flow*
- **Pricing outcomes consistent with PJM's tie-line weighting methodology**

NYISO's method of modeling power flows for External Transactions scheduled at the Keystone Proxy Generator Bus



NYISO's Proxy Bus Pricing

- **Scheduled Lines**
  - ***Prices set based on the expectation that actual power flow will be equal to scheduled power flows.***

NY/PJM Interchange Buses

Interface / Line	NYISO Proxy Bus	PJM Proxy Bus
A/C Interface	PJM_GEN_KEYSTONE	NYIS
Neptune Scheduled Line	PJM_GEN_NEPTUNE_PROXY	NEPTUNE
Linden VFT Scheduled Line	PJM_GEN_VFT_PROXY	LINDENVFT
HTP Scheduled Line	PJM_HTP_GEN	HUDSONTP

For further information:

- **Tariff References:**
  - ***Market Services Tariff (MST) Section 4.4.4 "Identifying the Pricing and Scheduling Rules that Apply to External Transactions"***
  - ***MST Section 17 – Attachment B - LBMP Calculation Method***
- **Pricing Examples:**
  - ***Interface Pricing filing of the NYISO (ER08-1281 / ER13-780)***
    - http://www.nyiso.com/public/webdocs/markets_operations/documents/Legal_and_Regulatory/FERC_Filings/2013/Jan/NYISOIntrfcPrcngFlngCmplt1_18_13.pdf
- **OASIS Posting:**
  - ***Interface Pricing Expected Unscheduled Power Flows.***
    - http://www.nyiso.com/public/webdocs/markets_operations/market_data/power_grid_info/DAM_UPF_Web_Posting.pdf

PJM INTERFACE PRICE FORMATION

PJM Interface Pricing Methods

Section 2.6A of Attachment K of the OATT

- **Tie-Line Weighting (ex. NYISO)**
  - ***Uses external pnodes on the sending end of tie-lines***
  - ***Weights price based on tie-line flows***
- **Marginal Cost Proxy (ex. CPLEIMP/EXP)**
  - ***Has lower Tier methods such as High/Low***
  - ***Determines the marginal unit(s) in the external area***
  - ***Averages LMPs at marginal pnodes in external area***
  - ***May also result in High/Low under some conditions***
- **Other methods (ex. Geographic, External Congestion Analysis)**
- **Interface prices use external generator pnodes ONLY**

Tie-Line Weighting

- **Uses a fixed set of pnodes as tie lines between areas that do not typically change**
  - ***NYISO (DUNKIRK 20%, ROSETON 80%)***
- **Permits for changes in definition and weighting up to every 5-minutes**
  - ***5-minute changes to either occur infrequently***
  - ***PJM historically has not provided notification of the exact weighting and definition changes***
- **PJM currently posts the bus definitions but not weightings**

Marginal Cost Proxy Method (MCPP)

- **Used for interfaces between PJM and non-market areas**
  - ***Overlap SOUTHIMP/EXP region to provide more locational prices where applicable***
  - ***CPLEIMP/EXP, DUKIMP/EXP, NCMPAIMP/EXP***
- **Most flexible interface pricing method**
  - ***Pnodes used in the determination of the interface price can and likely do change every 5 minutes***
  - ***Weightings used for included pnodes can and likely do change every 5 minutes***
- **PJM posts a list of all pnodes that <u>may be</u> used to determine the interface price**
- **PJM <u>does not</u> provide notification each time the pnode composition and/or weighting of the interface price changes.**

Geographic Method

- **A set of pnodes that *geographically* represent an interface**
  - ***SOUTHIMP and SOUTHEXP***
  - ***Permits for up to 5 minute changes in pnode definition and weighting but typically does not utilize this.***
  - ***PJM historically has not provided notification of the exact weighting and definition changes.***
    - **Very infrequent - Network model changes**

