

Changes to 2 Ancillary Service Mitigation Provisions

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(REVISED 9/20/2011 – Revised text in red)

2010 SOM Recommendation #5

- ◆ **Potomac Economics recommend that the NYISO modify two mitigation provisions that may limit competitive 10-minute reserves offers in the day-ahead market.**
- ◆ **The mitigation provisions:**
 - *Limit GTs to a 10-minute non-spinning reserve reference of \$2.52/MWh.*
 - *Require New York City steam units to offer 10-minute spinning reserves at \$0/MWh.*
- ◆ **Potomac Economics opined that changing these mitigation provisions should improve convergence of day-ahead and real-time reserve prices in peak load hours.**

- ◆ **The MMU found that convergence between day-ahead and real-time reserves prices has been poor under certain conditions*:**

- Average day-ahead reserves prices are systematically higher than real-time prices in the majority hours.
 - ✓ This is consistent with the risks suppliers may incur by selling reserves in the day-ahead market.
 - ✓ However, it may also be that some suppliers over-estimate the likelihood of a real-time price spike.
- Average real-time prices are frequently much higher than average day-ahead prices during afternoon hours under high-load conditions.
 - ✓ Systematically low day-ahead prices in these hours increase the opportunity cost of selling reserves in the day-ahead market.
 - ✓ Adjustments in day-ahead offer prices by reserve suppliers are likely to improve convergence between day-ahead and real-time.

*** 2010 State of the Market Presentation, Slide 77.**

The Att. H Provisions

- ◆ **Tariff provision Att. H §23.3.1.4.5:**
 - *Notwithstanding the foregoing provisions, the reference level for 10-Minute Non-Synchronized reserves shall be the lower of (i) the amount determined in accordance with the provisions of Section 23.3.1.4.1.1, or (ii) \$2.52.*
- ◆ **Tariff provision Att. H §23.5.3.3**
 - *In addition, In-City generators must Bid zero (\$0) for the availability portion of Day-Ahead Spinning Reserves Bids. The implementation of this mitigation measure will have no effect on the ability of a Generator located in New York City to recover the market-clearing price established by the ISO for the sale of Spinning Reserves.*

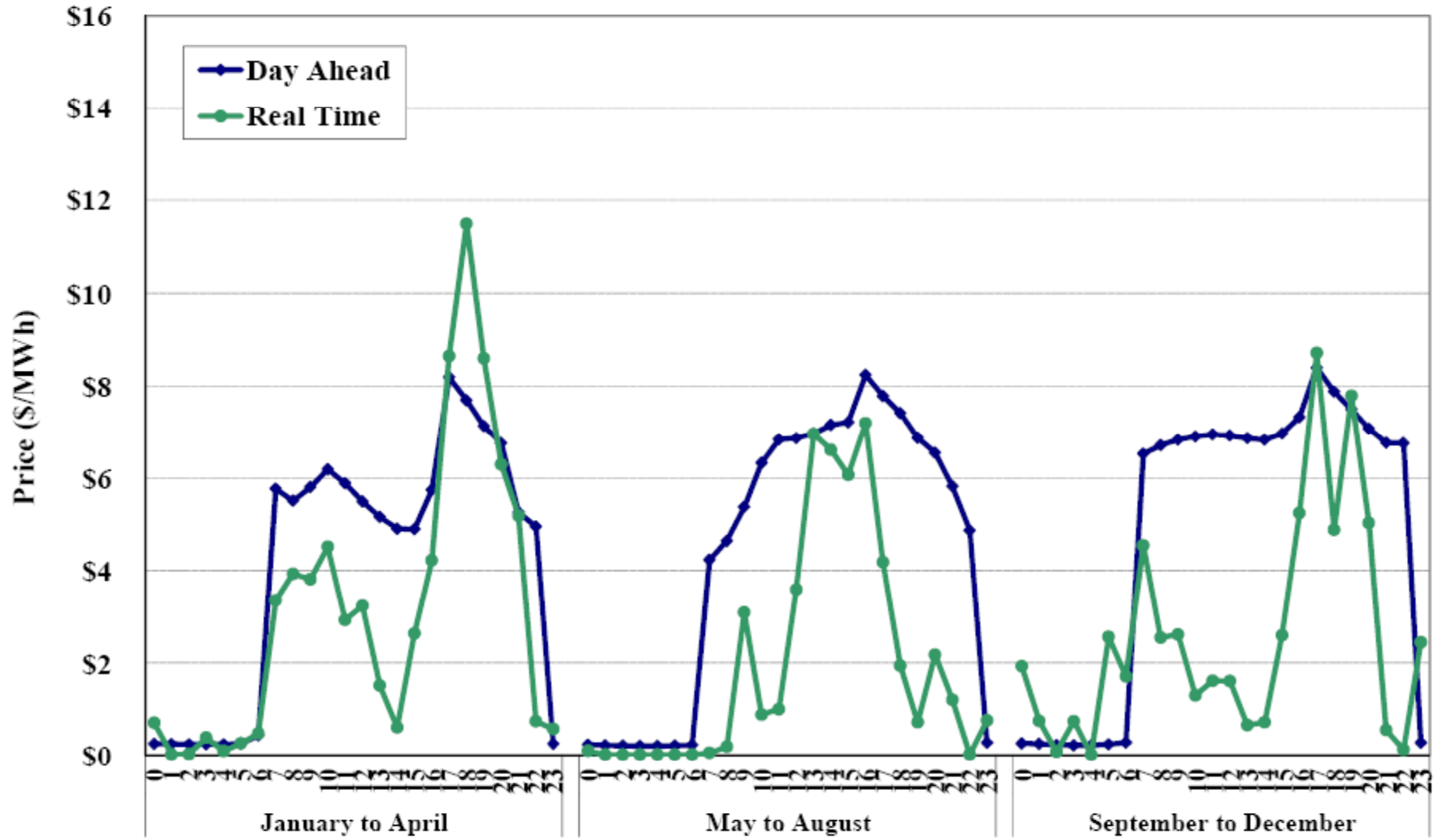
MMU's Concern

From the SOM Report (pg 54)

- ◆ **Day-ahead reserve prices tend to fluctuate based on the expected likelihood of a real-time price spike, although day-ahead reserve prices are also affected by the risks that suppliers face from the high volatility of real-time prices.**
- ◆ **If a supplier sells reserves in the day-ahead market and the real-time price spikes unexpectedly, the supplier can incur substantial losses or foregone profit. Accordingly, the day-ahead premium during most periods may reflect the risks face by suppliers. Nevertheless, *the fact that day-ahead prices were consistently higher than real-time prices during period when real-time price spikes are particularly unlikely suggests that participant may be unable to arbitrage the day-ahead prices during these periods under the current market rules.* [emphasis added]**

