

# Changes to 2 Ancillary Service Mitigation Provisions

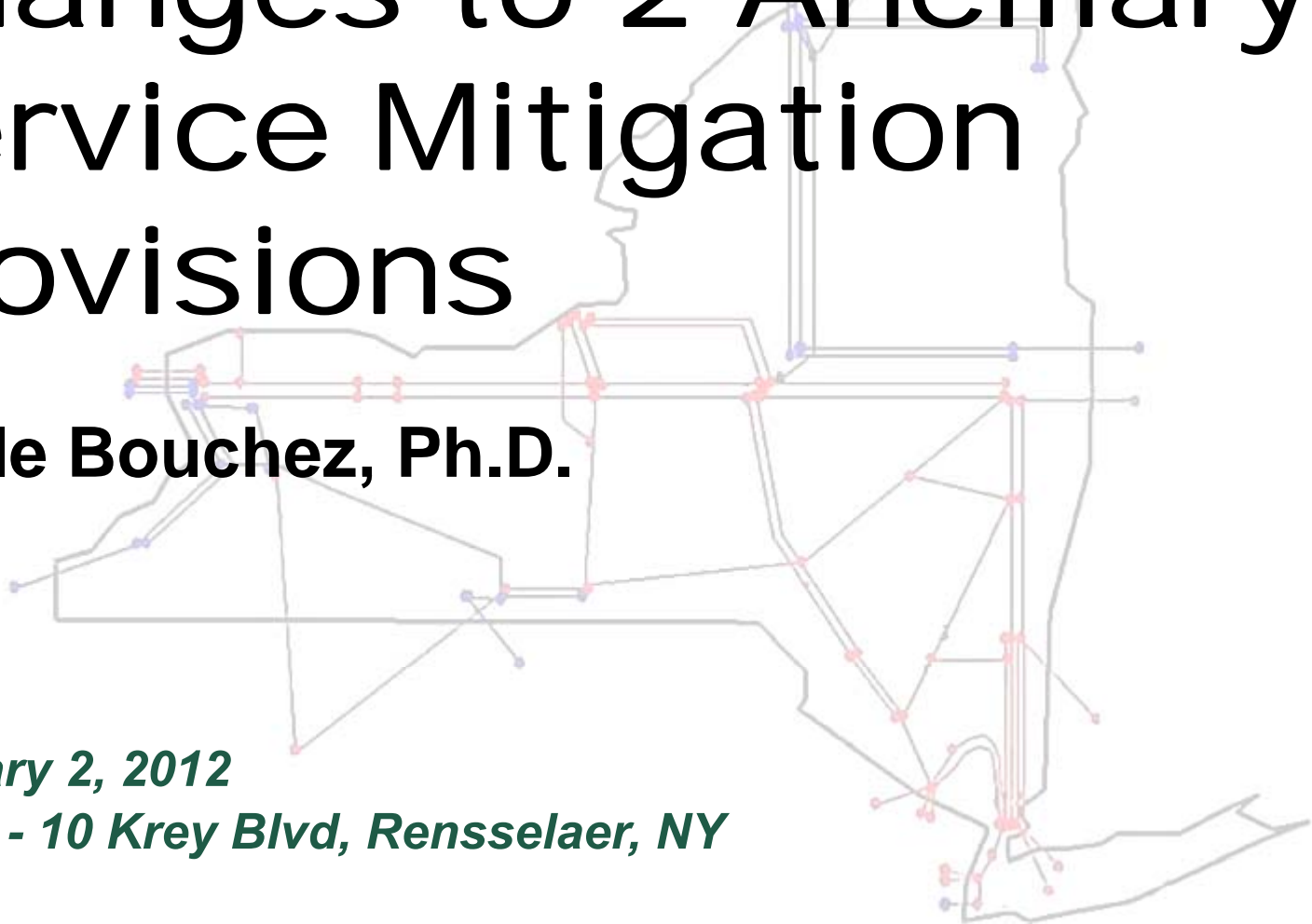
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**MIWG**

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**NYISO - 10 Krey Blvd, Rensselaer, NY**

**Version 2 - 1/31/2012 Revised Slide 13**



# 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 [in the DAM].*
- ◆ **Potomac Economics opined that changing these mitigation provisions should improve convergence of day-ahead and real-time reserve prices in peak load hours.**

# History

- ◆ **Concept presentation at MIWG  
September 16**
- ◆ **Market Participant comments  
received**
  - *Three sets of written comments received*

# Proposed Agenda

- ◆ **Review of the proposal**
- ◆ **Overview of issues raised in the comments**
- ◆ **Additional market power analysis**
- ◆ **Revised Proposal**

# 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.*

# EXISTING PROVISION: SPINNING RESERVES

# The current mitigation measure:

(Emphasis added)

## **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 was required to be offered for dispatch 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.**



# EXISTING PROVISION: NON-SPINNING 10 MINUTE RESERVES

# 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 ER00-3591-000**
  - *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 market based pricing in the 10 minute reserves market.*

# Background: FERC filings

- ◆ **FERC approved NYISO proposal to limit bids in the non-spinning reserve markets to \$2.52, which reflected the highest market clearing price during the initial period of ISO operations, when the market appeared to have been operating competitively.**
- ◆ **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.*

