



# Monthly Report

**December 2017**

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# ***Operations Performance Metrics Monthly Report***



## ***December 2017 Report***

### **Operations & Reliability Department New York Independent System Operator**

Prepared by NYISO Operations Analysis and Services, based on settlements initial invoice data collected on or before January 10, 2017.

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## December 2017 Operations Performance Highlights

- Peak load of 24,256 MW occurred on 12/28/2017 HB 17
- All-time winter capability period peak load of 25,738 MW occurred on 1/7/2014 HB 18
- 0 hours of Thunder Storm Alerts were declared
- 0 hours of NERC TLR level 3 curtailment
- The following table identifies the estimated production cost savings associated with the Broader Regional Market initiatives.

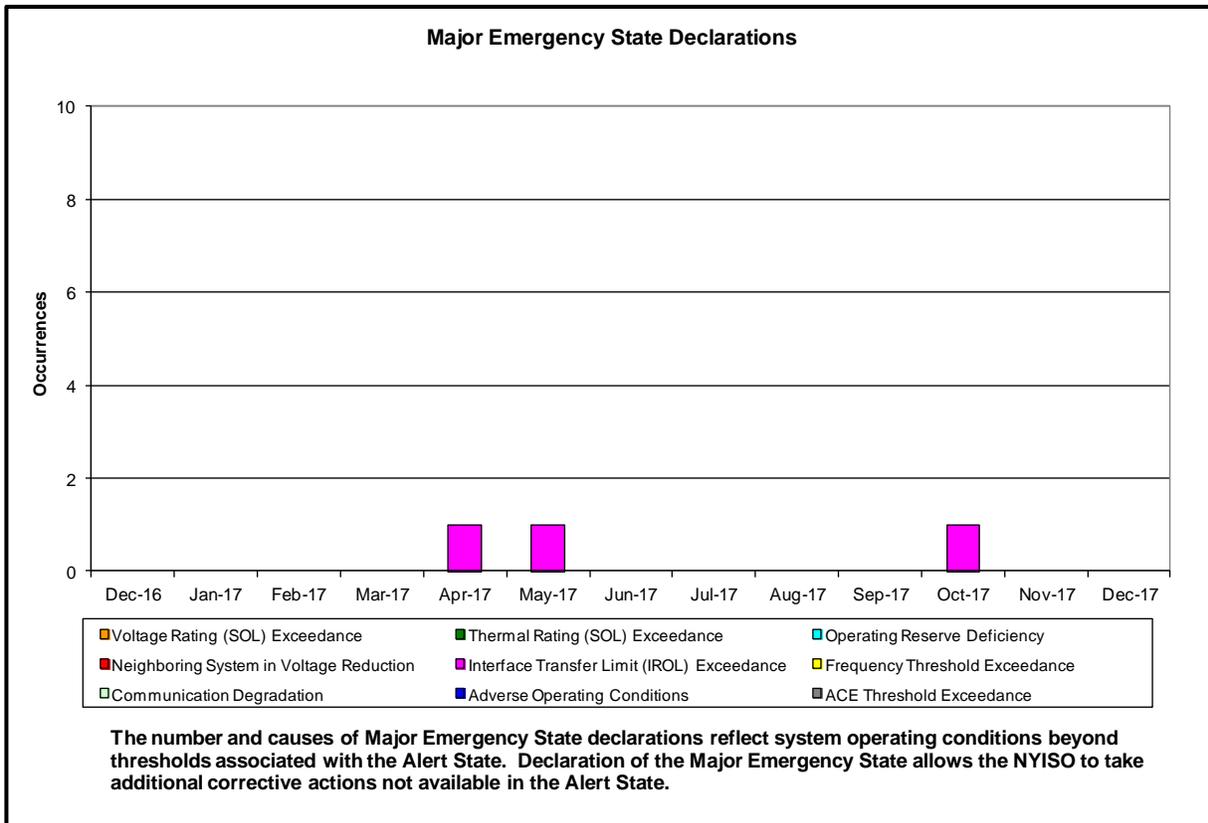
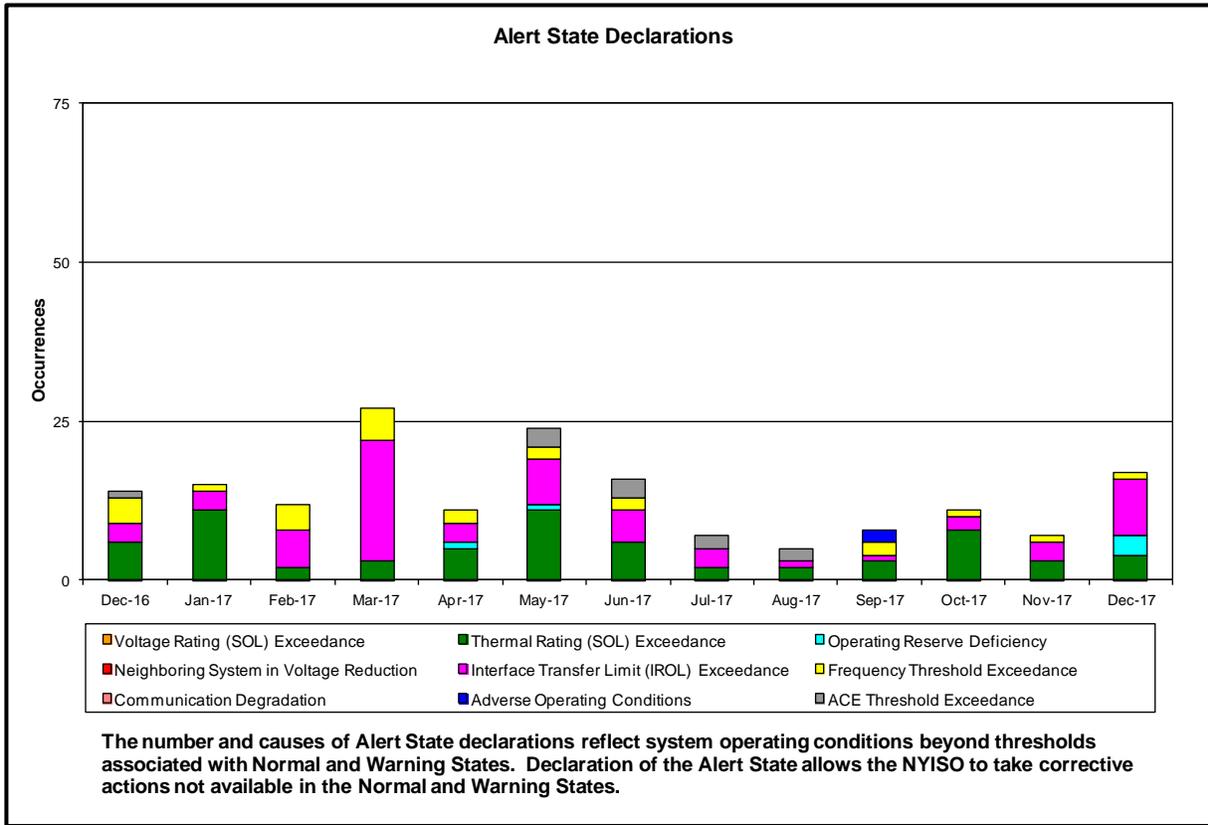
	Current Month Value (\$M)	Year-to-Date Value (\$M)
<b>NY Savings from PJM-NY Congestion Coordination</b>	\$3.31	\$15.93
<b>NY Savings from PJM-NY Coordinated Transaction Scheduling</b>	\$0.18	(\$0.96)
<b>NY Savings from NE-NY Coordinated Transaction Scheduling</b>	(\$0.05)	(\$1.22)
<b>Total NY Savings</b>	\$3.44	\$13.75
<b>Regional Savings from PJM-NY Coordinated Transaction Scheduling</b>	\$0.25	\$3.08
<b>Regional Savings from NE-NY Coordinated Transaction Scheduling</b>	\$0.01	\$1.04
<b>Total Regional Savings</b>	\$0.26	\$4.12

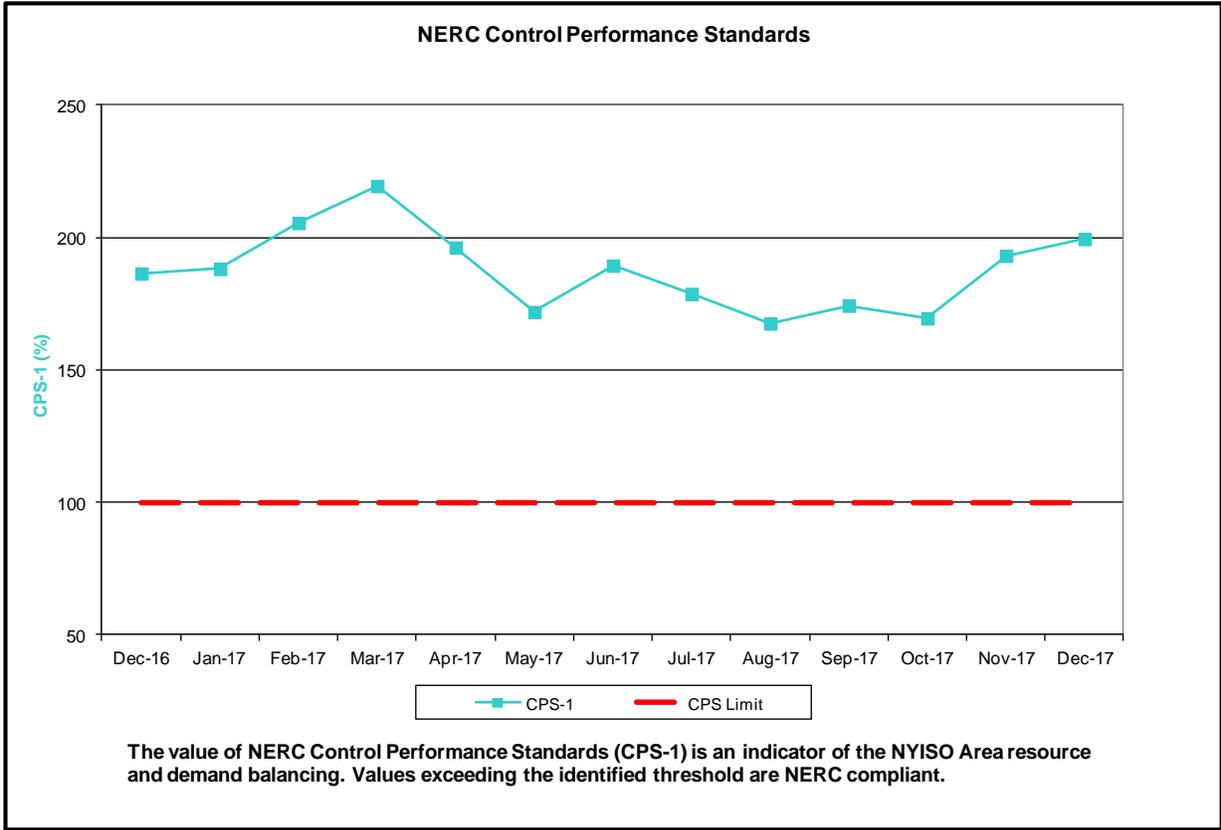
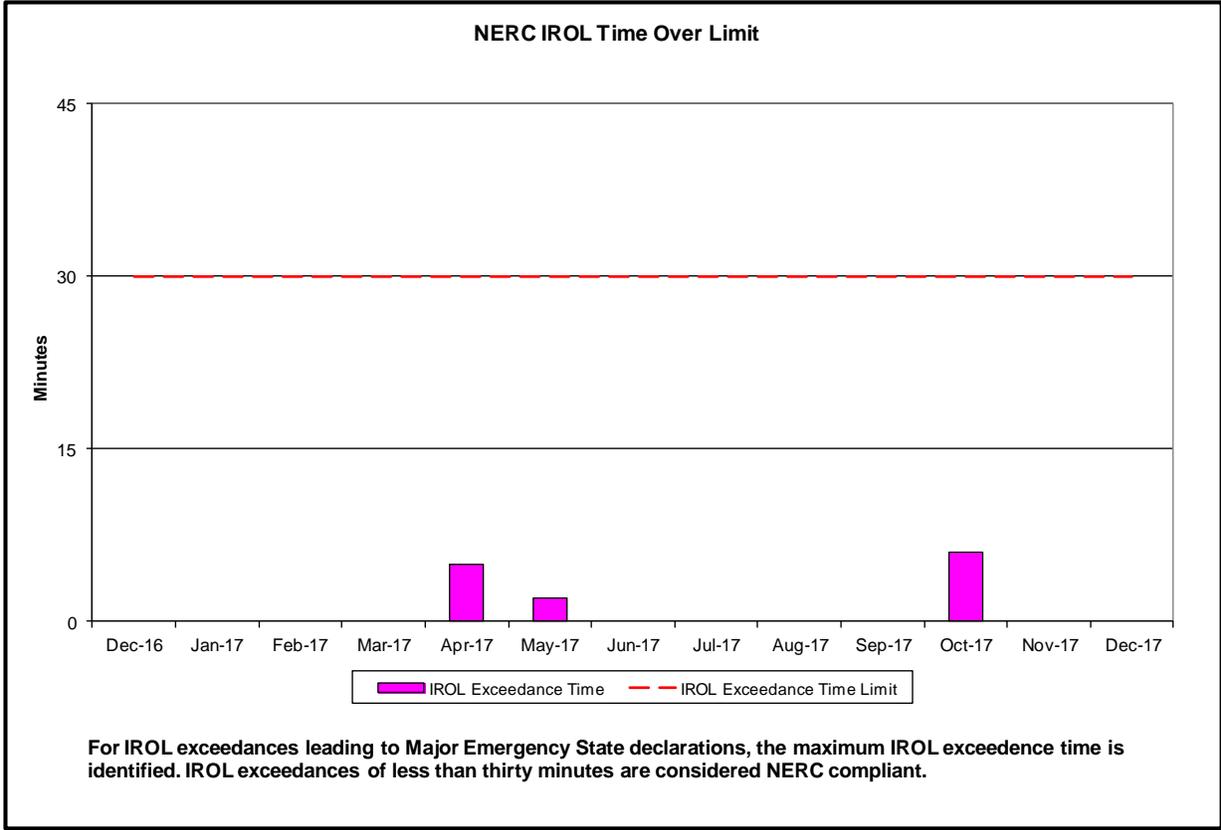
- Statewide uplift cost monthly average was (\$0.78)/MWh
- The following table identifies the Monthly ICAP Spot Market prices and the price delta.

Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
January 2018 Spot Price	\$0.44	\$3.19	\$3.19	\$0.70
December 2017 Spot Price	\$0.25	\$3.38	\$3.38	\$0.68
Delta	\$0.19	(\$0.19)	(\$0.19)	\$0.02

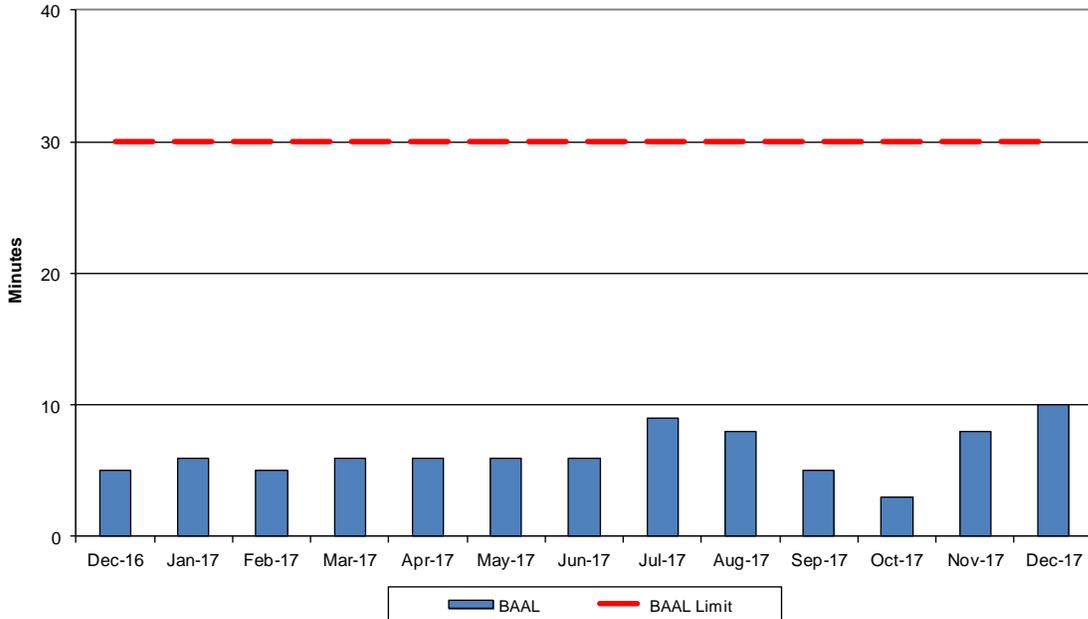
- NYC - Price decrease by \$0.19 due to decreases in unoffered capacity
- GHJ - Price decrease by \$0.19 due to decreases in unoffered capacity
- NYCA - Price increase by \$0.19 due to changes in unoffered capacity, imports, and exports.

- Reliability Performance Metrics



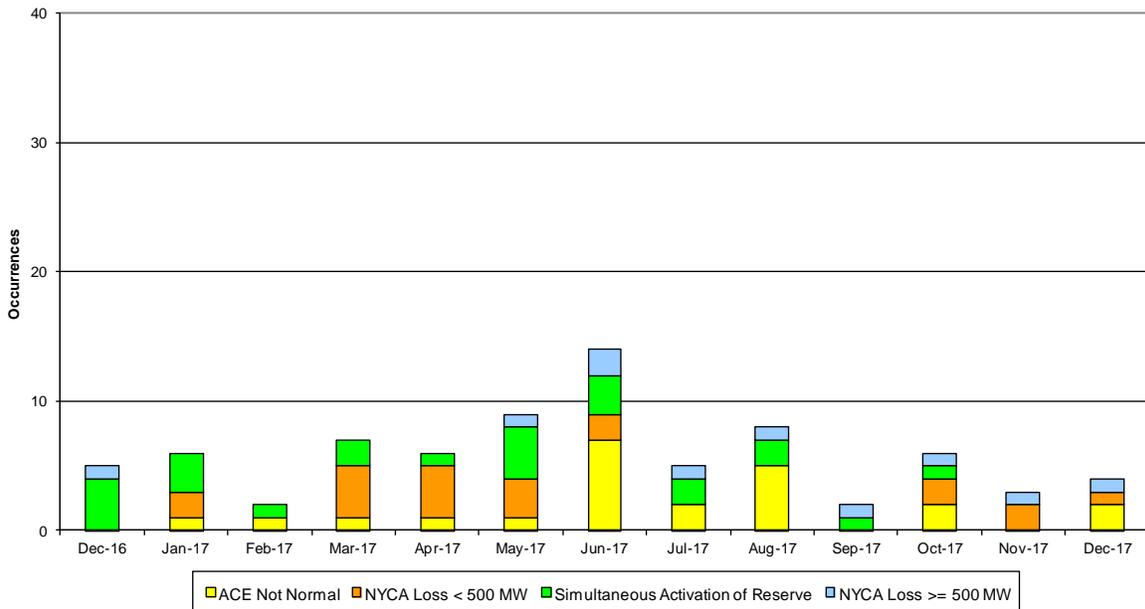


### NERC Balancing Authority ACE Limit Standard



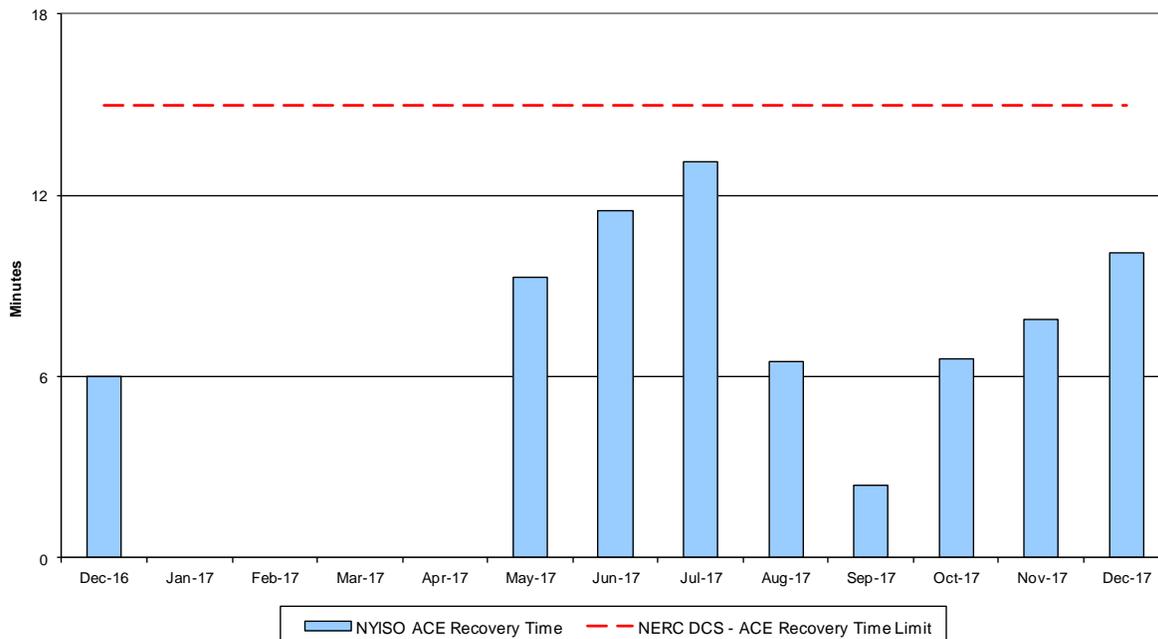
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

### Reserve Activations



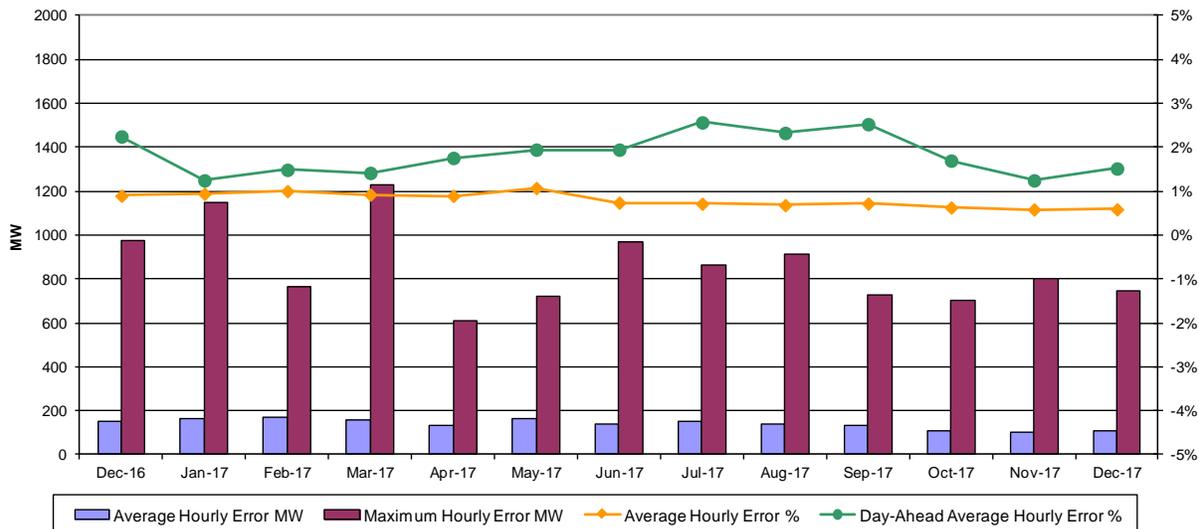
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