SPINNING RESERVES

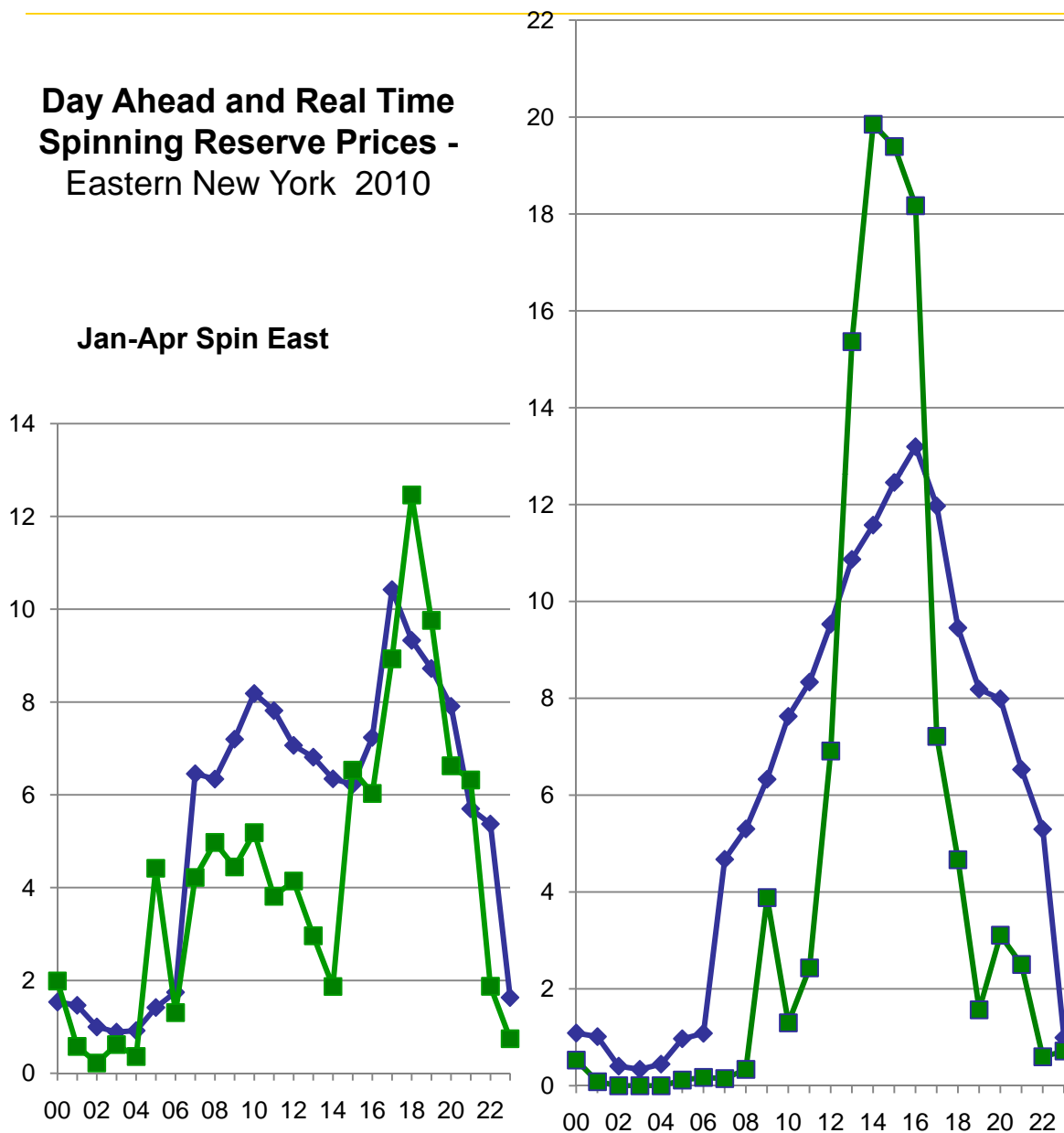
Figure 16: Day-Ahead and Real-Time 10-Minute Spinning Reserves Prices
Western New York, 2010



May- Aug Spin East



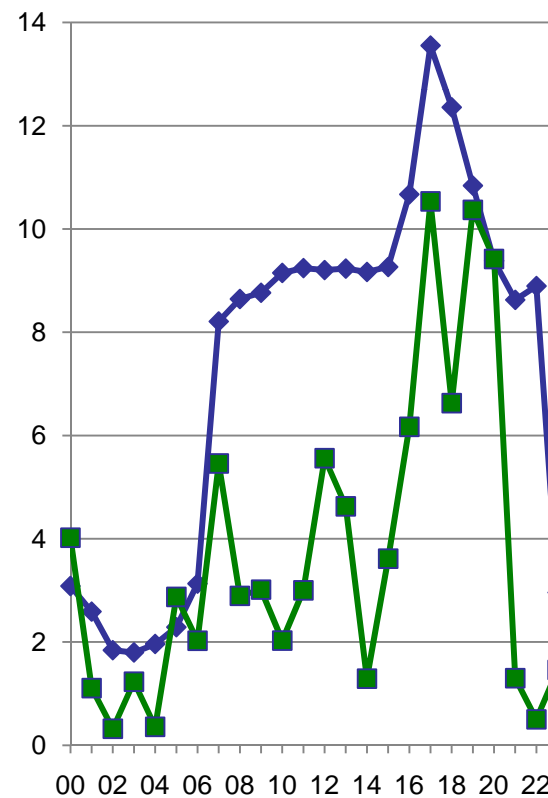
Day Ahead and Real Time Spinning Reserve Prices - Eastern New York 2010