# MARKET PARTICIPANT COMMENTS

# Written Comments Received

- ◆ **Comments were received from**
  - *The Department of State*
  - *The New York State Department of Public Service*
  - *York Transmission Owners, LIPA, and NYPA*
- ◆ **Verbal comments were also received.**

# Issues Raised- Broad Areas

- ◆ A Consumer Impact Analysis was requested.
  - *The CIA is underway.*
- ◆ There were requests for more market power analysis.
  - *This presentation provides the following for a shoulder month (October 2011) and a summer month (July 2011):*
    - An expanded HHI analysis
    - A pivotal Supplier analysis
    - A Residual Supplier analysis
- ◆ Are new/additional mitigation measures needed?
  - *MST Att. H contains conduct and Impact mitigation measures for both the 10 Minute Spinning Reserve and 10 Minute Non-Spin Reserve markets. The NYISO has modified the proposal to allow the stepped lifting of the two measures and an explicit evaluation by the MMU of any attempt to exercise market power. In addition, the NYISO and the MMU will continue their monitoring activity and should there be any concern with the competitiveness of any market would propose a new mitigation measure.*

## Issues Raised- Broad Areas (2)

- ◆ **Will this change will lead to higher prices?**
  - *We see higher RT prices than DAM prices on some peak days, and it would be appropriate to allow availability bids to boost clearing prices in the DAM on those days to the expected RT prices. Convergence between the DAM and RT is important because commitment decisions are primarily made in the DAM and the closer the DAM is to what happens in RT, the more likely the committed generators can address what happens in real time efficiently (and this will minimize the need for expensive quick start generators).*
  - *On days when there is not a large price differential between DAM and RT prices, we do not expect higher prices given the competitive nature of the markets. If there is an attempt to exercise market power, the existing conduct/impact mitigation measures would apply. Also, the stepped lifting of the two measures and the explicit evaluation by the MMU of any attempt to exercise market power will provide notice of a market power issue should one appear.*
- ◆ **Information was requested about Ancillary Reference Levels and Ancillary Mitigation.**
  - *MMA will provide an overview of Reserve Reference Levels and Ancillary Services Mitigation at the next MIWG (February 17).*

## Issues Raised- Broad Areas (3)

- ◆ **Are there benefits to convergence?**
  - *Yes, better convergence between the DAM and RT allows for a better commitment in the DAM so the least cost set of units is available to address the conditions in Real Time. Supplemental commitments, and especially the commitments of quick start units in real time are inefficient (and costly). If the commitments can be made in the Day Ahead Market instead of in Real Time there will be benefits to consumers, and generators will also be compensated appropriately.*
- ◆ **Will the changes result in additional MMU costs to monitor the markets?**
  - *Monitoring the markets for competitiveness is part of the duties of the MMU and the findings are reported on in the Annual and Quarterly Reports. The Quarterly Reports “provide timely updates to the annual report, emphasizing issues of concern to the Market Monitoring Unit.” (MST 30.10.2) and provide an existing vehicle to identify any new or emerging issues. The NYISO does not believe that the change in these mitigation measures will result in substantial increases to the costs of the MMU.*



# EXPANDED MARKET POWER ANALYSIS

# EXPANDED: HERFINDAHL- HIRSCHMAN INDEX (HHI)

# Herfindahl-Hirschman Index (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 HHI below 1,500 or 1,800 is generally considered to indicate an unconcentrated market.*
  - *An HHI above 2,500 is generally considered an indication of a concentrated market.*
- ◆ **Note that the HHI *only* measures the size of firms in relation to the industry and does not indicate that a firm (or firms) will or are able to exercise market power.**

# Herfindahl-Hirschman Index (HHI) Analysis (2):

- ◆ The NYISO Presented the results of the as-scheduled-HHI (“Scheduled HHI”) at the 9/16/2011 MIWG
  - *HHI for DAM 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.
  - *As was pointed out by Market Participants, this is likely to overstate the market concentration, especially if one supplier is scheduled frequently.*
- ◆ Based on Market Participant feedback, the NYISO has augmented the analysis with an the analysis of the available units
  - *The DAM Hourly Supply-Based HHI (“Available HHI”) based on the organizations offering and capable of providing 10 Minute Spinning and 10 Minute Non-Spinning Reserves.*
  - *Both a summer month (July 2011) and a shoulder month (October 2011) have been analyzed (October 2011 replaces October 2010 now that the 2011 data is available).*
  - *On Peak and Off Peak analysis.*

# HHI Summary Statistics

	HHI Summary Statistics			
Jul-11	Mean	Median	Min	Max
Available EAST Total 10 Reserves HHI	1236	1138	963	1846
Available NYCA Total 10 Reserves HHI	1242	1088	810	2066
Available EAST SPIN Reserves HHI	1294	1024	768	2806
Available NYCA SPIN Reserves HHI	1505	1211	763	3133