### DCS Event Time to ACE Recovery

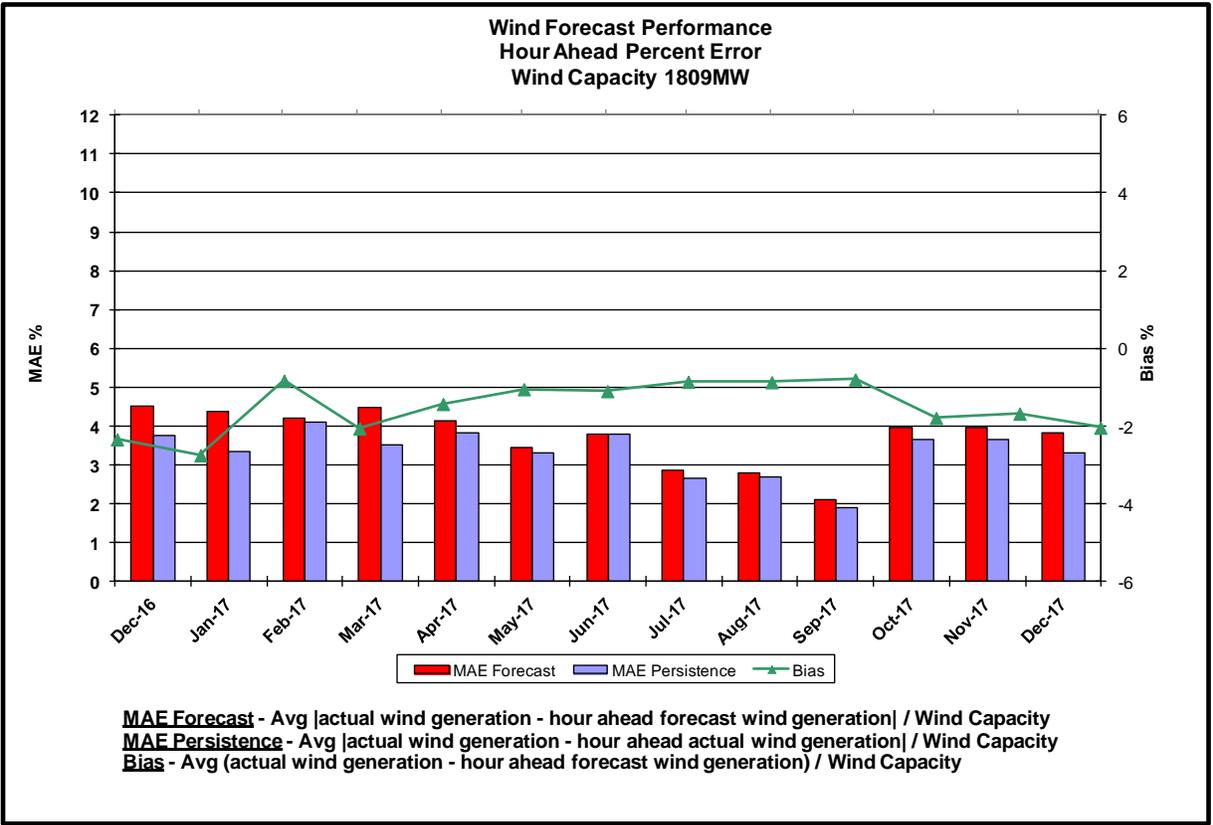
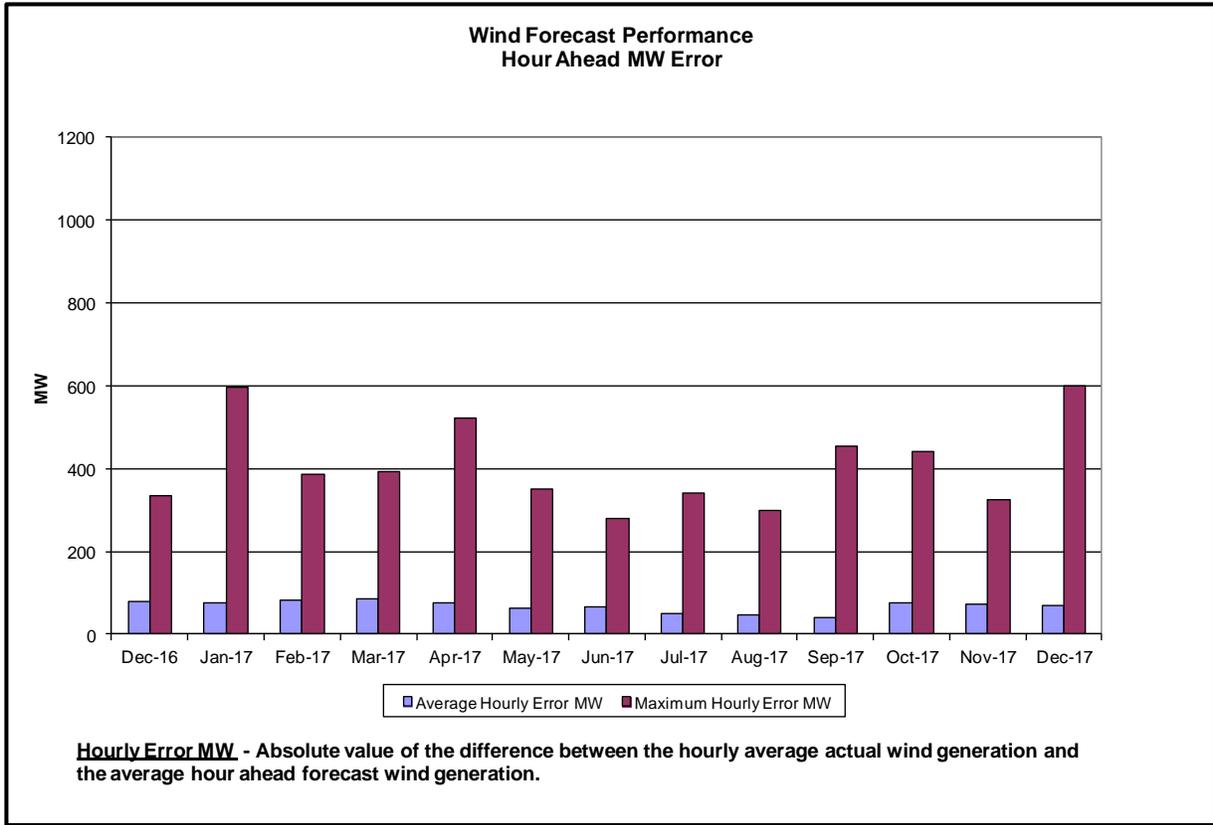


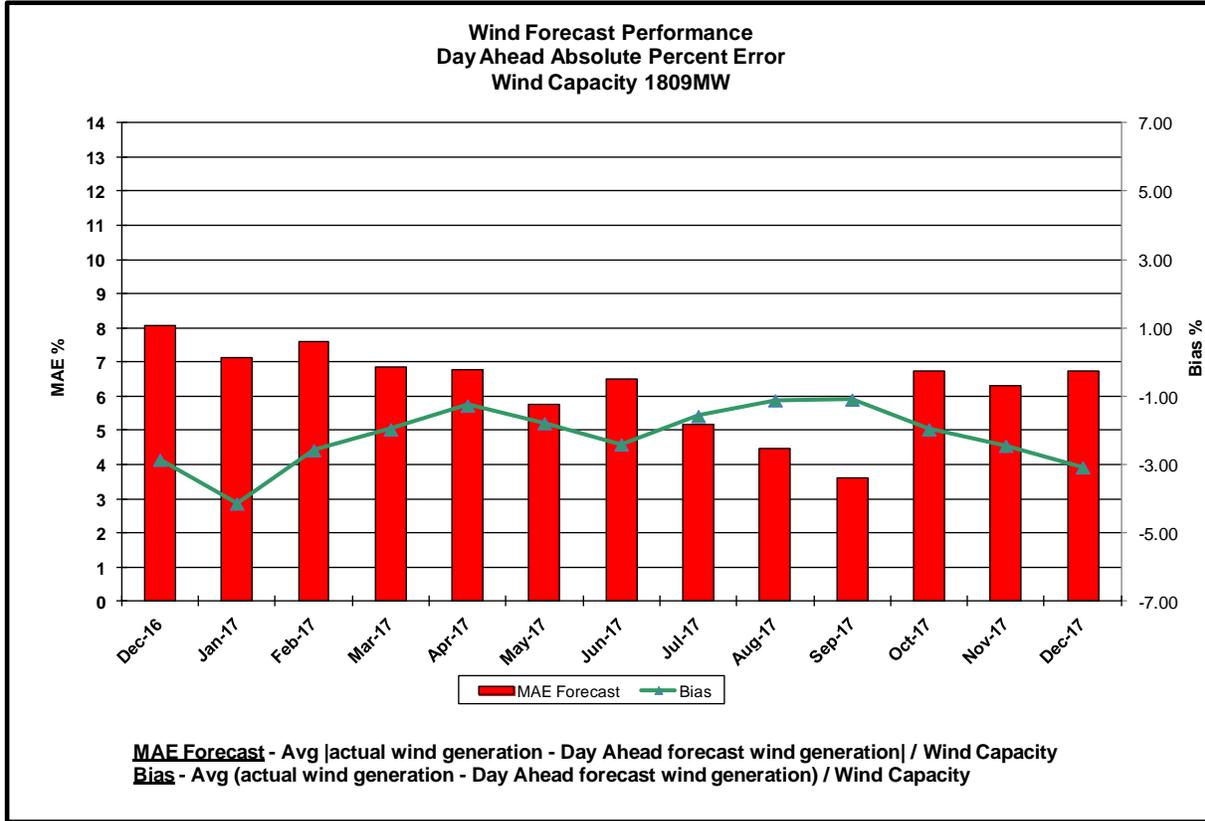
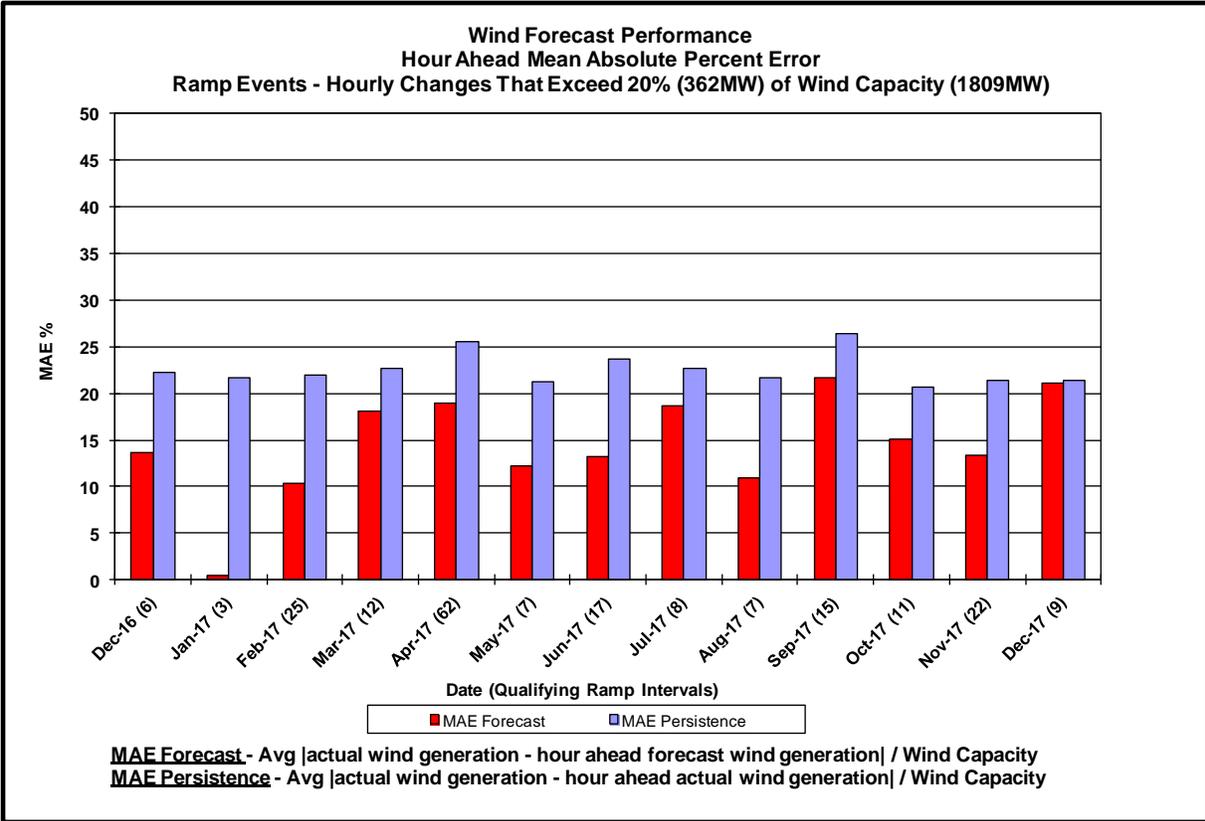
For NYISO initiated Reportable Disturbances, the maximum ACE recovery time is identified. Recovery times of less than 15 minutes are considered NERC compliant.