Jan-Apr Spin East

Sept-Dec Spin East

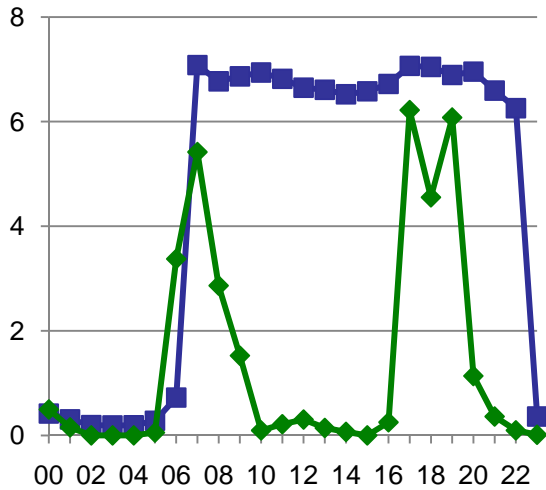
◆ Day Ahead
■ Real Time



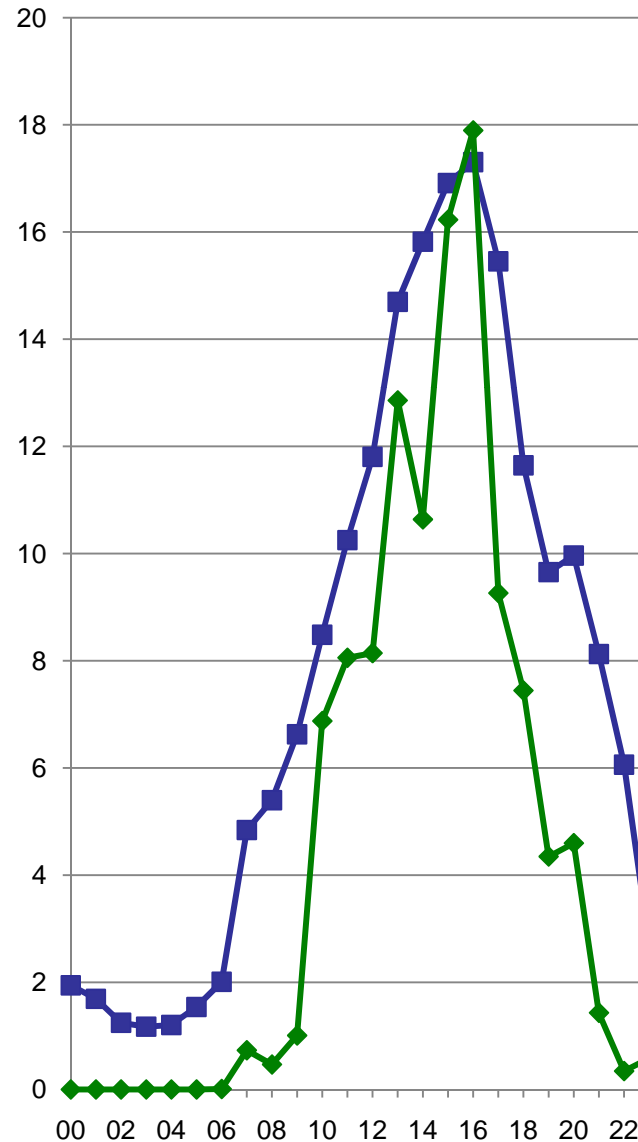
Day Ahead and Real Time Spinning Reserve Prices – Western New York 2011

January-April 10 Min Spinning Reserve Prices West 2011

■ Day Ahead
◆ Real Time



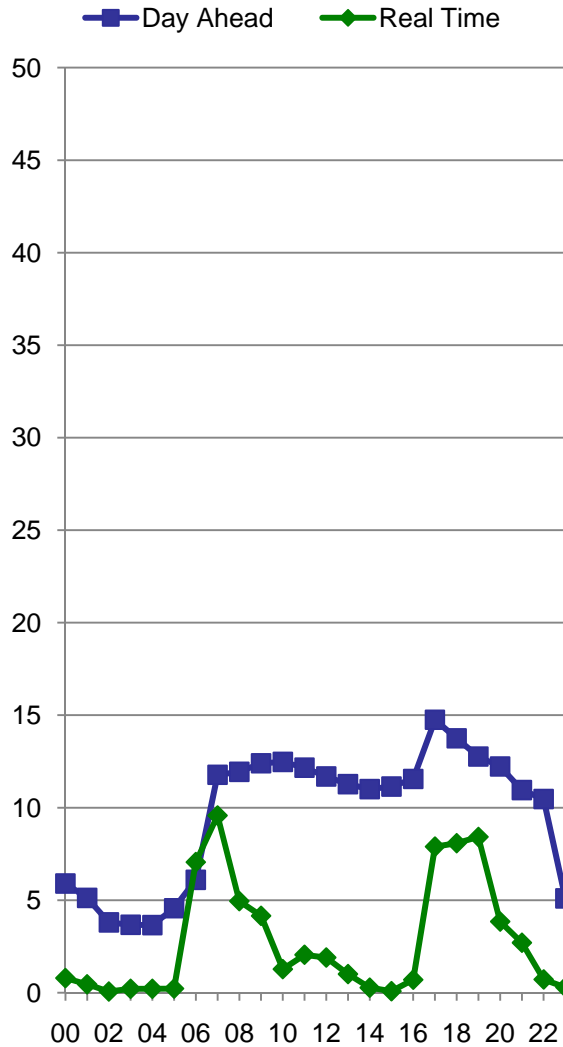
May-August 10 Min Spinning Reserve West 2011