	HHI Summary Statistics			
Oct-11	Mean	Median	Min	Max
Available EAST Total 10 Reserves HHI	1347	1201	957	2368
Available NYCA Total 10 Reserves HHI	1419	1238	992	2683
Available EAST SPIN Reserves HHI	1699	1355	1014	4415
Available NYCA SPIN Reserves HHI	2012	1696	1229	4714

# Herfindahl-Hirschman Index (HHI) Summary of Results\*

- ◆ **As expected, calculating the HHI using all the available supply (versus using just the scheduled units) results in lower HHIs because there are generally twice as many suppliers available than scheduled (this holds for both spinning and total 10 minute reserves).**
- ◆ **Over all hours, the mean and median HHI values are reasonable in both months examined.**

*\*Appendix 1 includes additional statistics on the HHI*

# Herfindahl-Hirschman Index (HHI) Summary of Results (2)

- ◆ There is some evidence that in some hours spinning reserves show some evidence of concentration (HHI greater than 2500). More so in the NYCA than the East and more so in the shoulder month (October) than in the summer.
- ◆ From the Peak and Off Peak summary statistics, the Off-Peak hours (HB00-06,23) are times when spinning reserves have higher HHIs (see Appendix 1).
- ◆ This is not of as great of a concern because:
  - *DAM Spinning reserve prices in off peak hours are much lower than in peak hours -prices in July and October 2011 are \$0.34 (\$3.46) off peak in the east and \$0.05 (\$0.16) in the west, and \$10.68 (\$9.87) peak in the east and \$4.74 (\$4.67) peak in the west.*
  - *The average spinning reserve RSI in October in (Off Peak) hours with more than a 2500 HHI is 3.9 in the East and 2.5 in NYCA indicating that although the market is concentrated there is also a lot of additional supply available to meet demand. See slide 26 for a discussion of the “RSI.”*
  - *The effective supply curve is expected to be very flat at that time of day, especially since many additional units are available for dispatch.*
  - *These reasons lead the NYISO to believe that the exercise of market power in those hours is unlikely and that the other existing (conduct and impact based) mitigation measures, along with the stepped removal of the “must offer at \$0” provision, are sufficient.*

# PIVOTAL SUPPLIER /RESIDUAL SUPPLIER ANALYSIS



# Methodology

- ◆ **These two measures reflect three key factors affecting market outcomes:**
  - *(1) Demand, and*
  - *(2) Total available supply and*
  - *(3) Large suppliers' capacity share .*
- ◆ **Pivotal Supplier:**
  - *A binary variable indicates when the market could not be solved without the contribution of the largest supplier. In other words, without this supplier, can the residual supply meet the demand?*
    - **If a producer is pivotal, the other suppliers can not meet demand without the largest supplier.**

# Methodology (2)

- ◆ **Residual Supplier Index (RSI):**

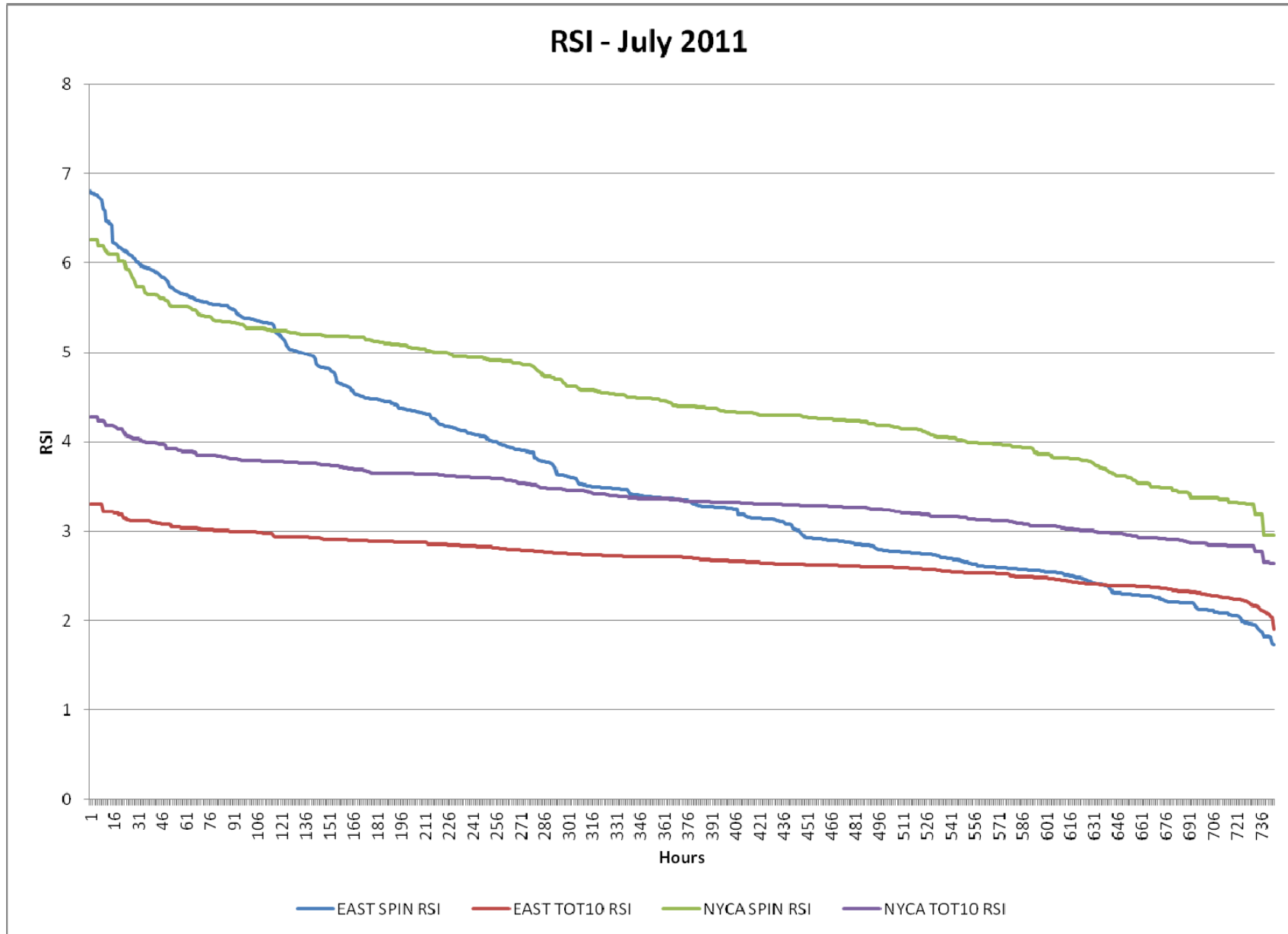
- *Even when the market is not reliant on the contribution of a single supplier, there may be times when very little additional supply is available. The RSI is a continuous index that looks at the amount of supply from suppliers other than the largest suppliers:*