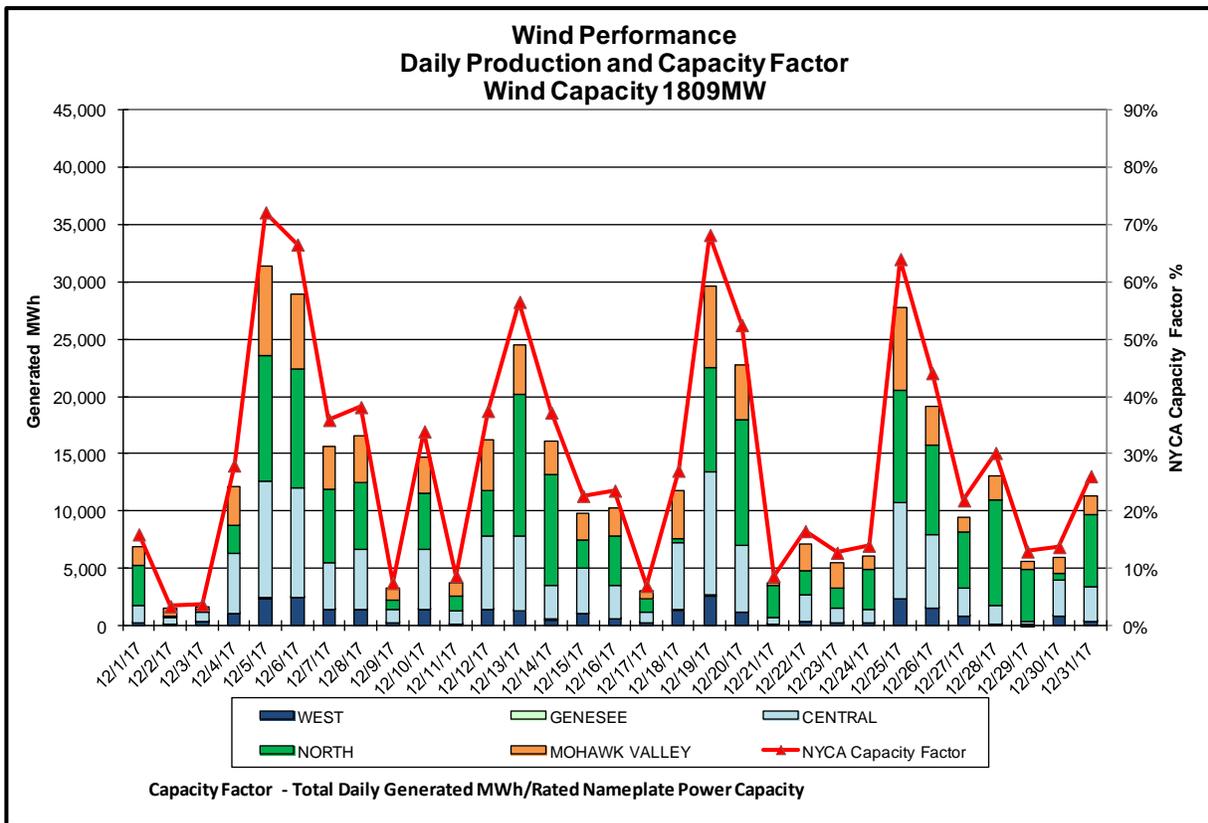
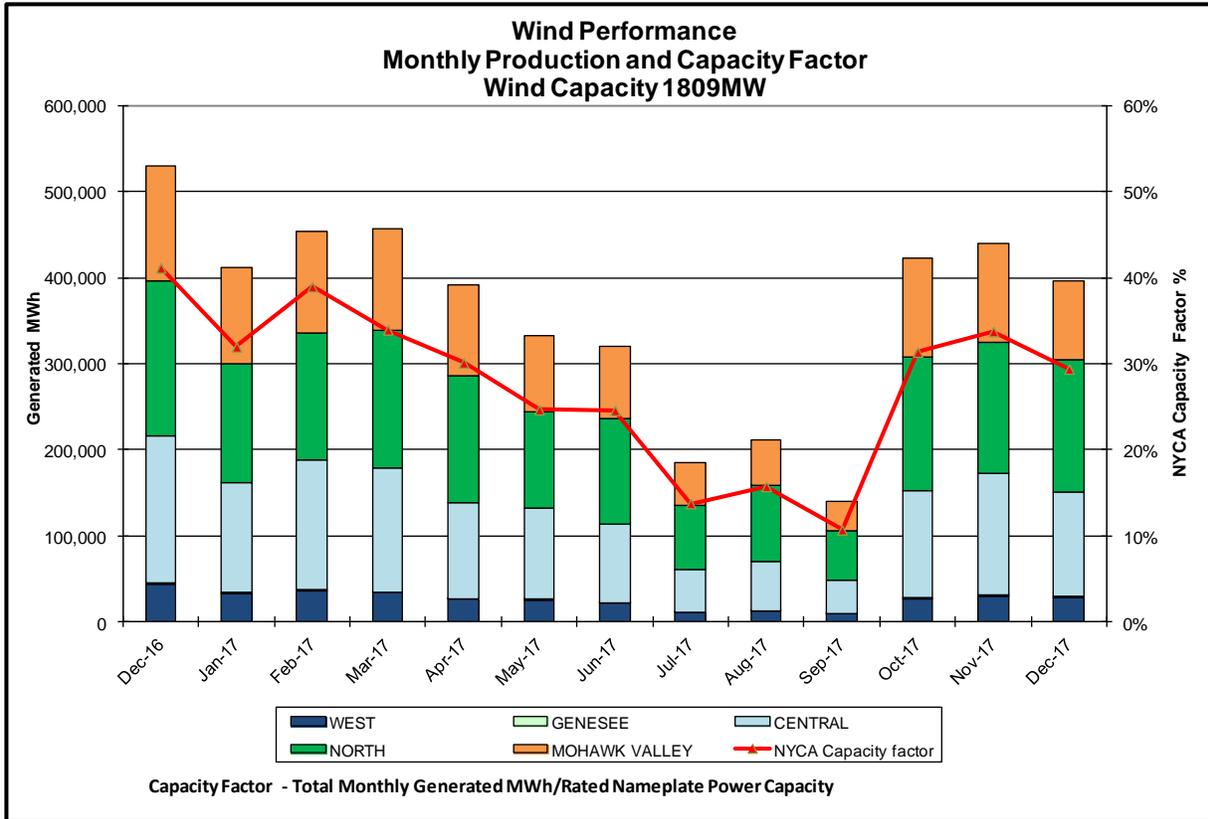
### Load Forecast Performance

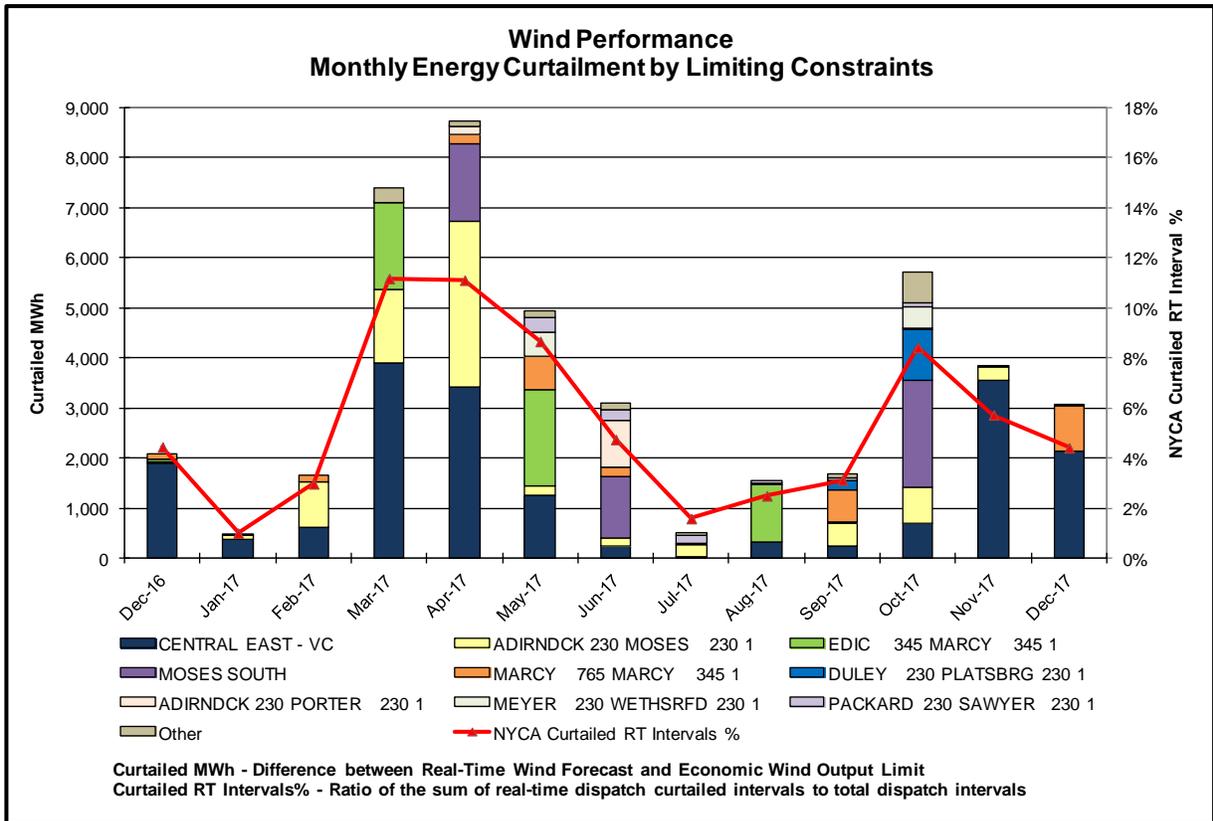
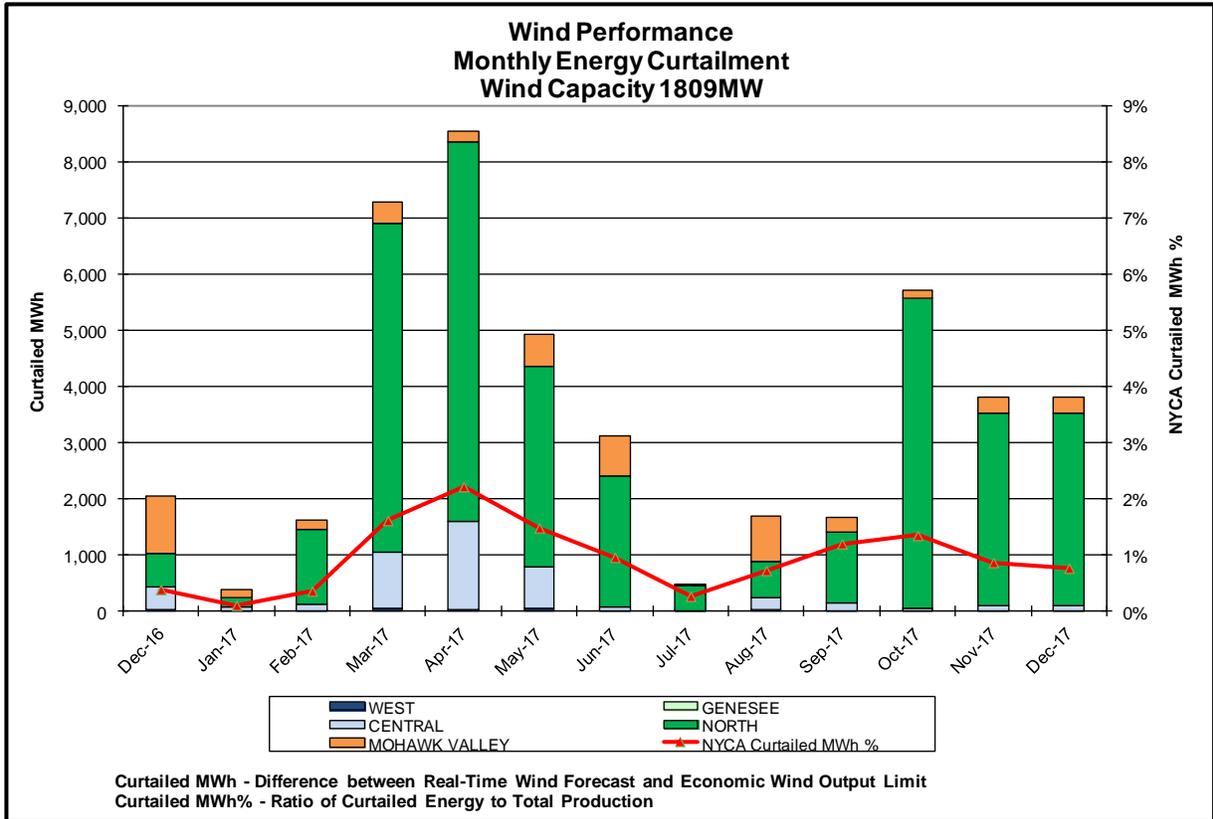