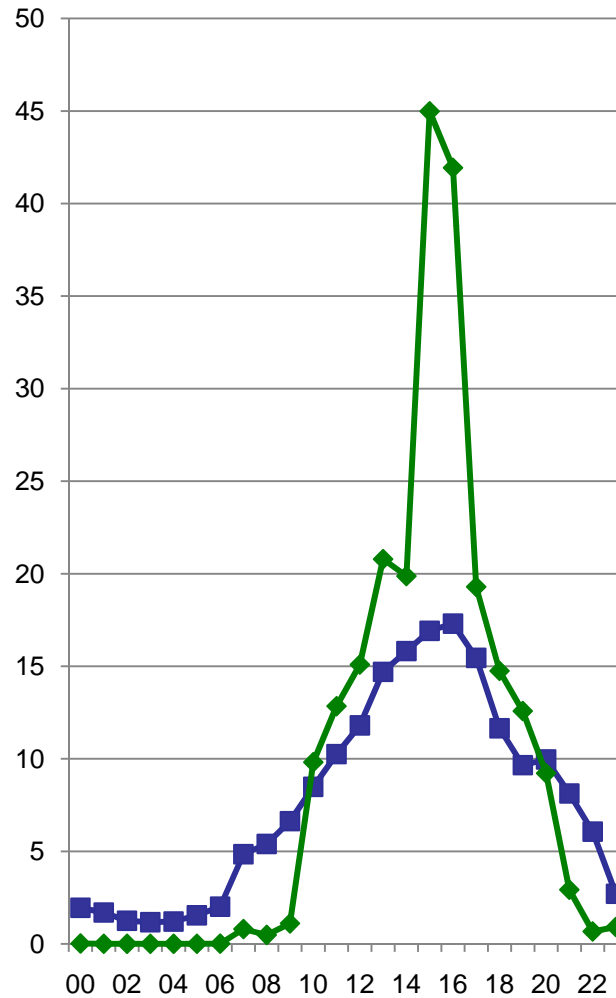
*August data through mid-August

Day Ahead and Real Time Spinning Reserve Prices - Eastern New York 2011

January-April 10 Min Spinning Reserve Prices East 2011



May-August 10 Min Spinning Reserve East 2011

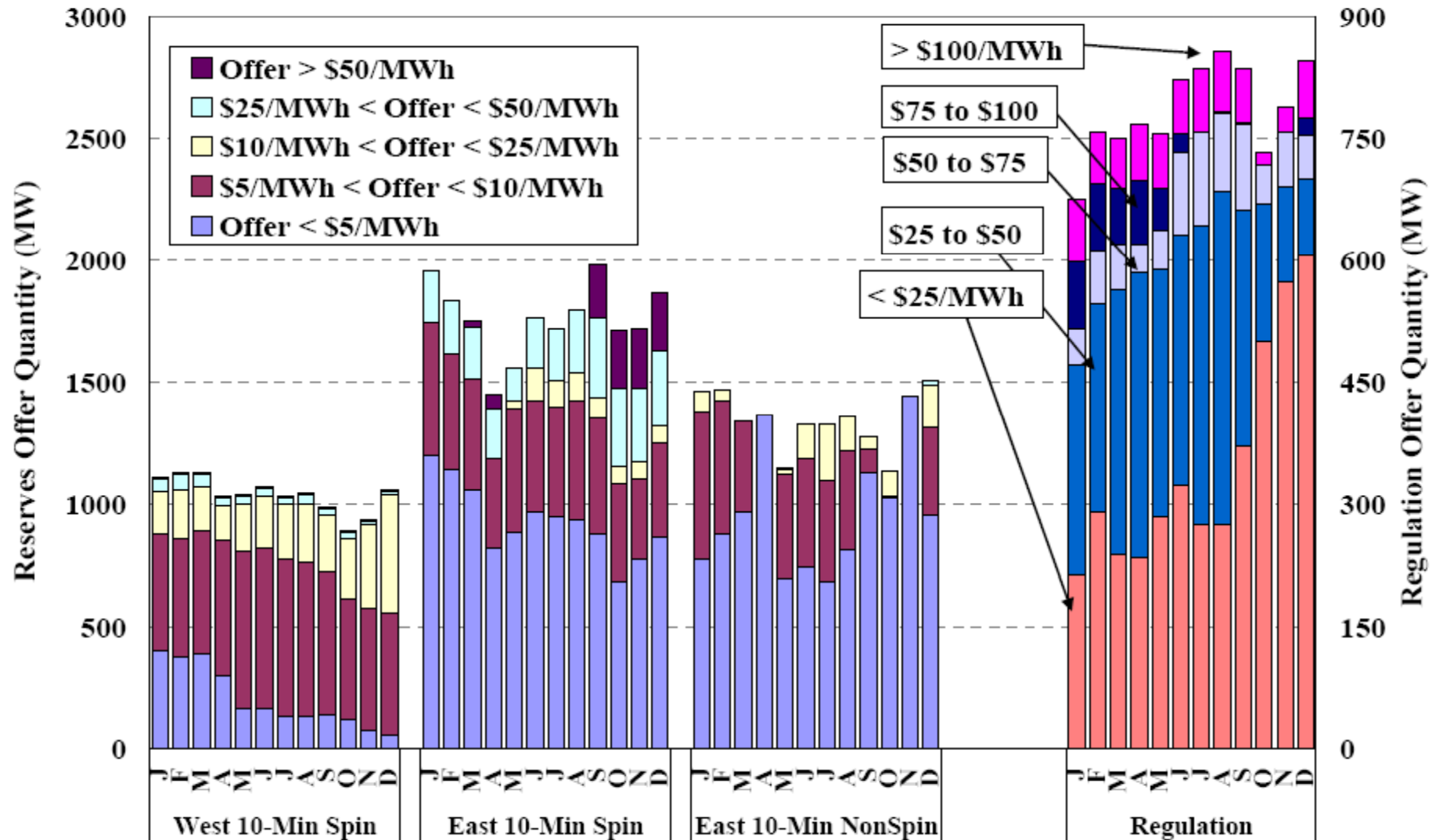


*August data through mid-August

SOM pg 67

- ◆ **The offer prices of 10-minute spinning reserves were generally higher in Western New York than in Eastern New York. The primary reason for this is that New York City generators are required to offer 10-minute spinning reserves at \$0 per MWh, while there is no offer cap for generators outside New York City. Higher offers for 10-minute spinning reserves tend to increase the clearing prices of 10-minute spinning reserves in the day-ahead market relative to the real-time market.**

Figure 22: Summary of Ancillary Services Offers
Day-Ahead Market, 2010



- ◆ **[From the SOM] Figure 22 shows that approximately 200 MW of 10-minute spinning reserves in Eastern New York was offered above \$25 per MWh in the first quarter of 2010, while the amount rose to roughly 500 MW by the last quarter of 2010. Suppliers normally submit such high offers when they prefer not to provide 10-minute spinning reserves in the day-ahead market. The volatility of real-time reserves prices makes it risky for a generator to sell reserves in the day-ahead market because if the generator is dispatched to provide energy rather than reserves in the real-time market, it will have to buy back reserves at the real-time clearing price in order to satisfy its obligations from selling day-ahead *[NYISO: and therefore forgo the opportunity to sell ancillary services in Real-Time]*. Hence, the increase in offer prices may indicate that some suppliers believed that real-time reserve prices had become more volatile by the end of 2010.**

The current mitigation measure:

23.5.3 Market Power Mitigation Measures Applicable to Sales of Spinning Reserves

23.5.3.1 Local reliability rules require that specified amounts of Spinning Reserves be provided by In-City Generators. The Spinning Reserve-capable portion of each Generator located in New York City must be made available to the ISO for purposes of meeting the New York City Spinning Reserve requirement.

23.5.3.2 The market power mitigation measures applicable to Spinning Reserves will be implemented when the ISO's least-cost dispatch requires that one or more of the Generators located in New York City be committed to meet the In-City Spinning Reserve requirement. For any day that an In-City Generator is committed to meet the In-City Spinning Reserve requirement under circumstances where the Generator would not otherwise have been committed under the ISO's least-cost dispatch, the market power mitigation measures applicable to unit commitments, as described in Section 23.5.2, would apply.

23.5.3.3 In addition, In-City generators must Bid zero (\$0) for the availability portion of Day-Ahead Spinning Reserves Bids. The implementation of this mitigation measure will have no effect on the ability of a Generator located in New York City to recover the market-clearing price established by the ISO for the sale of Spinning Reserves.