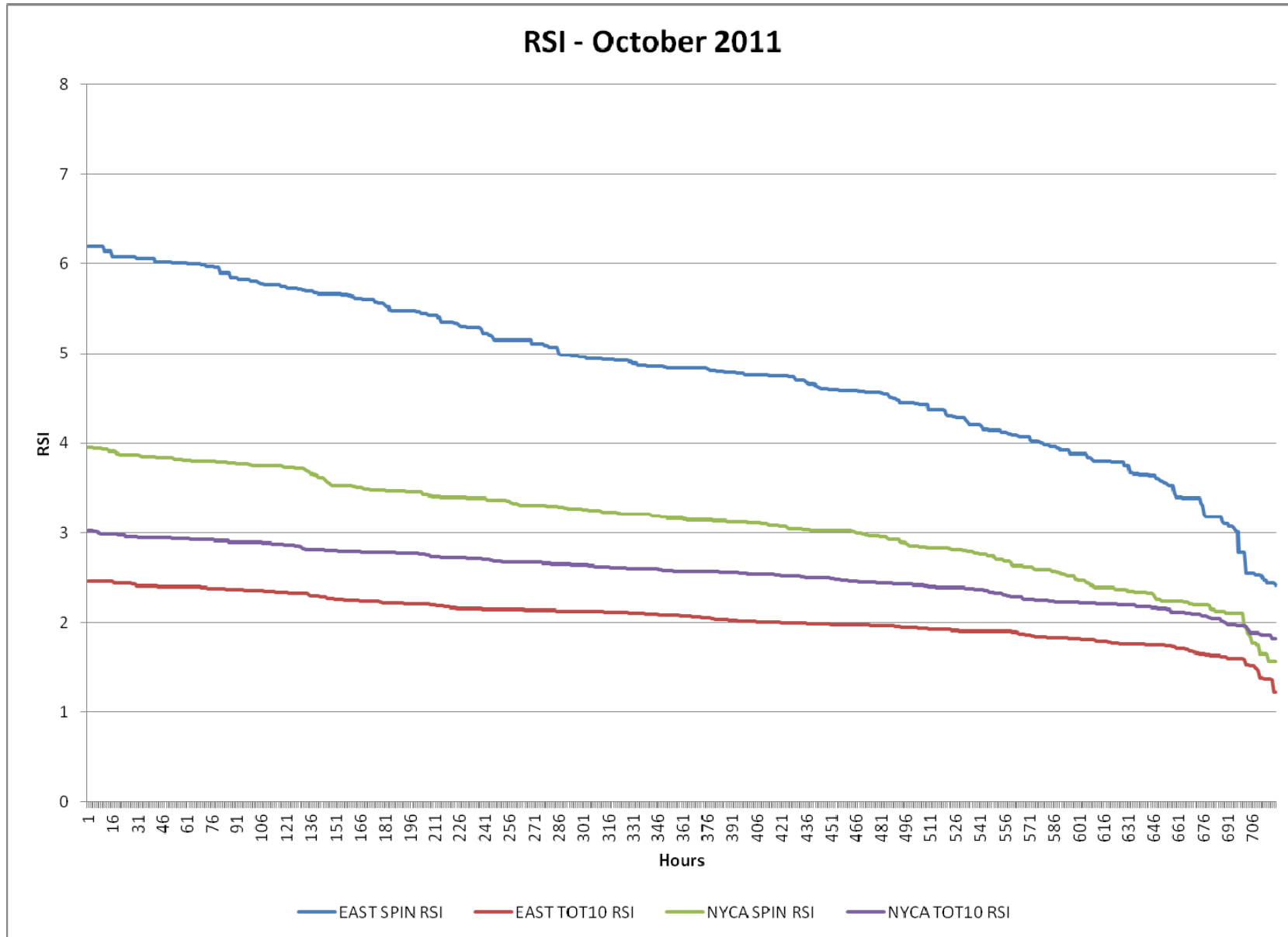
$$\text{RSI} = (\text{Total Supply} - \text{Largest Seller's Supply}) / (\text{Total Demand})$$