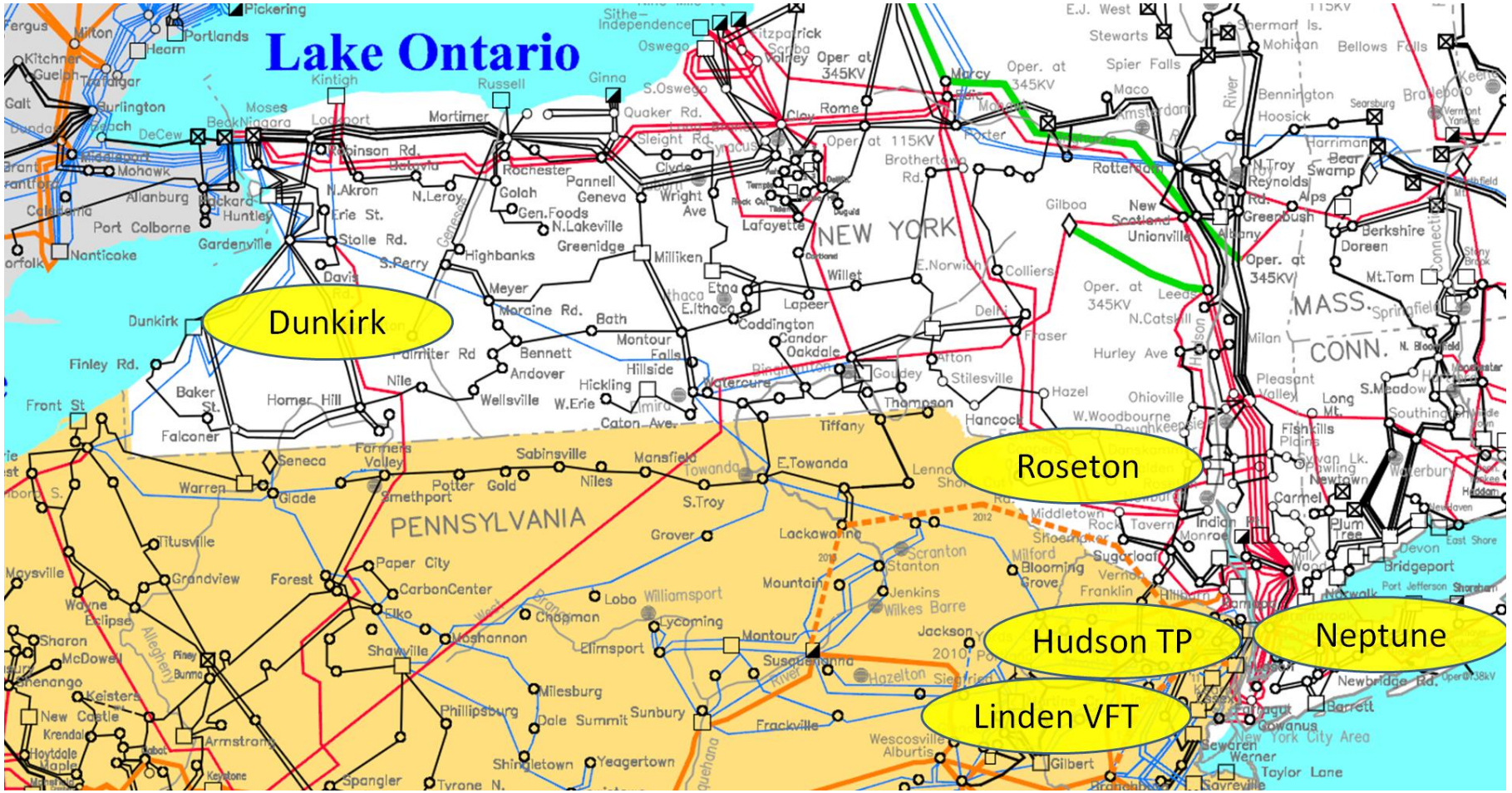
External Congestion Analysis

- **Perform historic analysis on external area congestion and select impactful pnodes to define the interface**
  - ***MISO Interface***
  - ***PJM does not envision the definition and/or weighting changing every 5-minutes but this flexibility would be analogous to other approved interface pricing methods.***
- **Accurately represents M2M congestion**

MISO Interface Analysis

- **Calculated total number of congested hours on relevant flowgates for prior year**
  - ***Considered major transmission upgrades that could impact future congestion***
  - ***Identified external generator pnodes on sending end of top 15-20 congested facilities***
  - ***Performed "what-if" analysis on the MISO Interface under various configurations to determine pricing impacts***