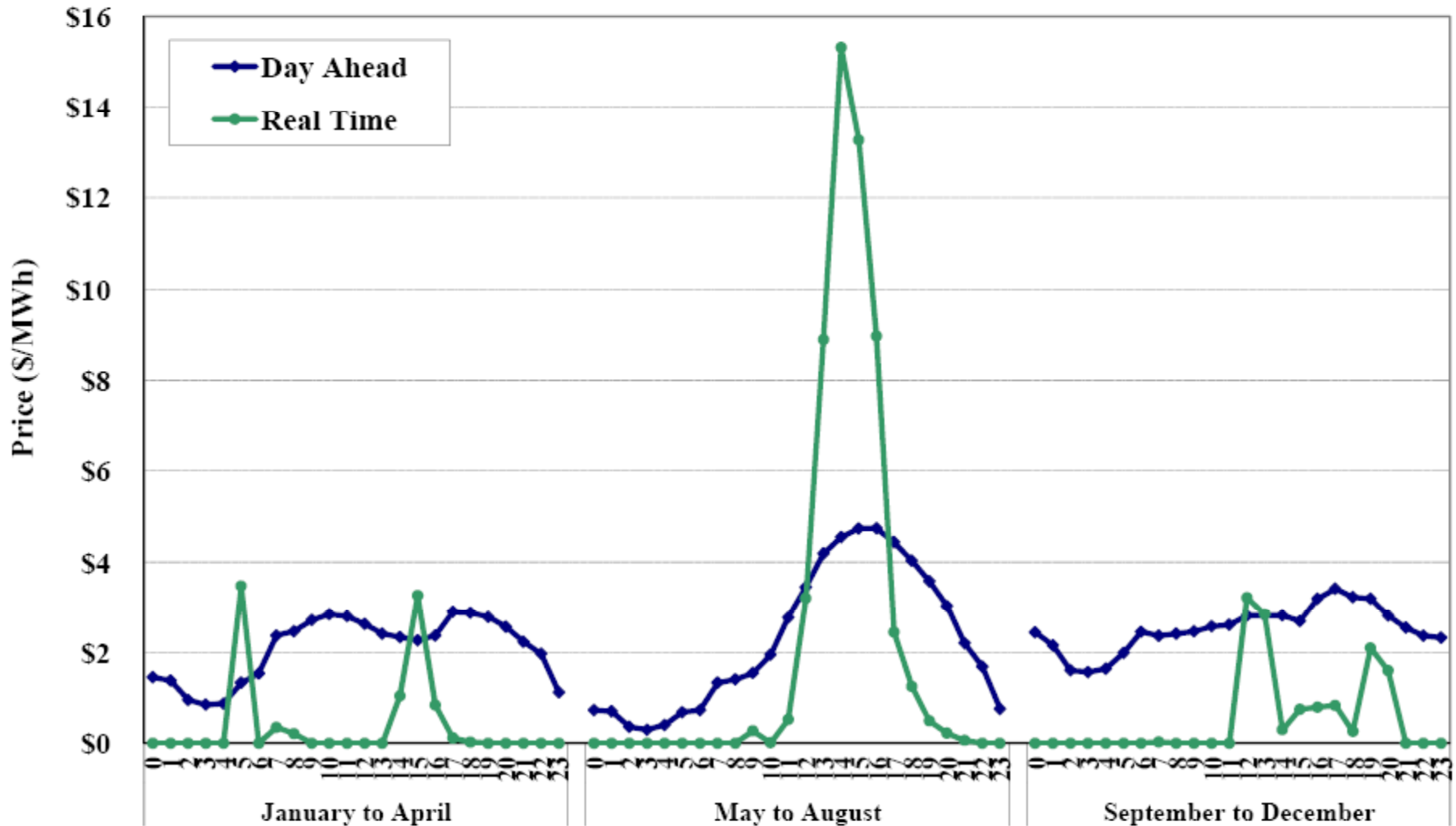
Background on the tariff measure

- ◆ **Section 23.5.3.1 is a reliability based requirement that has as its source NYS Public Service Commission order # 27302 that required defined levels of 10 minute reserve to be located in-city. This rule was the basis for the provision in the Consolidated Edison of NY (Coned) divestiture agreements that were defined in FERC Docket ER98-3169. In this ruling the divested generation blocks were required to offer their generation to be dispatched by the NYISO Security Constrained Dispatch (SCD) program. In the current market terminology this is a requirement that all Spinning Reserve capable In-City generation must bid as flexible/dispatchable units.***
- ◆ **Section 23.5.3.3 is an economic based provision that also has as its roots the Coned divestiture filing.**

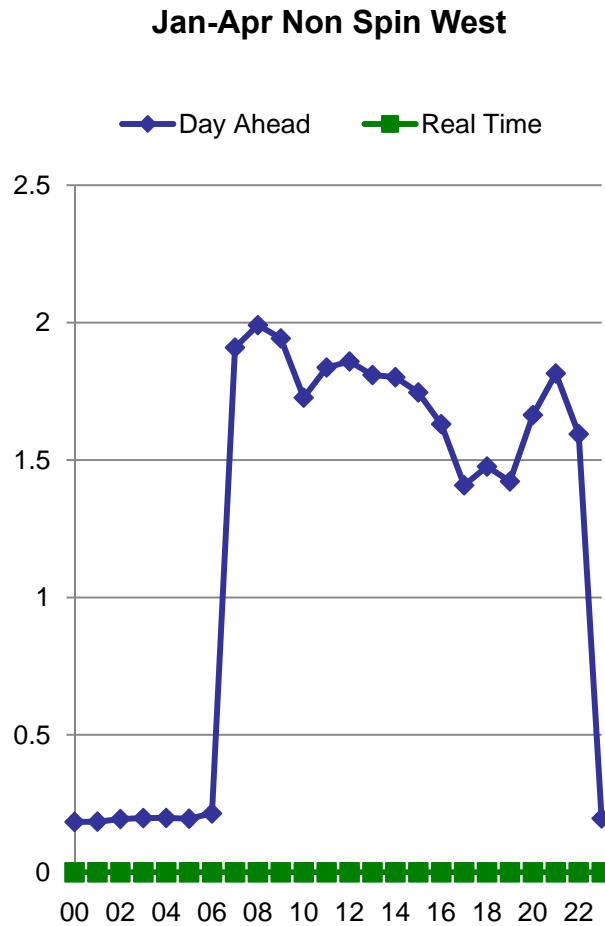
***The Coned divestiture was limited to 3 blocks of generation, Astoria, Arthur Kill and Ravenswood. This requirement was not meant to be applied to the Coned units that support the steam system.**

NON-SPINNING 10 MINUTE RESERVES

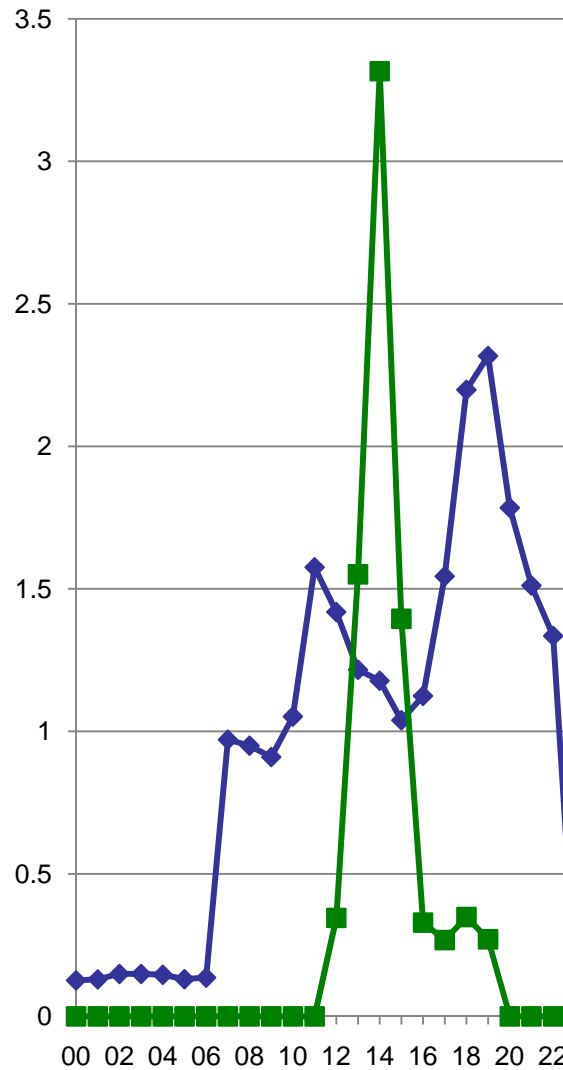
Figure 15: Day-Ahead and Real-Time 10-Minute Non-Spinning Reserves Prices
Eastern New York, 2010