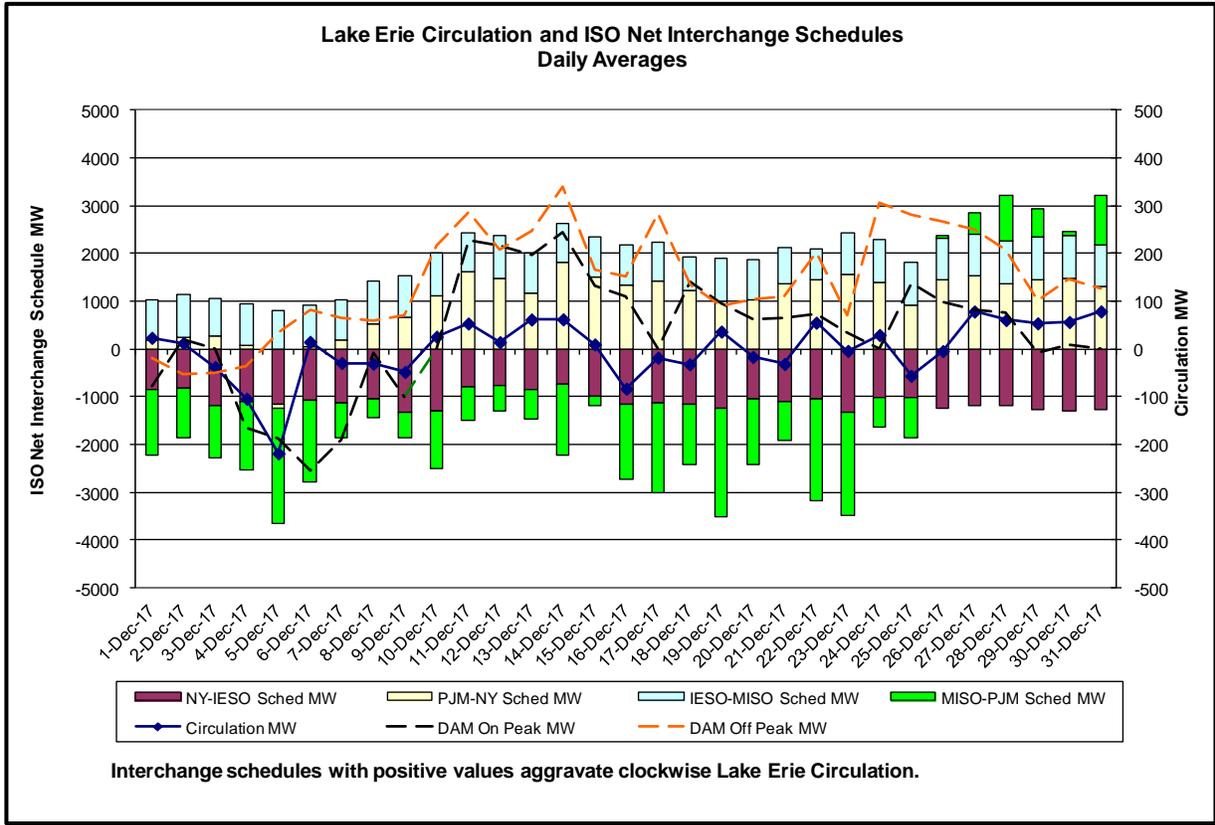
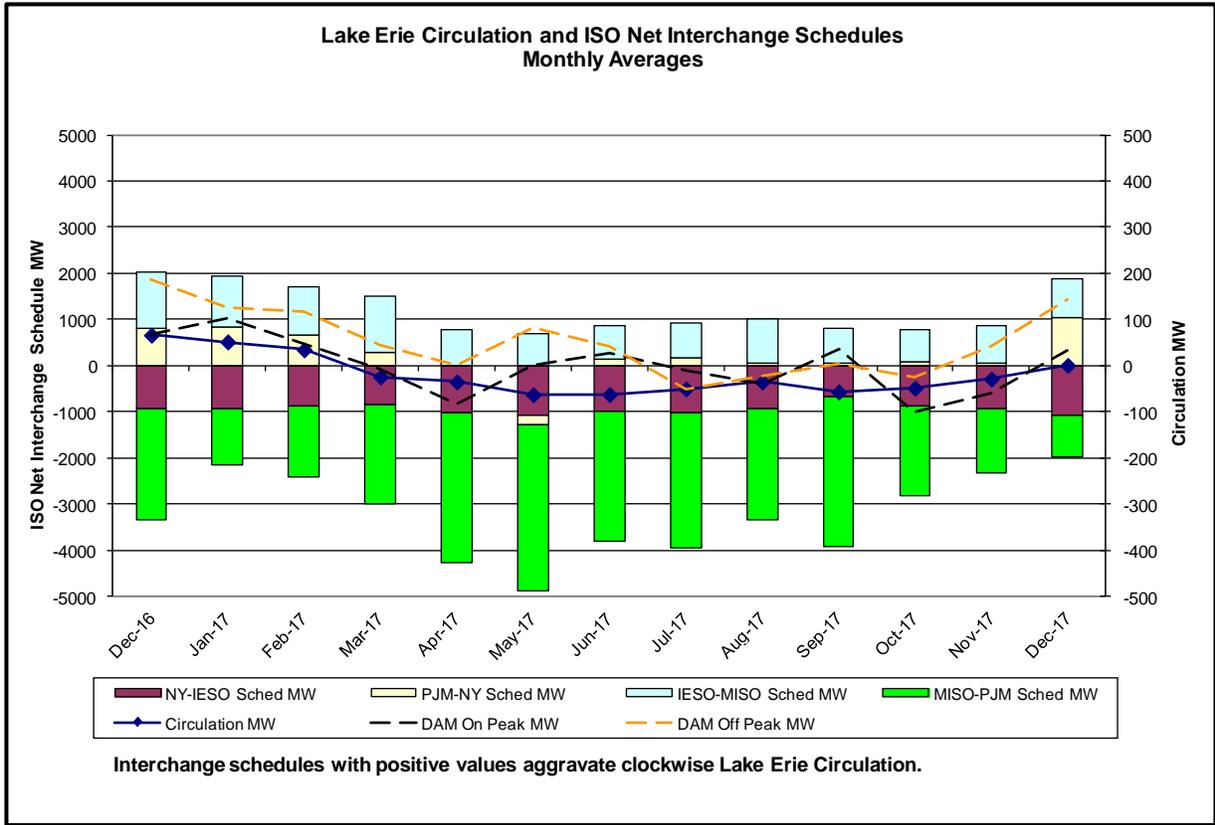
**Hourly Error MW** - Absolute value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.  
**Average Hourly Error %** - Average value of the ratio of hourly average error magnitude to hourly average actual load demand.  
**Day-Ahead Average Hourly Error %** - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.



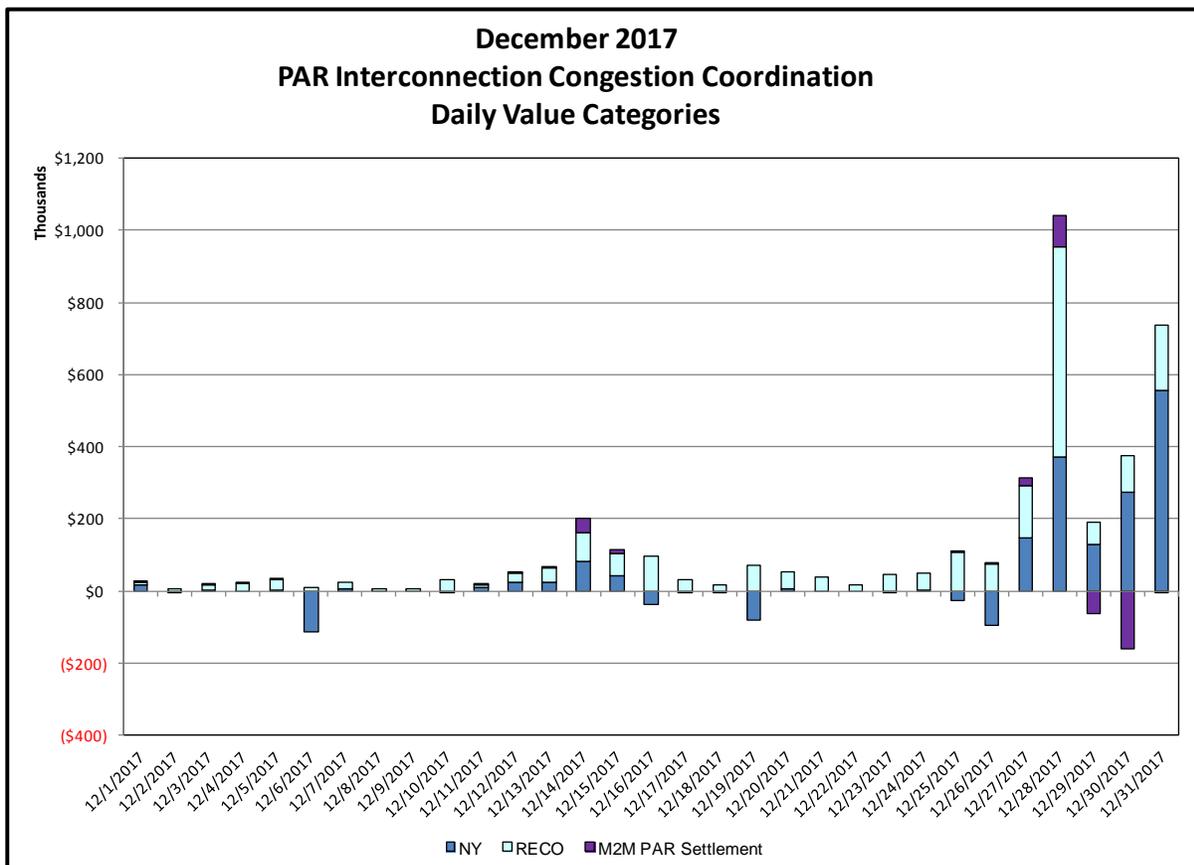
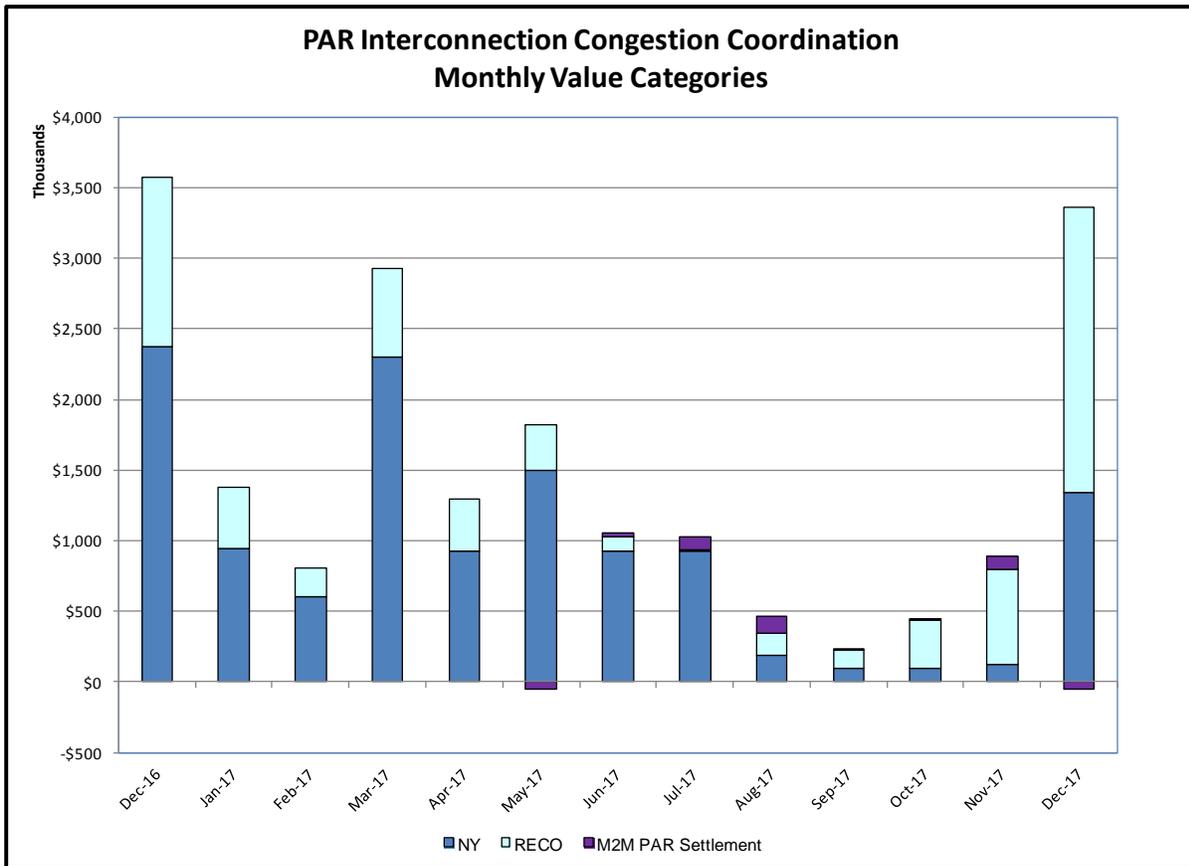