NYISO Interface Graphic



“LOOK AHEAD” PRICES

NYISO Look-Ahead Prices

- **In New York look-ahead prices are posted on the NYISO Website and are overwritten as new prices are produced. The prices are also available in the NYISO Decision Support System (DSS) public market data.**
- **The following analysis covers the first interval of the RTC and compares those prices to the average RTD prices for that same time period. The first interval is the interval that CTS will be using along with the PJM IT SCED prices.**
  - ***Data covers two time periods:***
    - **August 2012 to February 2013 - 15 Minute Scheduling was activated in August 2012.**
    - **January 2013 to February 2013 – this analysis provides information on the winter peak.**
  - ***Pricing point used is the PJM Keystone (the PJM reference bus)***

NYISO Look-Ahead Price Analysis: August 2012-February 2013

The price difference between the RTC LBMP and the average of the three RTD LBMPs

RTC Interval	Mean	Median	Mean Squared Error
First Interval	-2.20	-0.06	670.74

$ Difference	% Occurrence First Interval
>20	2
10 to 20	3
5 to 10	6
-5 to 5	72
-10 to -5	7
-20 to -10	5
< -20	5

NYISO Look-Ahead Price Analysis: January 2013-February 2013

The price difference between the RTC LBMP and the average of the three RTD LBMPs

RTC Interval	Mean	Median	Mean Squared Error
First Interval	-3.32	-0.08	1385.83

$ Difference	% Occurrence First Interval
>20	4
10 to 20	5
5 to 10	7
-5 to 5	64
-10 to -5	7
-20 to -10	6
< -20	8

PJM Look-Ahead Price Analysis

- PJM's IT SCED Application provides four look ahead solution intervals over a two hour period
- Analysis was performed to compare the accuracy of the IT SCED forecasted LMPs to the Real Time (RT) LMP
  - *Data referenced from January and February 2013*
  - *Pricing point representative of the NYISO Interface price*

PJM Look-Ahead Price Analysis

IT SCED Interval	Mean	Median	Standard Deviation
1	6.38057	0.53167	55.4997
2	6.96919	0.48667	59.0518
3	2.72133	0.15667	72.4996
4	-0.22039	0.01667	78.9419

The 2nd Interval is the solution data that will be used in the CTS process

	% Occurrence by Interval			
$ Difference	1	2	3	4
>20	15	16	16	17
10 to 20	4	5	4	4
5 to 10	6	5	5	6
-5 to 5	56	54	47	42
-10 to -5	4	5	6	5
-20 to -10	4	4	5	6
< -20	11	11	17	20

PJM IT SCED Improvements

- **Current Functions**
  - *Commits CTs for energy and constraint control*
  - *Performs the Three Pivotal Supplier Test*
  - *Commits Demand Resources for energy*
  - *Provides Intra hour commitment recommendations for Regulation and Reserve resources*
- **Opportunities for Improvements**
  - *Evaluating accuracy of input data*
  - *Enhanced Operator training*
  - *Increased functionality*

Publishing Look-Ahead Prices

- **PJM is supportive of publishing Look-Ahead prices from IT SCED**
  - ***Currently evaluating the specifics of what will be published***
    - **What solution interval?**
    - **What pricing locations?**
  - ***Targeting summer 2014 implementation***

BID GUARANTEES/MAKE WHOLE PAYMENTS

Bid Guarantees/Make Whole Payments

- **CTS Transaction imports bids will not be protected from the latency between the scheduling (RTC) and settlement prices (RTD).**
  - ***It is not readily apparent what bid guarantees/make whole payments should apply for CTS Transactions:***
    - **For example, the marketer agrees to flow for a $5 price difference. PJM IT SCED projects $17/MWh and NY RTC projects $23/MWh. The transaction is scheduled. The final settlement prices are $20/MWh in PJM and $24/MWh in NY (a $4/MWh difference). What is due the marketer and which loads should pay?**
- **Since RT LBMP bids are moving from second time step to the first time step, and because it would not be appropriate to protect some RTC scheduled 15 minute transaction from latency and not others, we are proposing to eliminate real-time bid production cost guarantees for RT LBMP bids.**