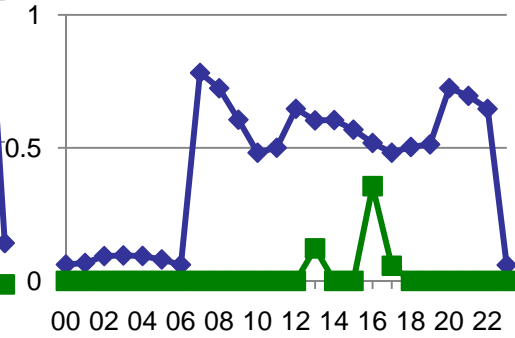
Day Ahead and Real Time Non-Spinning Reserve Prices – Western New York 2010



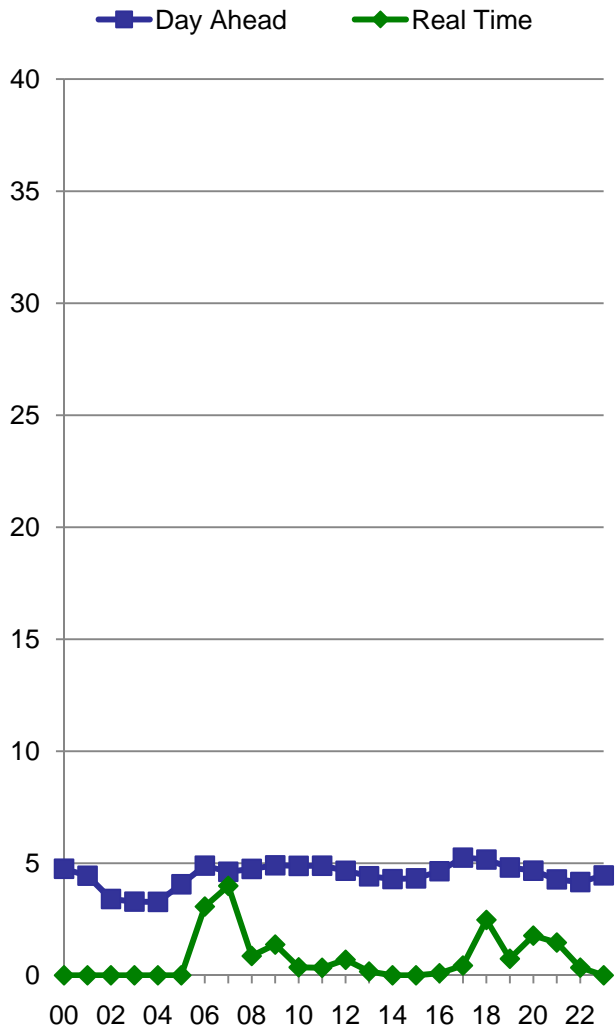
May-Aug Non Spin West



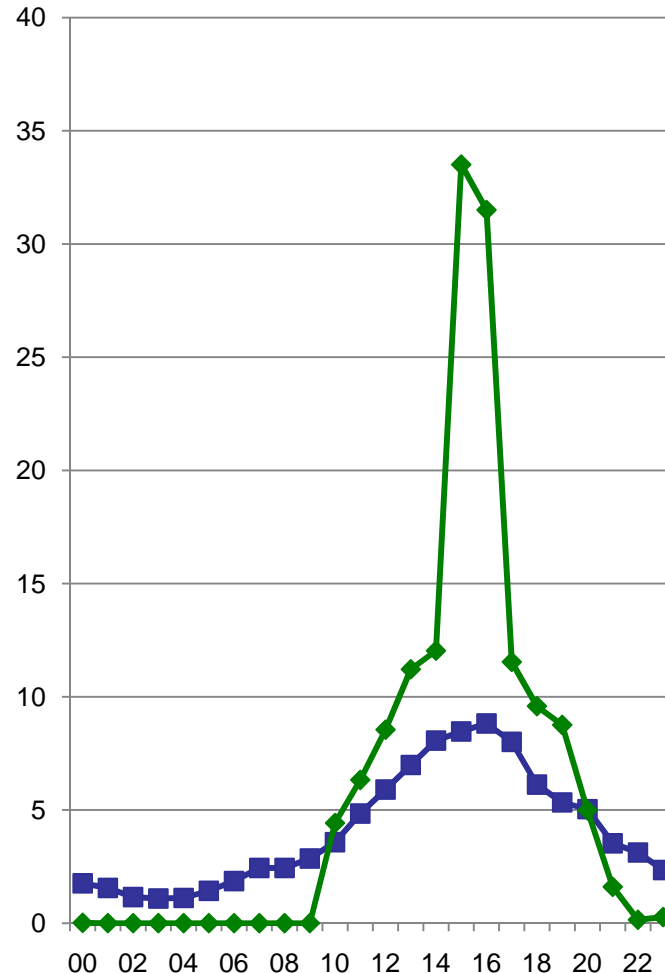
Sept-Dec Non Spin West



January-April 10 Min Non-Spinning East 2011



May-August 10 Min Non-Spinning East 2011

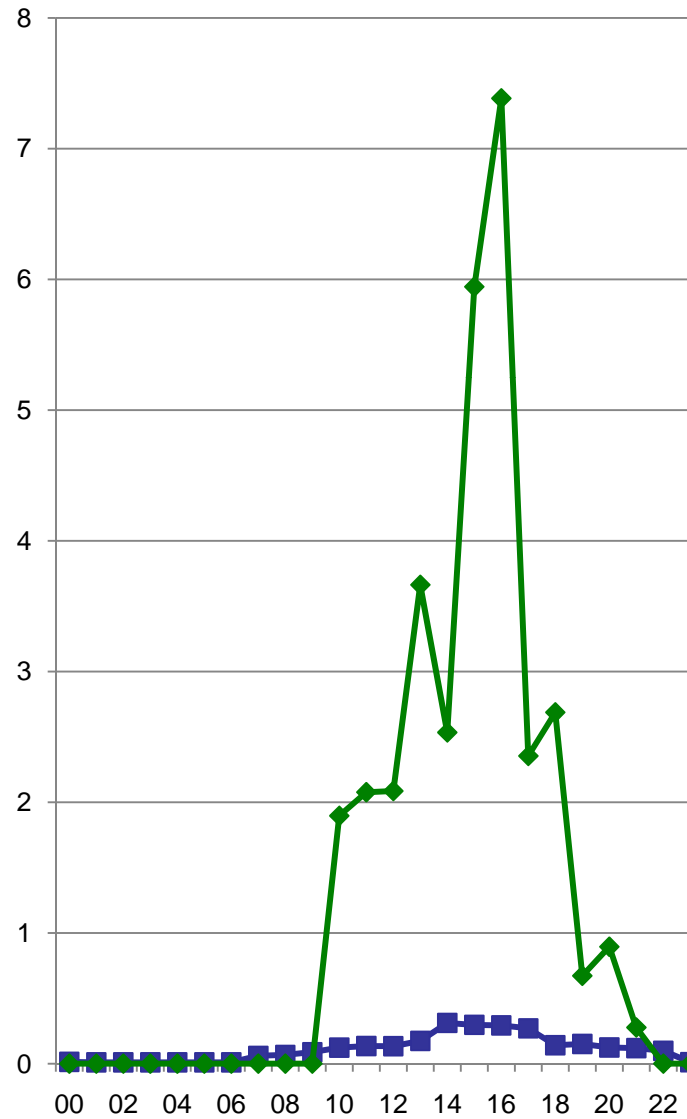


*August data through mid-August

January-April 10 Min Non-Spinning West 2011



May-August 10 Min Non-Spinning West 2011

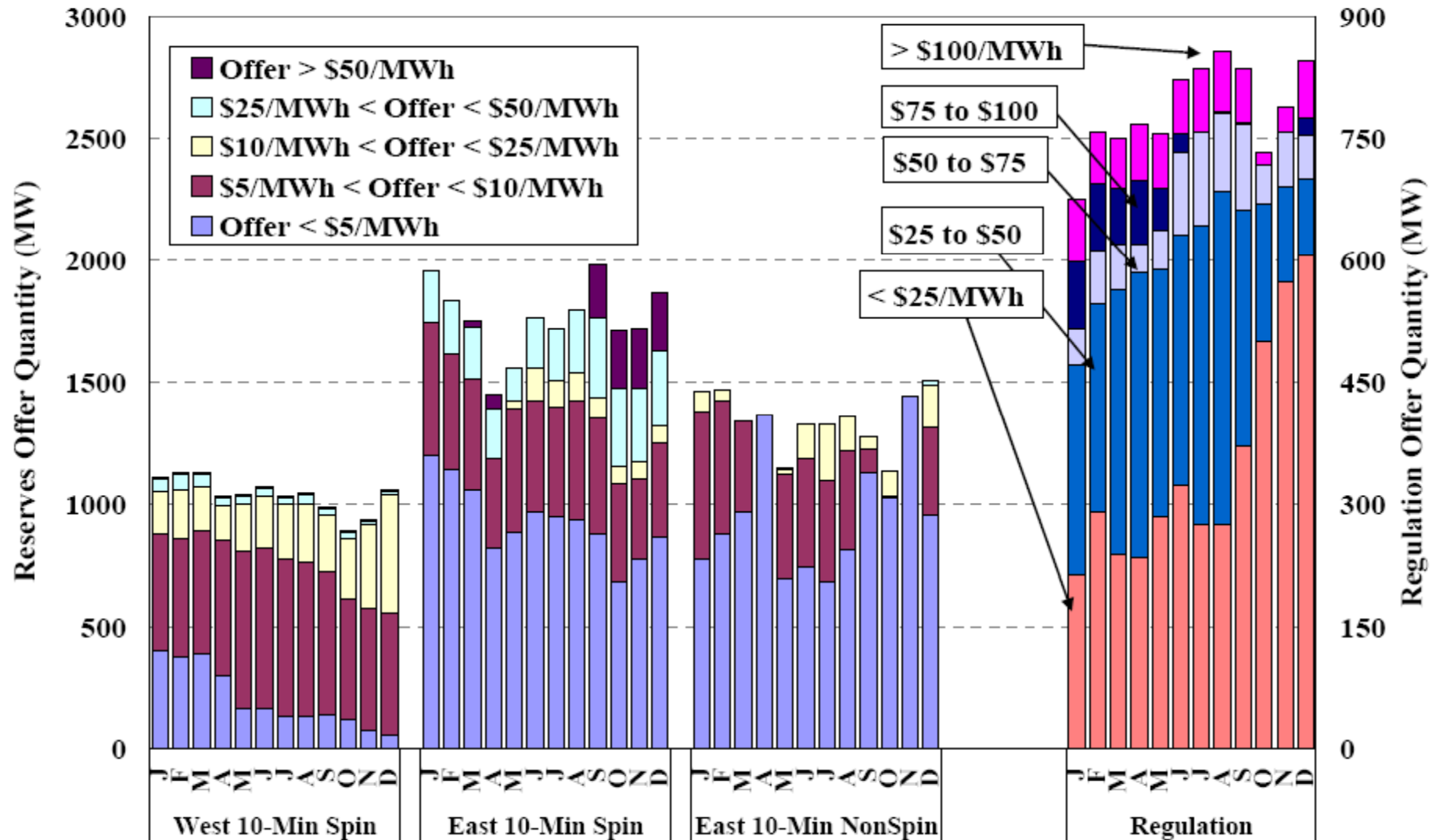


*August data through mid-August

SOM Report (p 61)

- ♦ **To the extent suppliers would prefer to raise their day-ahead offer prices for 10-minute non spinning reserves (or not offer at all), they are limited by two factors. First, offer prices are limited by the mitigation rules, which cap the reference levels of 10-minute non-spinning reserve units at \$2.52 per MWh. Second, decreases in offer quantities are limited by the ICAP rules, which require non-PURPA ICAP units that have 10-minute non-spinning reserve capability to offer it in the day-ahead market. Hence, suppliers that are capable of providing 10-minute non spinning reserves cannot avoid the mitigation rules simply by not offering in the day-ahead market. These restrictions prevent generators from rationally arbitraging the day-ahead and real-time prices when real-time prices are expected to be higher (or the probability of real-time shortages is non-trivial). Unfortunately, only generators are currently able to arbitrage these prices, so these restrictions may contribute to poor convergence between the day-ahead and real-time markets. [*emphasis added*]**

Figure 22: Summary of Ancillary Services Offers
Day-Ahead Market, 2010



The current tariff measure

- ◆ **Tariff provision Att. H §23.3.1.4.5:**