- *The RSI provides additional information on what the ratio of residual supply relative to demand is.*
- *An RSI below 1 indicates that there is a pivotal supplier.*
- *An RSI of 2 indicates that, even when the largest seller is excluded, there is twice as much supply as demand.*
- *CAL ISO used an RSI threshold of 110% in their energy market. (Predicting Market Power Using the Residual Supply Index, <http://wepex.net/docs/2002/12/05/2002120508555221628.pdf>)*

# Pivotal Supplier Results:

- ◆ **Summary of findings:**  
**No Pivotal Suppliers were identified any hours in either the Spinning or Non-Spinning reserve markets for either July or October 2011.**
  - ***Non-Spinning Reserves:***
    - **East Spin**
      - Day Ahead Market October 2011: No pivotal Suppliers.
      - Day Ahead Market July 2011: No pivotal Suppliers.
    - **NYCA Total 10 Reserves:**
      - Day Ahead Market October 2011: No pivotal Suppliers.
      - Day Ahead Market July 2011: No pivotal Suppliers.
  - ***Spinning Reserves:***
    - **East Spin:**
      - Day Ahead Market October 2011: No pivotal Suppliers.
      - Day Ahead Market July 2011: No pivotal Suppliers.
    - **NYCA Spin:**
      - Day Ahead Market October 2011: No pivotal Suppliers.
      - Day Ahead Market July 2011: No pivotal Suppliers.





# RSI Results:

- ◆ **The RSI does not indicate a cause for concern in the Spinning or Non-Spinning 10 Minute Reserve markets.**
  - *East Spinning Reserves: The average RSI is 3.63 (4.79) in July (October) and the RSI are all above 1.74 (2.42) in July (October) 2011.*
  - *NYCA Spinning Reserves: The average RSI is 4.51 (2.06) in July (October) and the RSI are all above 2.96 (1.22) in July (October) 2011.*
  - *East Total 10 Minute Reserves: The average RSI is 2.70 (3.10) in July (October) and the RSI are all above 1.91 (1.58) in July (October) 2011.*
  - *NYCA Total 10 Minute Reserves: The average RSI is 3.40 (2.55) in July (October) and the RSI are all above 2.65 (1.83) in July (October) 2011.*

# Revised Proposal

- ◆ **Based on the Market Participant comments and the analysis presented here, the NYISO is presenting a revised proposal that steps out the mitigation measures along with explicit oversight by the MMU.**

# Revised Proposal: Non-Spin

- ◆ **Stepped removal of the cap on 10 Minute Non-Spin Reference Levels.**
  - *Rationale for the steps: The gradual lifting would allow the competitiveness of the market to be evaluated along with the need for the lifting of the cap. The steps were chosen based on the evaluation of one NYC Generator's winter natural gas penalty data.*
- ◆ **Proposed steps**
  - *Existing cap on 10 Minute Non-Spin Reference Levels is \$2.52.*
  - *Step 1: \$5 cap on 10 Minute Non-Spin Reference Levels.*
  - *Step 2: \$10 cap on 10 Minute Non-Spin Reference Levels*
  - *Step 3: no cap on 10 Minute Non-Spin Reference Levels*
  - *The MMU will evaluate the competitiveness of the 10 Minute Non-Spin Markets and whether moving to the next step is expected to improve the convergence of day-ahead and real-time reserve prices. The MMU would issue a recommendation to either:*
    - **Proceed to the next step raising the cap**
    - **Keep the cap at its existing step**
    - **Move the cap to its preceding step.**
  - *The MMU will evaluate the first step as part of its quarterly report (when a full quarter's data is available). The evaluation of the need/appropriateness of moving from Step 2 to 3 will also be in a quarterly report but could include the review of up to one year of data.*



# Revised Proposal: NYC DAM Spinning Reserves

- ◆ **Stepped removal of the requirement that New York City generating units offer 10-minute spinning reserves at \$0/MW in the DAM.**
  - *Rationale: gradually lifting the requirement should minimize shocks and would allow the competitiveness of the market to be evaluated. The first step is approximately the average Real Time price for Eastern Spinning Reserves in 2011, the second step is twice that level.*
- ◆ **Proposed Steps**
  - *Step 1: New York City generating units must offer 10-minute spinning reserves at or below \$5/MW*
  - *Step 2: New York City generating units must offer 10-minute spinning reserves at or below \$10/MW*
  - *Step 3: No dollar threshold for New York City generating units in the DAM.*
  - *The MMU will evaluate the competitiveness of the 10 Minute spinning reserves markets and if moving to the next step is expected to improve the convergence of day-ahead and real-time reserve prices. The MMU would issue a recommendation to either:*
    - Proceed to the next step raising the cap
    - Keep the cap at its existing step
    - Move the cap to its preceding step.
  - *The MMU will evaluate the first step as part of its quarterly report (when a full quarter's data is available). The evaluation of the need/appropriateness of moving from Step 2 to 3 will also be in a quarterly report but could include the review of up to one year of data.*