EXPECTED CHANGES TO CREDIT REQUIREMENTS WITH CTS

Credit Requirement Changes

- At the last February meeting a stakeholder requested that information be provided on credit requirements for CTS transactions.
- PJM and NYISO will continue to maintain separate credit requirements.
  - *A stakeholder has indicated it is interested in coordinated credit requirements.*
  - *Any such structural change would be a separate project because of its complexity.*

Credit Requirement Changes

- **No changes expected to Day-Ahead Scheduling so there are no changes expected to credit requirements for Day-Ahead Imports, Exports or Wheel Through transactions in either PJM or NYISO.**
- **In Real-time, CTS Transaction Bids will likely impact Export credit requirements in PJM and the NYISO including:**
  - ***the way in which the credit coverage per megawatt is determined,***
  - ***the megawatt amount for which credit coverage would be required, and***
  - ***the timing of credit coverage adjustments.***
- **The credit requirements for Real-time Imports and Wheels Through is not expected to change.**

FEES AND TRANSMISSION CHARGES

Cross-Border Transaction Fees

- **There was a request from Stakeholders to report back on the fees faced by transactions in both PJM and NYIOS. This section covers:**
  - ***PJM fees and charges***
  - ***NYISO fees and charges***
- **The Coordinated Transaction Scheduling (CTS) project does not include the elimination of fees allocated to external transactions.**
  - ***If there is interest in addressing this issue it would have to be a separate project because of its complexity and the extensive discussions that would be involved.***

PJM Cross Border Fees (Exports to NY)

- **Operating Reserves:**
  - *Generators, Imports into PJM, and Demand Resources are guaranteed to receive Bid Costs over the Service Day*
  - *Day-Ahead Market, $983K.*
    - DA Op Res charged to DA Exports, DA Demand, and DA Decrement
  - *Balancing Operating Reserves Reliability, $619K.*
    - Costs relative to units dispatch for reliability reasons allocated to RT Load in PJM & RT Exports.
  - *Balancing Operating Reserves Deviations, $5.9Mil.*
    - Costs relative to unit's regular economic dispatch, allocated to participant's balancing market deviations. Hourly ABS(DA MW– RTMW)
  - *Balancing Operating Reserve Credits include protection to suppliers from PJM instructed real-time deviations from day-ahead position.*
    - PJM Term is LOC; Lost Opportunity Costs.
- **Synchronized, Non-Synchronized, and Day-Ahead Scheduling Reserves:**
  - *Availability payment to suppliers to maintain capacity available for conversion to energy*
    - Not Charged to Exports out of PJM, but are charged to Load in PJM.

PJM Cross Border Fees (Exports to NY)

- **Reactive Supply and Voltage Control, Schedule 2.**
  - ***FERC approved Revenue Requirement payment to suppliers to maintain the capability to provide voltage support to grid.***
  - ***The reactive supply and voltage control charge allocation is based on the reserved Firm and Non-Firm Transmission Reservation Capacity, $2.4M***
- **Black Start Service, Schedule 6A**
  - ***Revenue Requirement payment to suppliers to maintain capability to provide Black Start support to grid.***
  - ***Also the collection method for Operating Reserve Credits paid associated with dispatch of units providing for Black Start service.***
  - ***Black Start Service charge allocation is based on the Reserved Firm and Non-Firm Transmission Reservation Capacity, $1.2M***