 - *Notwithstanding the foregoing provisions, the reference level for 10-Minute Non-Synchronized reserves shall be the lower of (i) the amount determined in accordance with the provisions of Section 23.3.1.4.1.1, or (ii) \$2.52.*
- ◆ **The premise for the cap is defined in FERC Docket ER00-3591 and this filing was in response to a defined market flaw in the reserve markets that occurred between January and March 2000.**
 - *Beginning in January 2000 and continuing into February 2000 and March 2000 the reserve markets were not working as expected and the NYISO filed with FERC to suspend the markets.*

FERC filings

- ◆ **Three issue / causes for the reserve market issue were documented in the filing (ER00-1969):**
 - *The HHI index for the units capable of meeting the NYISO total 10 minute reserve requirement was 4,031. This was labeled as highly concentrated. Three Market Participants controlled over 97% of the assets that could provide 10 minute non-synchronous reserves east of central east and on Long Island.*
 - *Beginning in January fewer resources were offering reserve bids in the market. This was identified as physical withholding and the number of bids received decreased by over 50%.*
 - *Offer prices increased to levels greater than \$350 / MW.*
- ◆ **On September 1, 2000 NYISO submitted FERC Docket ER00-3591 which defined a number of corrective actions that the NYISO was taking to remedy the reserve market issues. In this and other sub-dockets the non-synchronous reserves bid cap was removed but the reference cap remained.**
- ◆ **Two other significant modifications that were made at the time were the change in the market representation of the Gilboa units which increased the amount of reserves available in the east and the lowering of the east reserve requirement. Both of these actions would have the effect of lowering the reserve market concentration in the east.**