# Next Steps

- ◆ **Implementation was included in the 2012 BPWG prioritization process for a Q3 deployment.**
- ◆ **Proposed schedule:**
  - *Finalize proposed design Jan-Feb 2011*
  - *BIC March 14*
  - *MC April 25*
  - *BOD May*
  - *FERC Filing June/July*

# APPENDIX 1 – ADDITIONAL HHI RESULTS

# HHI Summary Statistics for Scheduled Reserves

		HHI Summary Statistics based on Scheduled Reserves			
Month		Mean	Median	Min	Max
October 2011	As Scheduled EAST Total 10 Reserves HHI	2767	2769	1646	4147
October 2011	As Scheduled NYCA Total 10 Reserves HHI	2507	2503	1566	3614
October 2011	As Scheduled EAST SPIN Reserves HHI	2361	2233	1555	5166
October 2011	As Scheduled NYCA SPIN Reserves HHI	2420	2345	1526	5620
July 2011	As Scheduled EAST Total 10 Reserves HHI	2515	2518	1368	4484
July 2011	As Scheduled NYCA Total 10 Reserves HHI	2322	2306	1367	4130
July 2011	As Scheduled EAST SPIN Reserves HHI	2166	2031	1445	7746
July 2011	As Scheduled NYCA SPIN Reserves HHI	2251	2046	1188	7942

# Number of Organizations Available to provide reserves

Month		Average Number of Organizations (Available)			
		Mean	Median	Min	Max
October 2011	Count of Organizations Having Available Non-Zero EAST Total 10 Reserves	14.4	15	11	17
October 2011	Count of Organizations Having Available Non-Zero NYCA Total 10 Reserves	20.3	21	16	24
October 2011	Count of Organizations Having Available Non-Zero EAST SPIN Reserves	13.3	13	9	16
October 2011	Count of Organizations Having Available Non-Zero NYCA SPIN Reserves	17.6	18	13	22
July 2011	Count of Organizations Having Available Non-Zero EAST Total 10 Reserves	17.6	18	16	20
July 2011	Count of Organizations Having Available Non-Zero NYCA Total 10 Reserves	24.6	24	21	36
July 2011	Count of Organizations Having Available Non-Zero EAST SPIN Reserves	16.6	17	15	19
July 2011	Count of Organizations Having Available Non-Zero NYCA SPIN Reserves	22.7	22	18	35

# Number of Organizations Scheduled to provide reserves

Month		Average Number of Organizations (Scheduled)			
		Mean	Median	Min	Max
October 2011	Count of Organizations Having Scheduled Non-Zero EAST Total 10 Reserves	7.3	7	6	9
October 2011	Count of Organizations Having Scheduled NYCA Total 10 Reserves	9.6	10	7	12
October 2011	Count of Organizations Having Scheduled SPIN Reserves	6.1	6	4	8
October 2011	Count of Organizations Having Scheduled NYCA SPIN Reserves	6.6	7	4	10
July 2011	Count of Organizations Having Scheduled Non-Zero EAST Total 10 Reserves	8.4	9	4	10
July 2011	Count of Organizations Having Scheduled NYCA Total 10 Reserves	10.4	11	7	14
July 2011	Count of Organizations Having Scheduled SPIN Reserves	6.8	7	2	9
July 2011	Count of Organizations Having Scheduled NYCA SPIN Reserves	7.8	8	4	12