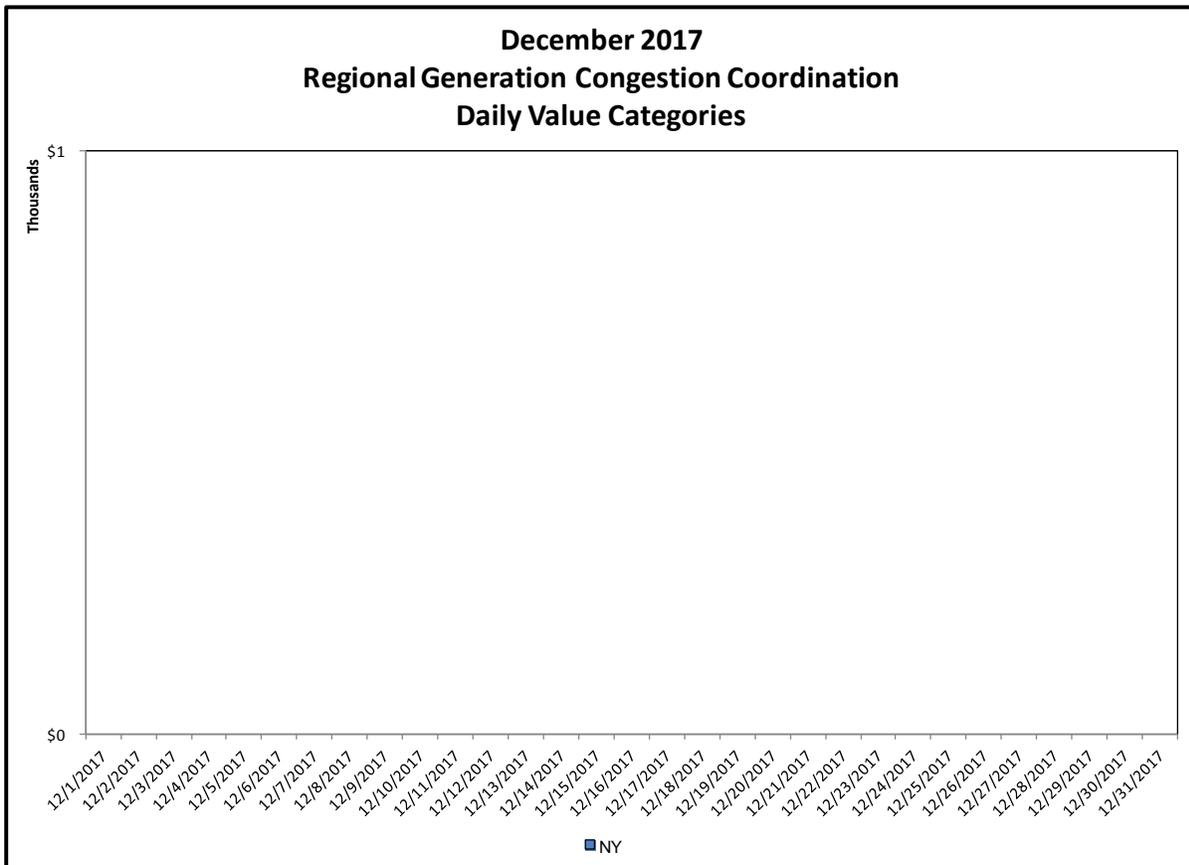
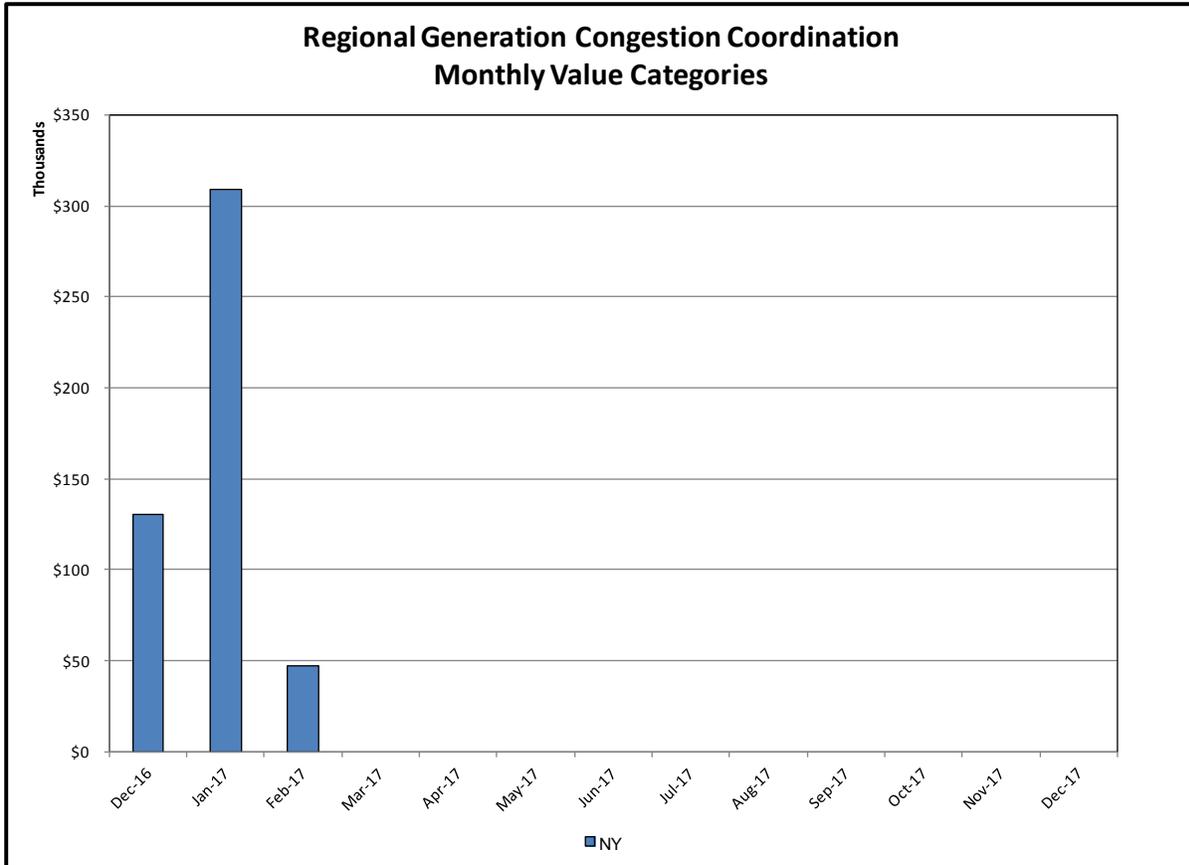


## Broader Regional Market Performance Metrics



**PAR Interconnection Congestion Coordination**

<b><u>Category</u></b>	<b><u>Description</u></b>
<b>NY</b>	Represents the value NY realizes from Market-to-Market PAR Coordination when experiencing congestion. This is the estimated savings to NY for additional deliveries into NY
<b>RECO</b>	Represents the value of PJM's obligation to deliver 80% of service to RECO load over Ramapo 5018. This is the estimated reduction in NYCA congestion due to the PJM delivery of RECO over Ramapo 5018.
<b>M2M PAR Settlement</b>	Market-to-Market PAR Coordination settlement on coordinated flowgates. Through April 2017 this value was included in the NY and RECO categories. The positive sign convention indicates settlement to NY while the negative indicates settlement to PJM.