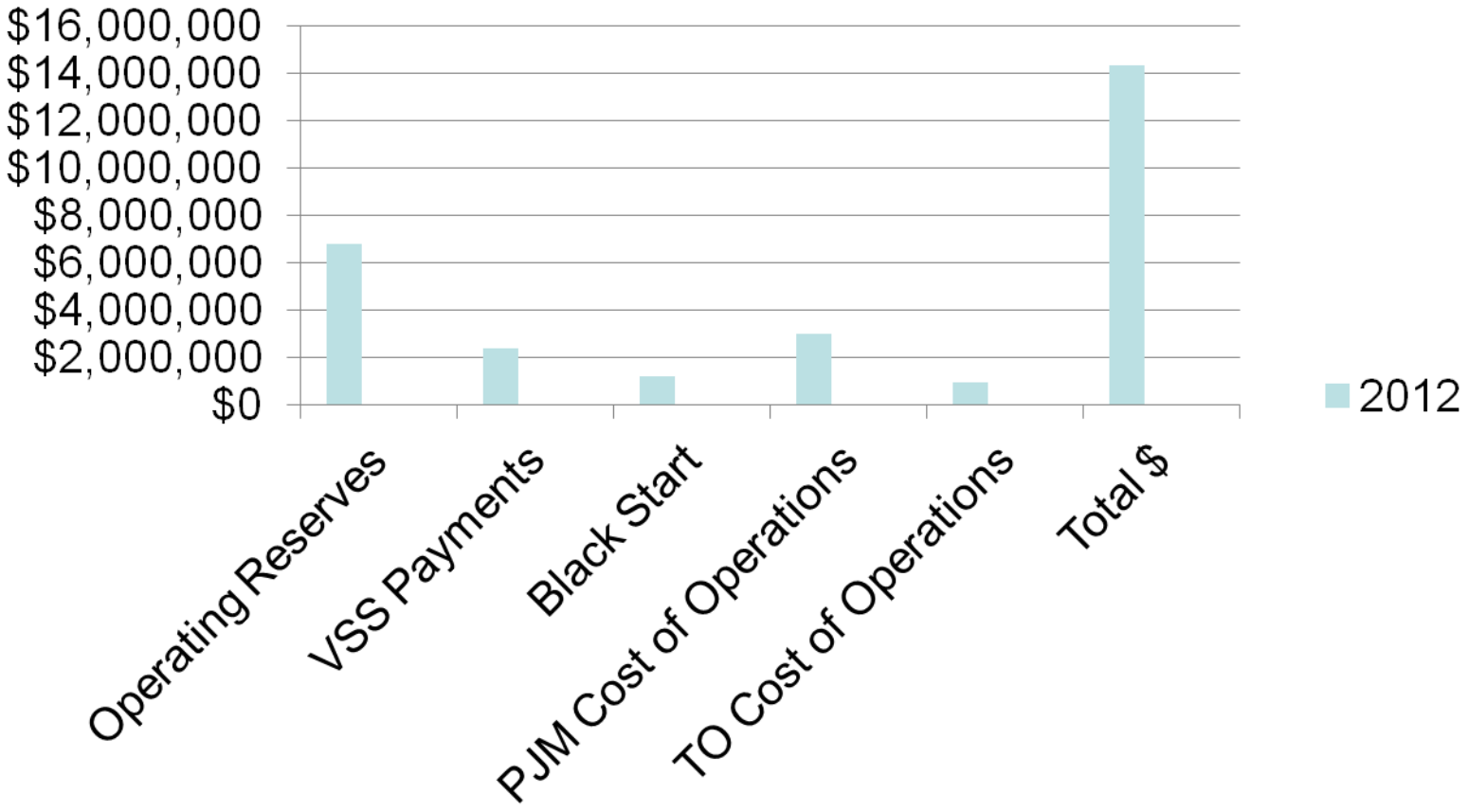
Point-to-point transmission customers pay market wide ratio share of Reactive Supply & Voltage Control and BS charges with the remainder allocated to Network Load in the applicable PJM Zone.

PJM Cross Border Fees (Exports to NY)

- **PJM Cost of Operations, Schedule 9:**
  - ***9-1 Control Area Admin, charged to RT Transmission use, $1.4Mil.***
  - ***9-3 Market Support, charged to MWh schedules, $434K.***
  - ***2nd Control Center cost charged to 9-1&9-3 activity,$385K.***
  - ***FERC Recovery charged to RT Transmission use, $731K.***
  - ***Market Monitor funding, charge to MWh schedules, $67K.***
- **Transmission Owner Control Center Costs, Schedule 1A:**
  - ***Most PJM TO's collect, via this schedule, costs relative to running their own control centers.***
  - ***Charge based on RT Transmission Use, $968K.***
    - ***Pt2Pt customer charged at market wide rate, while network customers in PJM are charged the specific zone rate of their given load location(s).***

Historic PJM Cross Border Fees –Total $

PJM Cross Border Charges at NY-PJM Interface* : Total Annual $



*Includes all NY-PJM Interfaces

NYISO Cross-Border Transaction Fees

- **Bid Guarantee Payments**
  - *Generators and Importers are guaranteed to receive Bid Costs over the Service Day*
  - *2012: $930 K*
- **Margin Assurance Payments**
  - *Protection to suppliers for ISO instructed real-time deviations from day-ahead position*
  - *2012: $300 K*
- **Operating Reserves**
  - *Availability payment to suppliers to maintain capacity available for conversion to energy*
  - *2012: $671 K*