Other changes since 2000

- ◆ **There have also been a number of units commissioned since 2000 which should also lower the reserve market concentration.**
- ◆ **There have been significant modifications to the market mitigation rules since the filings associated with the reserve market issue. There now exist specific rules with respect to physical withholding and specific rules with respect to economic withholding.**

Rationale for \$2.52

- ◆ **From ER00-1969**

- *[\$2.52] is the highest market clearing price (with the exception of one hour when the price was set by a 30 minute reserves unit) for 10-Minute NSR in the period from the start of the 10-Minute NSR market to the time when the bidding and pricing described [in the filing] started to occur.*

HERFINDAHL-HIRSCHMAN INDEX (HHI)

HHI Analysis:

- ◆ **HHI: the Herfindahl-Hirschman Index is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them.**
- ◆ **$HHI = \sum_{i=1}^n S_i^2$**
 - *Where s_i is the market share of firm i in the market, and N is the number of firms.*
- ◆ **HHIs range between 0 (Perfect Competition) and 10,000 (Monopoly)**
 - *An HHIs below 1,500 or 1,800 are generally considered to indicate an unconcentrated market.*
 - *Markets with HHIs above 2,500 are generally considered concentrated.*

HHI Analysis:

- ◆ **For the purpose of this analysis, the NYISO calculated the HHI for 10 Minute Spinning Reserves and 10 Minute Non-Spinning Reserves based on the Billing organizations whose resources were scheduled.**
 - *The basis for the 10 Minute Spinning Reserves are the units scheduled for Spinning Reserves*
 - *The basis for the 10 Minute Non-Spinning are the units scheduled for 10 Minute Spinning and 10 Minute Non-Spinning Reserves.*
- ◆ **The NYISO is presenting the results for shoulder month weekends (October 2010 & April 2011) since it is expected that low load periods are the most likely to have concentrated ancillary service markets because fewer generators are able to supply spinning reserves.**
- ◆ **The NYISO is also presenting the results for Summer weekends (Jul 2011) to show a period when the markets are less likely to be concentrated.**

HHI Results

	DAM Hourly HHI 10 Minute Spinning Reserves (NYCA)			DAM Hourly HHI 10 Minute Non-Spin Reserves (NYCA)			DAM Hourly HHI 10 Minute Spinning Reserves (Eastern NY)		
	HHI	Peak Hours HHI	Off Peak HHI-HB0-6,23	HHI	Peak Hours HHI	Off Peak HHI-HB0-6,23	HHI	Peak Hours HHI	Off Peak HHI-HB0-6,23
Summer Weekends (July 2011)									
Ave	2199	2149	2299	2415	2547	2150	2142	2072	2283
Min	1453	1453	1546	1447	1466	1447	1494	1494	1540
Max	4413	4056	4413	4130	4130	3910	4413	3098	4413
Median	2121	2080	2221	2345	2468	2014	2051	2034	2208
Shoulder Weekend (Oct 2010, April 2011)									
Ave	3159	2746	3983	2628	2538	2808	2609	2428	2971
Min	1396	1396	1971	1722	1722	1804	1580	1580	1757
Max	9571	9571	8286	5179	3835	5179	9481	9481	8286
Median	2849	2392	3711	2551	2530	2739	2399	2308	2524

A look at a low load hour:

- ◆ **Looking at 10 minute reserves in a single hour: Market day Saturday 10/2/2010 HB 3 (shoulder month, middle of the night when loads are low – 12,956 MW load forecast)**
 - **Prices:**
 - East 10 Minute Spin: \$1.91
 - West 10 Minute Spin: \$0.25
 - East 10 Minute Non-Spin: \$1.91
 - West 10 Minute Non-Spin: \$0.25
 - 30 Minute Reserves: \$0.01
 - **Commitment** (*Reminder: reserve requirements are nested*):
 - Committed for the 10 Minute Spin requirement: 10 Units scheduled from 7 different billing organizations.
 - Capable of satisfying the 10 Minute Non-Spin requirement: 29 units scheduled from 10 billing orgs.
 - Capable of satisfying the 30 Minute Reserve requirement: 38 Units scheduled from 10 Billing Orgs.
 - **There were no pivotal suppliers for any of the 10 Minute spin or non-spin requirements.**
 - **HHIs were**
 - Eastern 10 Minute Spin: 2085
 - NYCA 10 Minute Spin: 4271
 - 10 Minute Non-Spin: 2921

BENEFITS, OPTIONS, & NEXT STEPS

Market Benefits

- ◆ **Increased efficiency: lifting these restrictions may **allow** generators **to** rationally **arbitrage** the day-ahead and real-time prices when real-time prices are expected to be higher (or the probability of real-time shortages is non-trivial).**
- ◆ **Increased risks for generators drives a wedge between DAM and RT prices.**

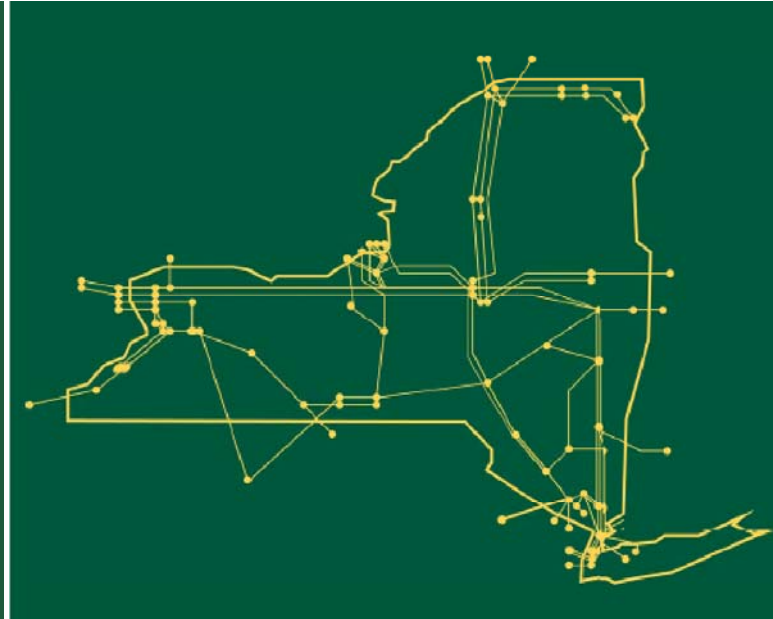
Proposed changes

- ◆ **Remove the cap on 10 Minute Non-Spin Reference Levels.**
- ◆ **Remove the requirement that New York City generating units offer 10-minute spinning reserves at \$0/MWh.**

Next Steps

- ◆ **Identify any concerns or recommendations from Market Participants.**
 - *Please send any comments **by October 14** to nbouchez@nyiso.com*
- ◆ **Finalize proposed design and come back to MIWG late 2011Q4/early 2012Q1**
- ◆ **Implementation is being considered as part of the 2012 BPWG prioritization process and would be targeted for the second half of 2012.**

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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