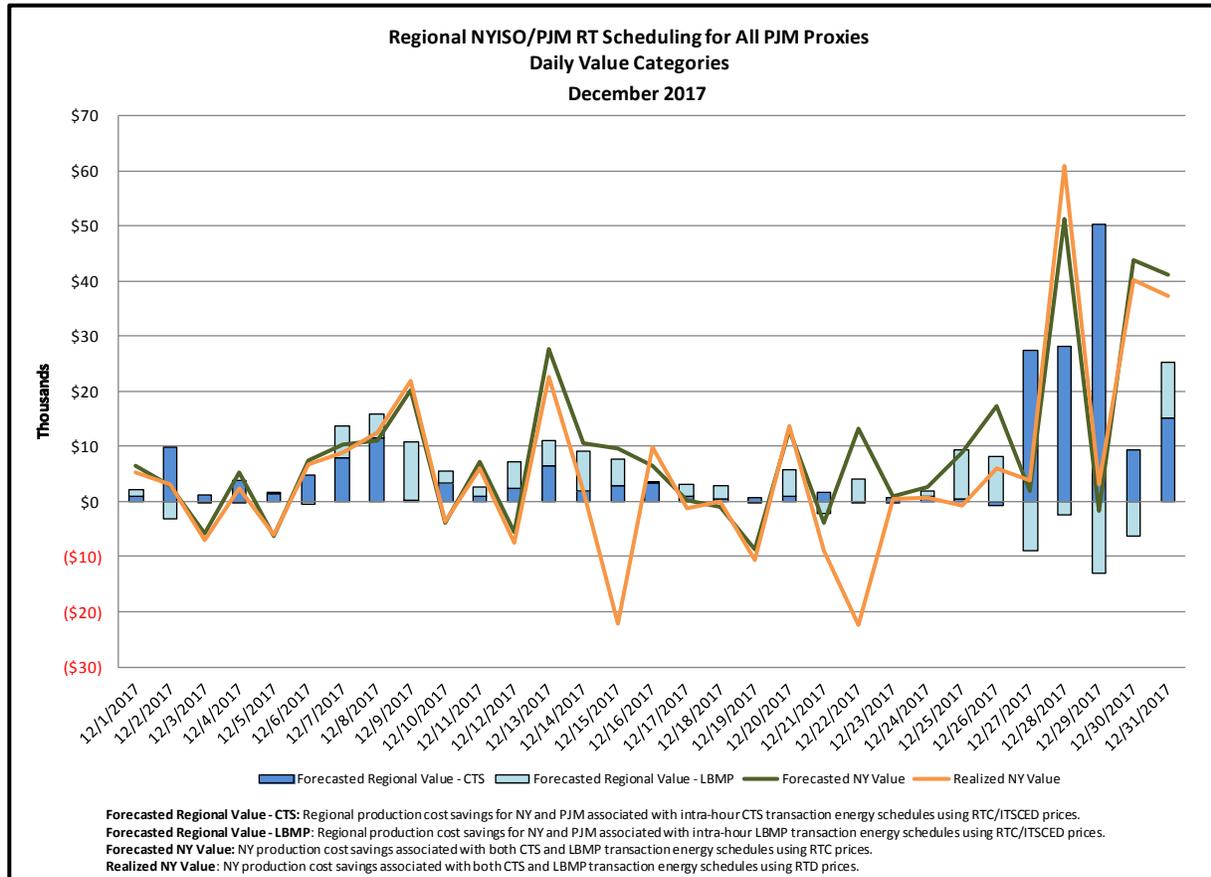
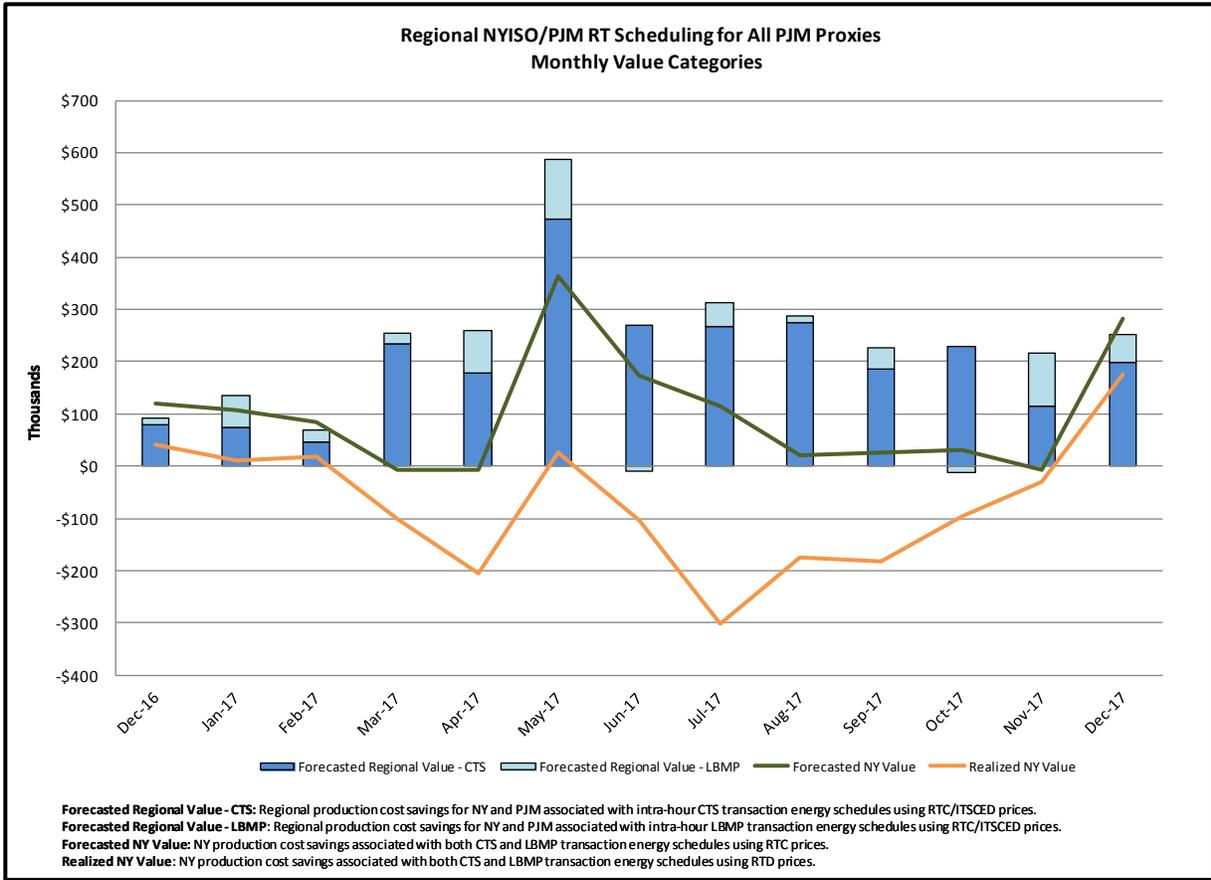
**Regional Generation Congestion Coordination**

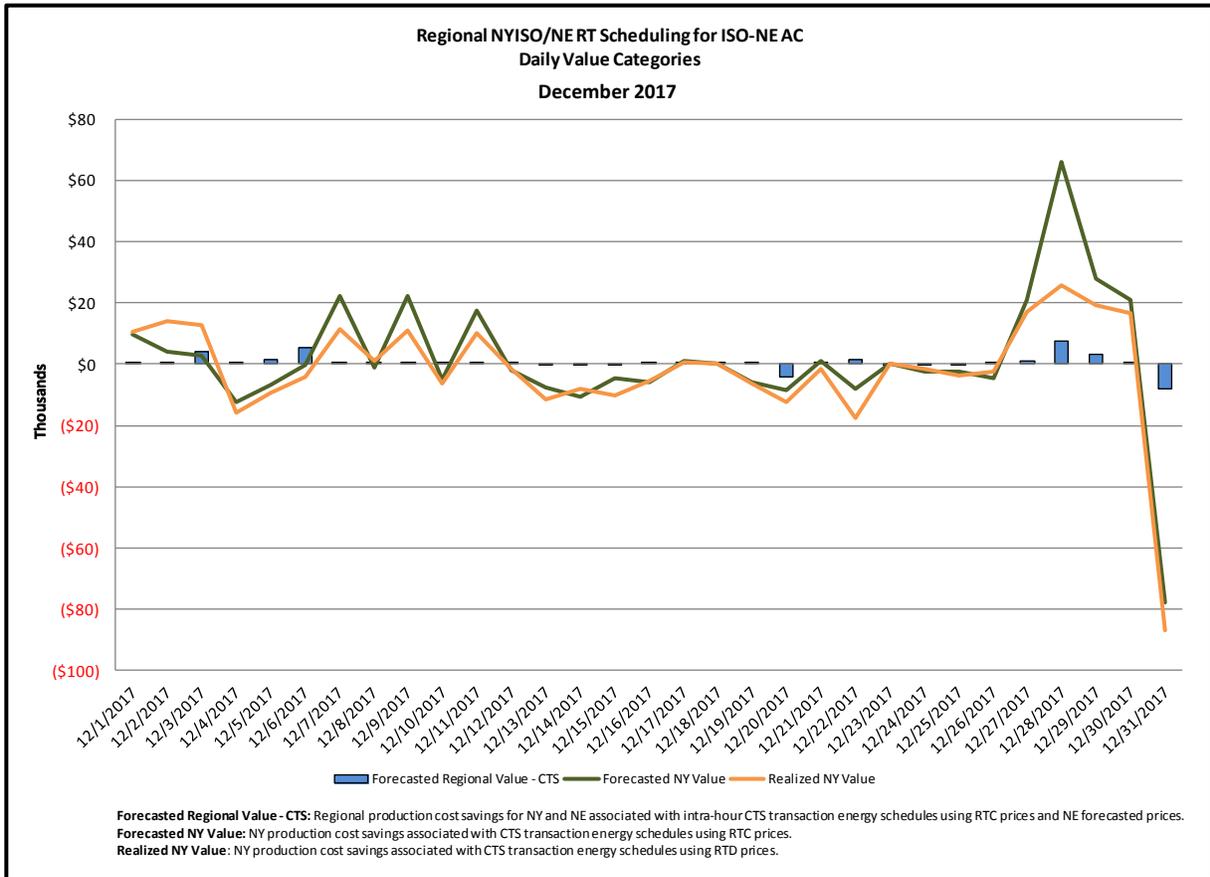
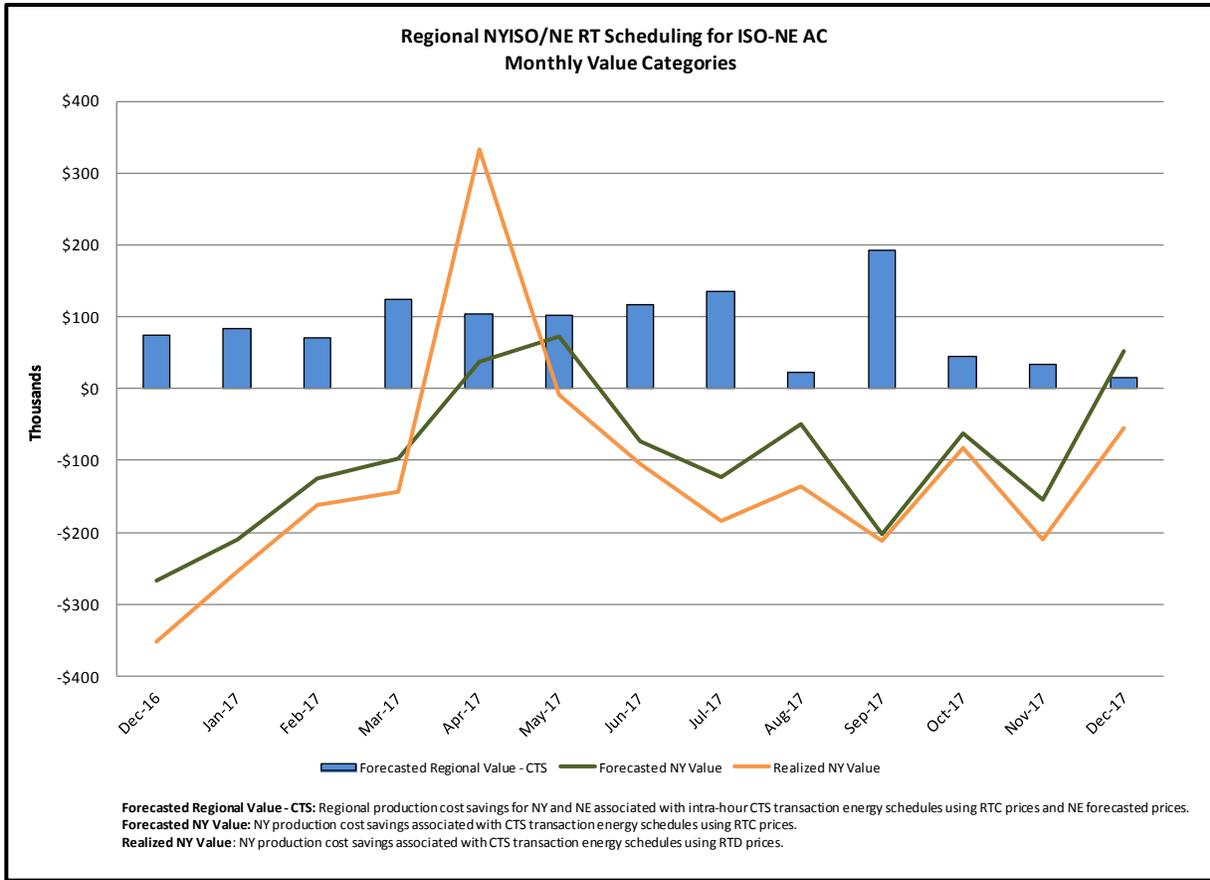
**Category**