NYISO Cross Border Fees *–continued*

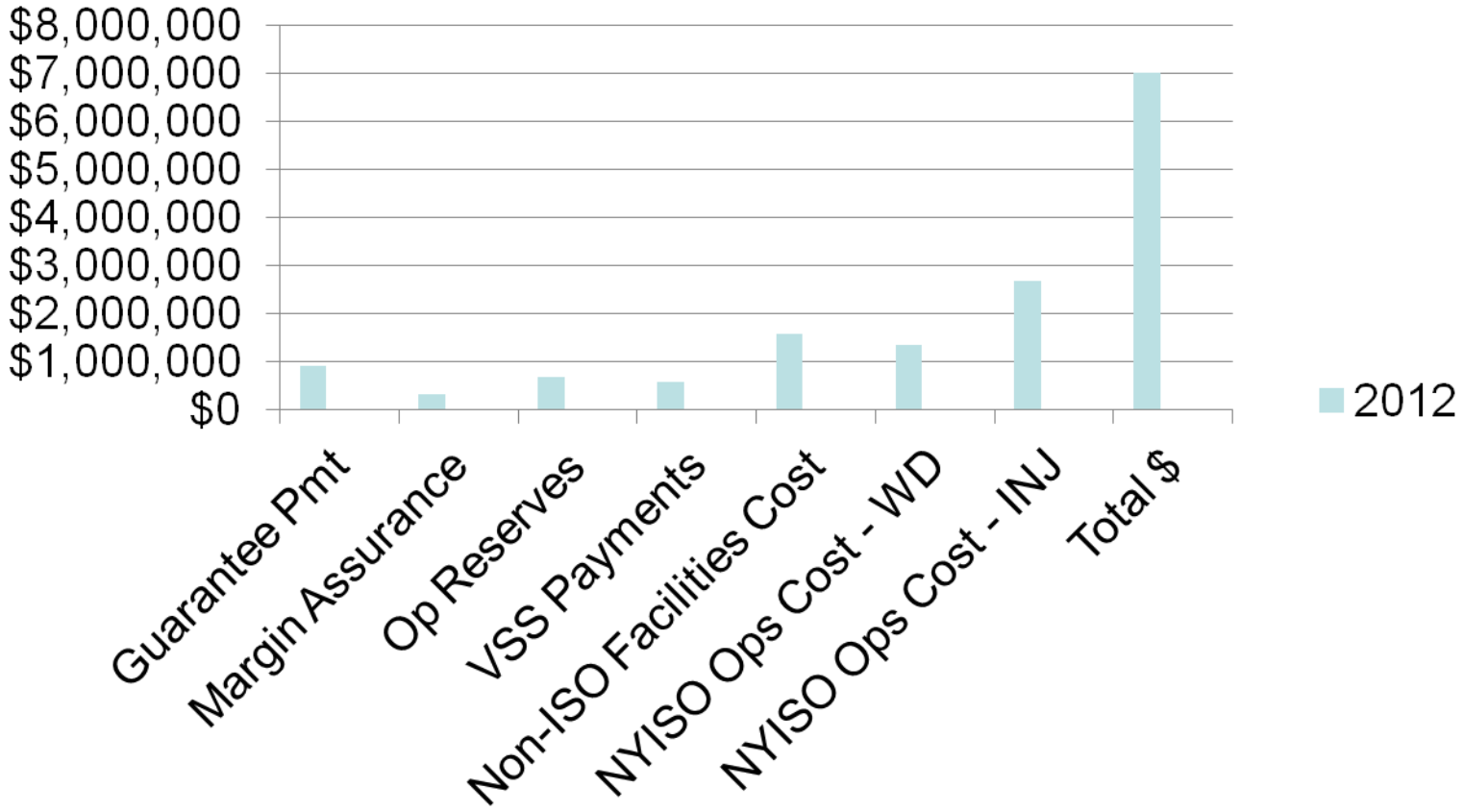
- **Voltage Support (VSS)**
  - *Availability payment to suppliers to maintain capability to provide voltage support to grid*
  - *2012: $590 K*
- **Non-ISO Facilities Charge**
  - *Operating costs for Ramapo PAR, Station 80 Capacitor Bank, NYPA Transmission*
  - *2010: $ 1.59 M*
- **NYISO Cost of Operations:**
  - *Pay for NYISO annual budget and FERC fees*
  - *Withdrawals allocated 72% of NYISO cost of operations; includes internal load, exports, wheels (out)*
  - *Injections allocated 28% of NYISO cost of operations; includes internal generation, imports, wheels (in)*
  - *2012: $4.0 M*

How are NY Cross-Border Fees Allocated?