# Peak and Off Peak HHI Summary Statistics

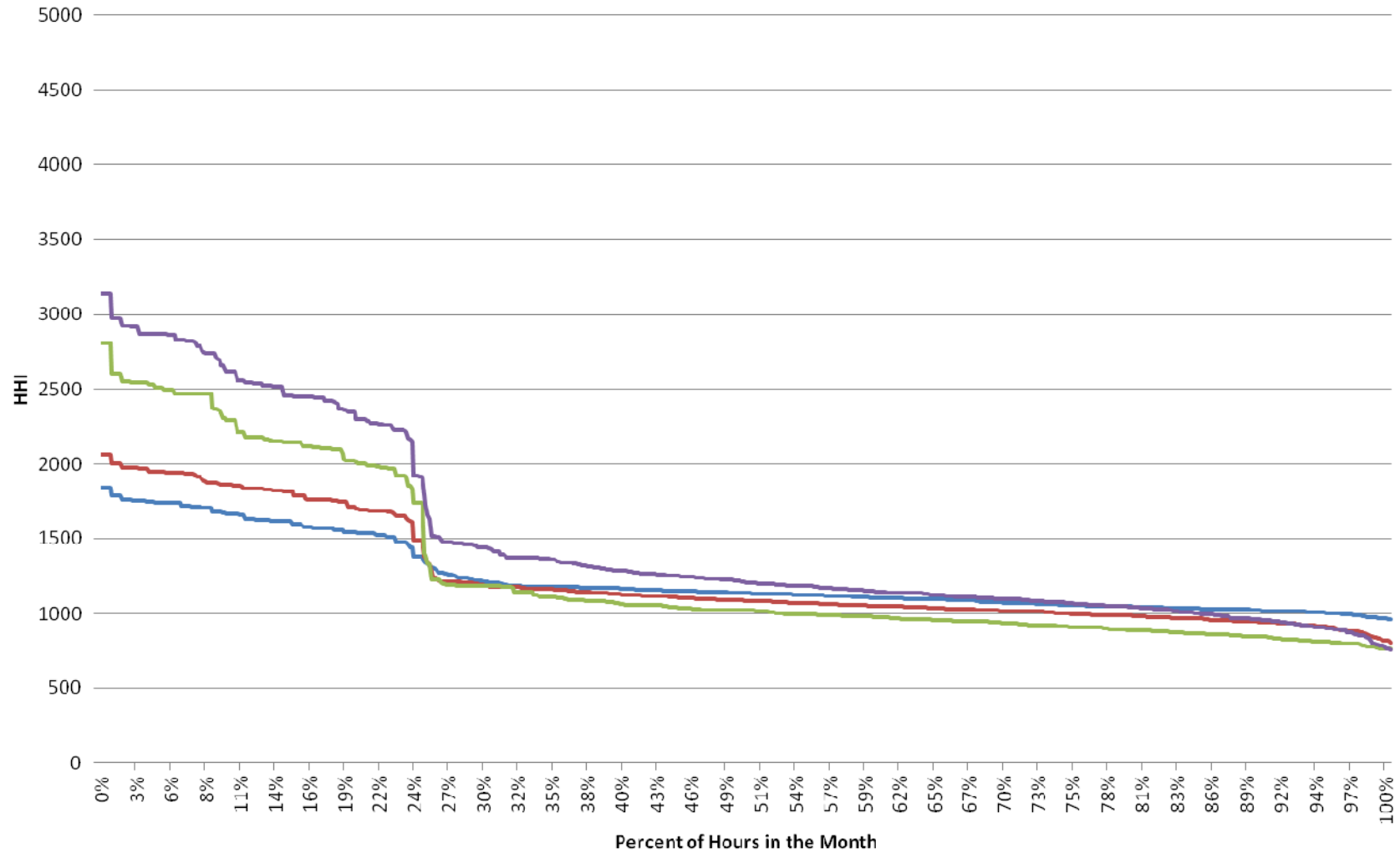
Jul-11 HHI Summary Statistics: Peak Hours (07 to 22)				
Product	Mean	Median	Min	Max
PEAK Available EAST Total 10 Reserves HHI	1093	1095	963	1318
PEAK Available NYCA Total 10 Reserves HHI	1036	1033	810	1324
PEAK Available EAST SPIN Reserves HHI	975	966	768	1334
PEAK Available NYCA SPIN Reserves HHI	1139	1127	763	1626

Jul-11 HHI Summary Statistics: Off Peak Hours				
Product	Mean	Median	Min	Max
OFF PEAK Available EAST Total 10 Reserves HHI	1522	1570	1033	1846
OFF PEAK Available NYCA Total 10 Reserves HHI	1655	1757	939	2066
OFF PEAK Available EAST SPIN Reserves HHI	1930	2112	784	2806
OFF PEAK Available NYCA SPIN Reserves HHI	2236	2445	911	3133

Oct-11 HHI Summary Statistics: Peak Hours (07 to 22)				
Product	Mean	Median	Min	Max
PEAK Available EAST Total 10 Reserves HHI	1189	1159	957	1846
PEAK Available NYCA Total 10 Reserves HHI	1203	1194	992	1570
PEAK Available EAST SPIN Reserves HHI	1320	1263	1014	1989
PEAK Available NYCA SPIN Reserves HHI	1603	1549	1229	2371

Oct-11 HHI Summary Statistics: Off Peak Hours				
Product	Mean	Median	Min	Max
OFF PEAK Available EAST Total 10 Reserves HHI	1662	1682	1000	2368
OFF PEAK Available NYCA Total 10 Reserves HHI	1851	1962	1030	2683
OFF PEAK Available EAST SPIN Reserves HHI	2457	2623	1059	4415
OFF PEAK Available NYCA SPIN Reserves HHI	2829	2948	1259	4714