- **Pro-rata share of MWh: internal load, exports, wheels**
  - ***Bid Guarantee , Margin Assurance***
- **Pro-rata share of MWh: internal load, exports**
  - ***Operating Reserves***
- **Fixed annual (monthly) rates:**
  - ***VSS –internal load, exports, wheels***
  - ***Non-NYISO Facility Charges –internal load, exports, wheels***
  - ***NYISO cost of operations***
    - **internal load, exports, wheels (out): 72%**
    - **internal generation, imports, wheels (in): 28%**

Historic NYISO Cross Border Fees –Total $

NYISO Cross Border Charges at NY-PJM Interface* : Total Annual $



*Includes all NY-PJM Interfaces

NEXT STEPS

Proposed Timeline and Next Steps

- **Proposed Implementation Timeline**
  - ***EOY-2012:*** ***Introduce to Stakeholders***
  - ***Mid-2013:*** ***Market Design Approved***
  - ***2014:*** ***Implement***
- **NYISO Consumer Impact Analysis**
  - ***Will be presented at the NYISO Market Issues Working group in May/June timeframe.***
- **Joint stakeholder meetings:**
  - ***June 25th at PJM's CTC in Valley Forge***
    - **List of Expected Tariff Revisions**

Tariff Changes

- **Each ISO/RTO will pursue tariff changes, as needed, with their stakeholders. Expected process and timeline:**

NYISO:

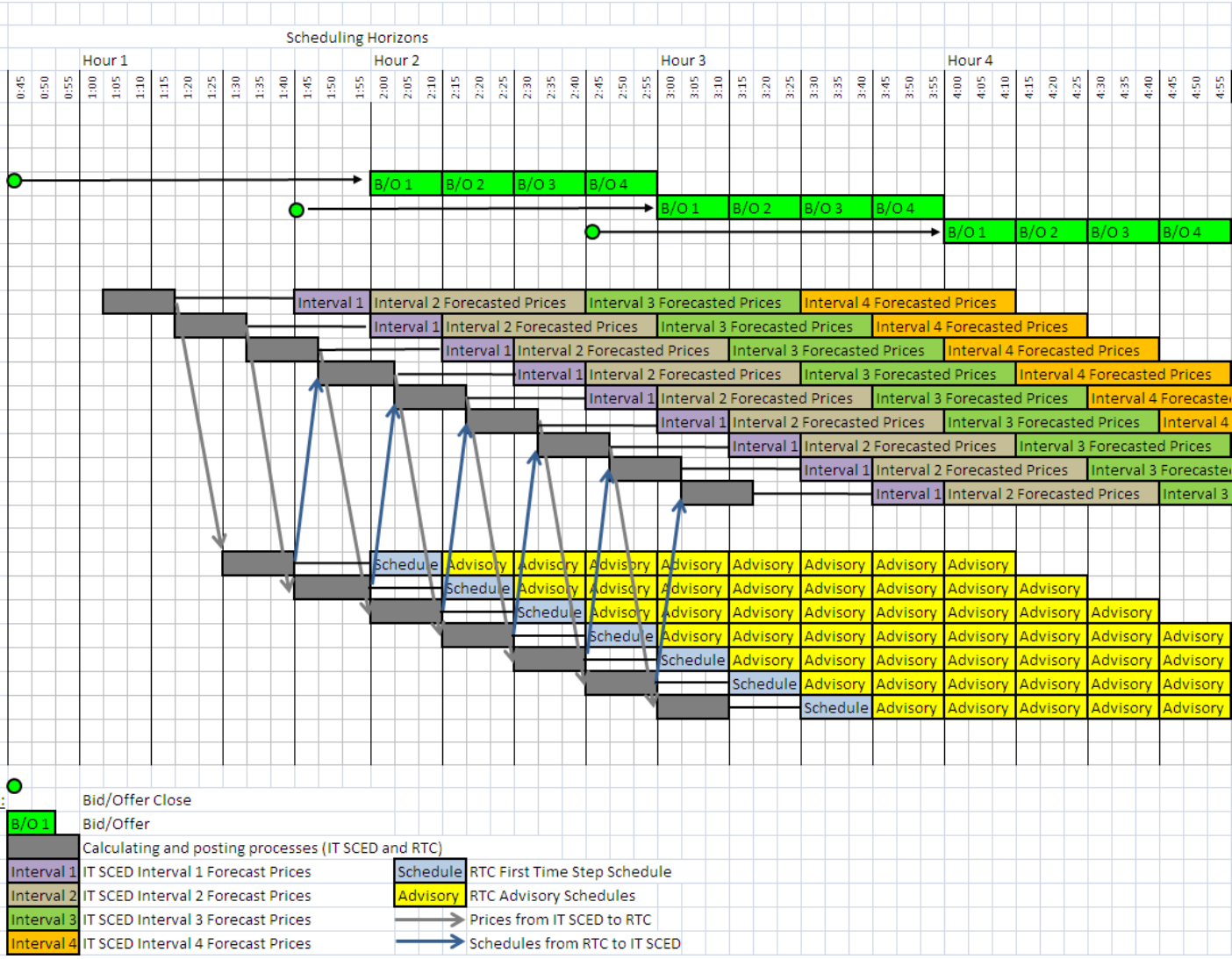
- **MIWG Review of tariff changes (June/July)**
- **Approval by the Business Issues Committee (BIC) (August)**
- **Approval by the Management Committee (MC) (August)**

PJM:

- **MIC Review of tariff changes (June/July)**
- **MRC Review of tariff changes (July/August)**
- **Approval by Members Committee (MC) (August)**

APPENDIX

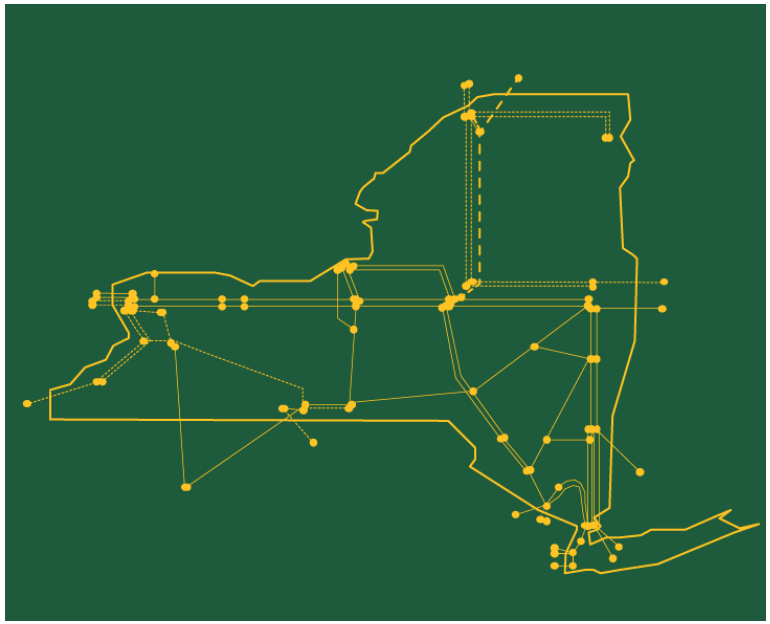
NOTE: All Intervals are interval beginning



Legend:

	Bid/Offer Close
B/O 1	Bid/Offer
	Calculating and posting processes (IT SCED and RTC)
Interval 1	IT SCED Interval 1 Forecast Prices
Interval 2	IT SCED Interval 2 Forecast Prices
Interval 3	IT SCED Interval 3 Forecast Prices
Interval 4	IT SCED Interval 4 Forecast Prices
Schedule	RTC First Time Step Schedule
Advisory	RTC Advisory Schedules
→	Prices from IT SCED to RTC
→	Schedules from RTC to IT SCED

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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