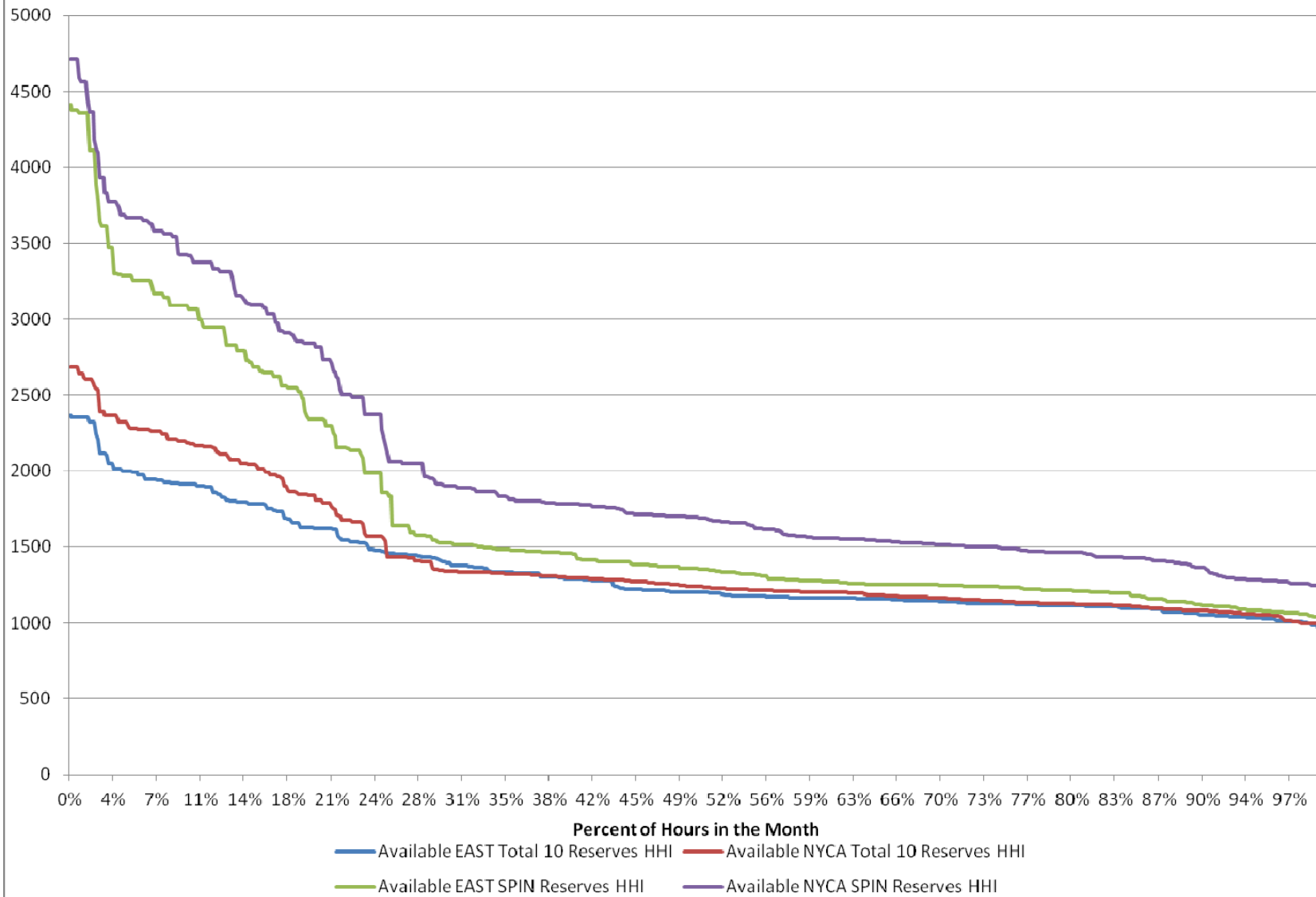
### HHI duration curve for July 2011



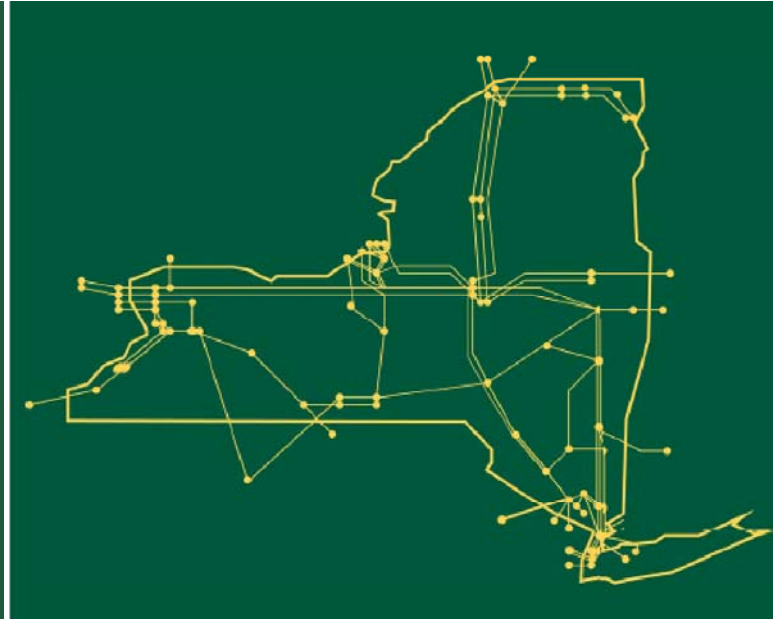
— Available EAST Total 10 Reserves HHI (July)   
 — Available NYCA Total 10 Reserves HHI (July)  
— Available EAST SPIN Reserves HHI (July)   
 — Available NYCA SPIN Reserves HHI (July)



### HHI Duration Chart for October 2011



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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