NY

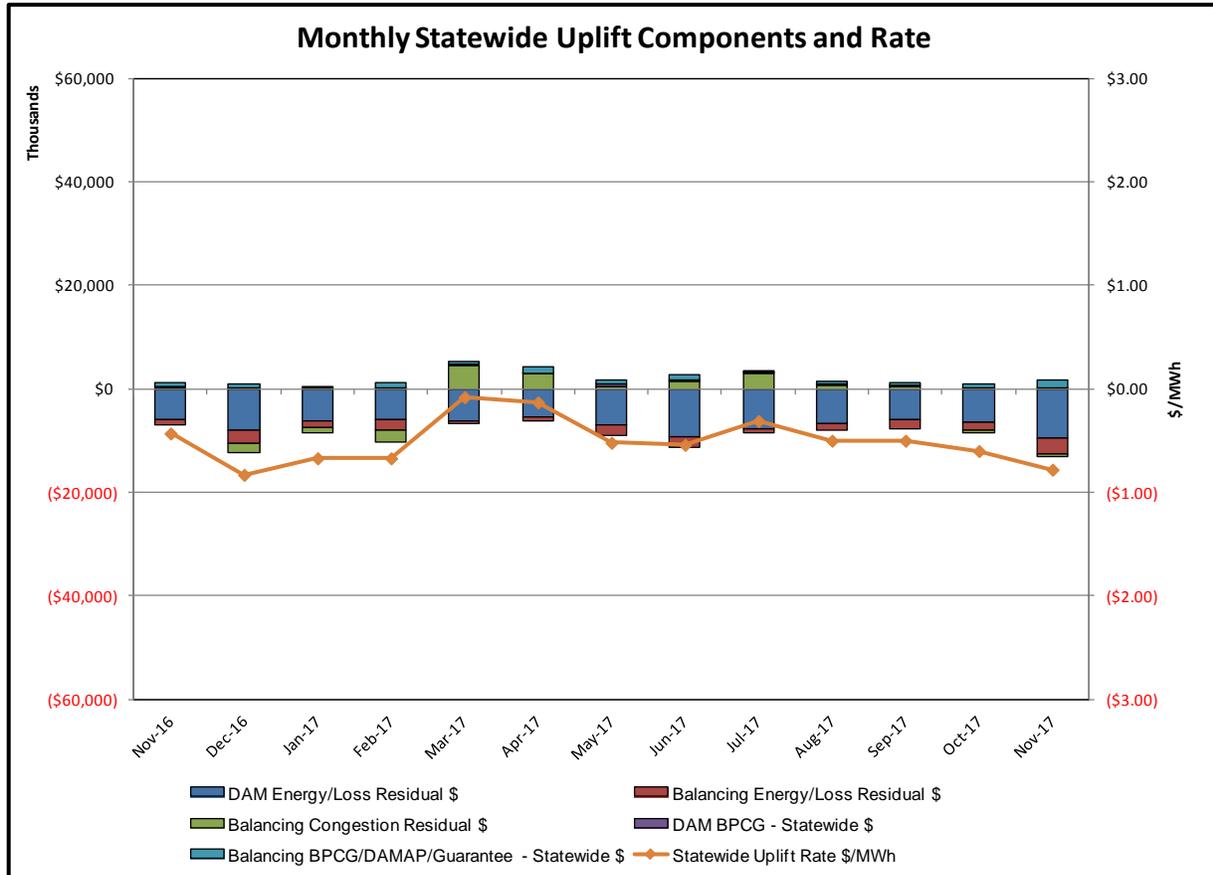
**Description**

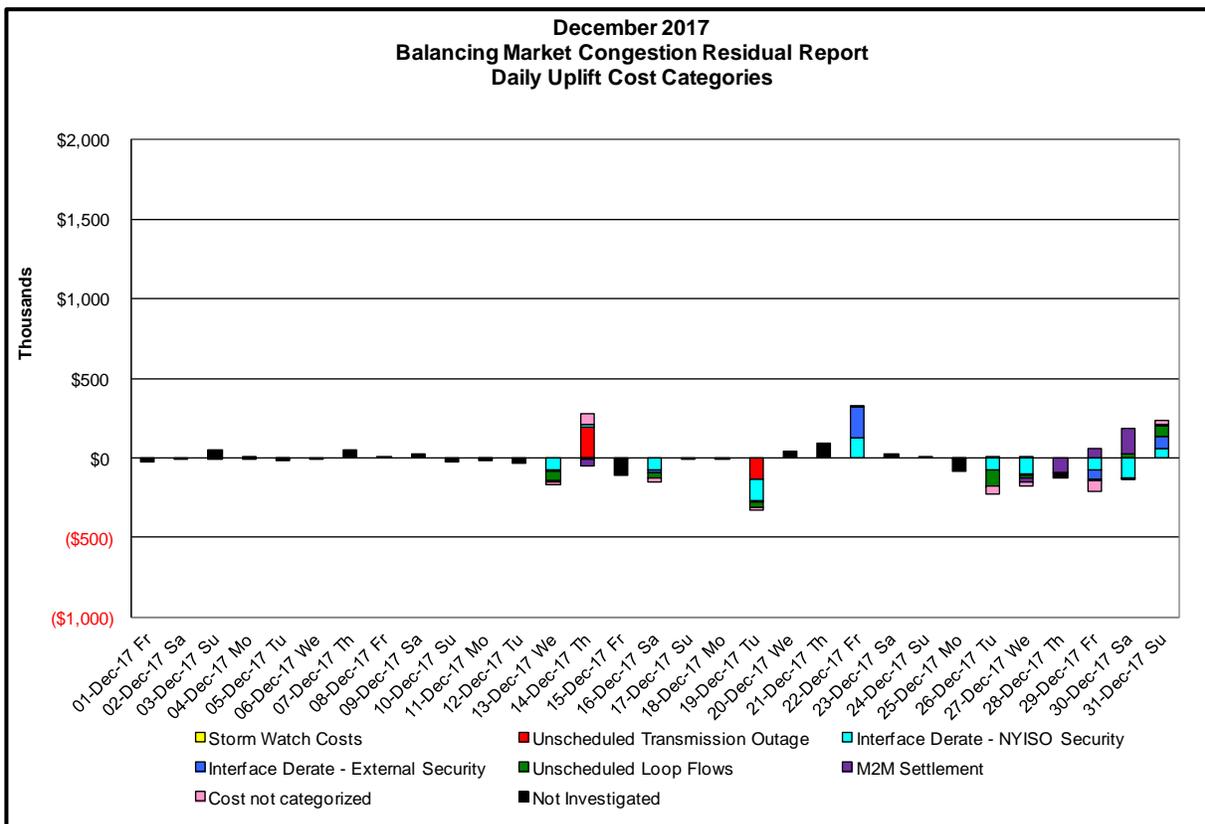
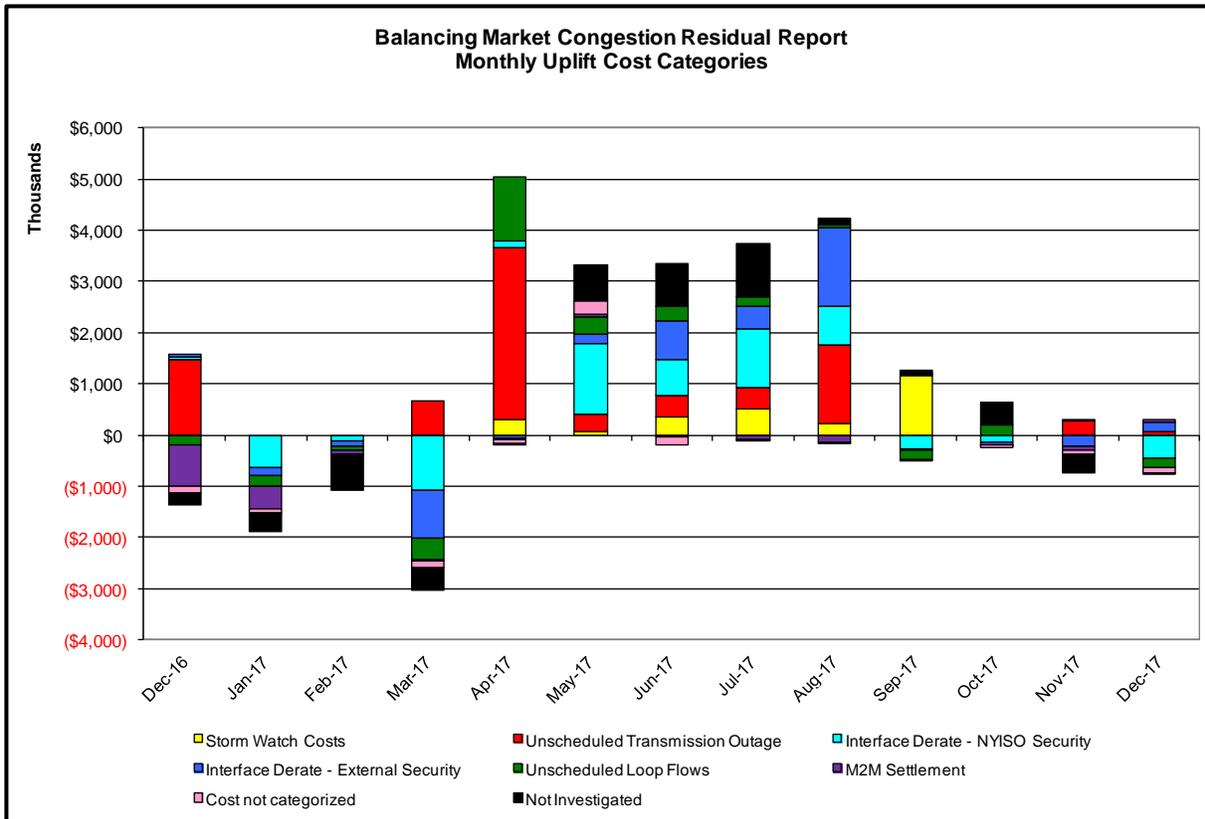
NYISO savings that result from PJM payments to NYISO when PJM's transmission use (PJM's market flow) is greater than PJM's entitlement of the NY transmission system and NYISO is incurring Western or Central NY congestion. Additionally, NYISO savings may result from the more efficient regional utilization of PJM's generation resources to directly address Western or Central NY transmission congestion.





### Market Performance Metrics





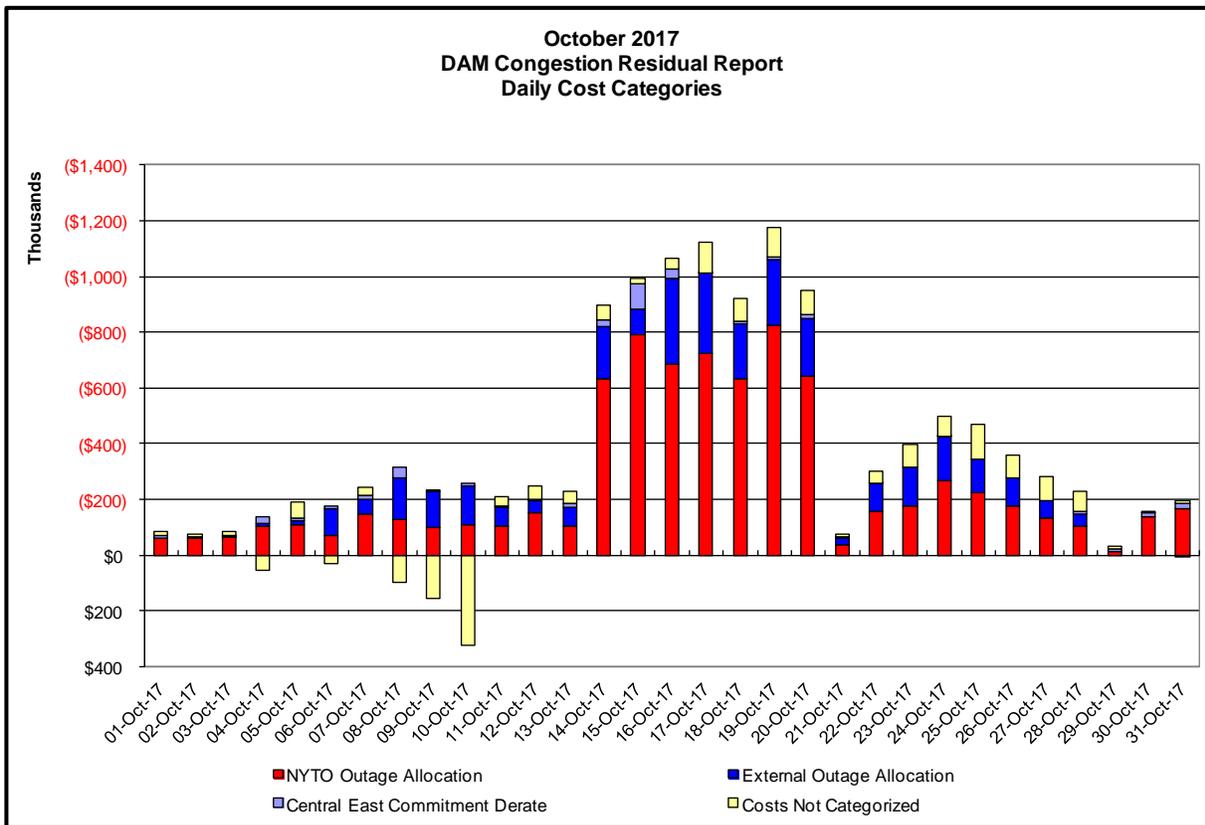
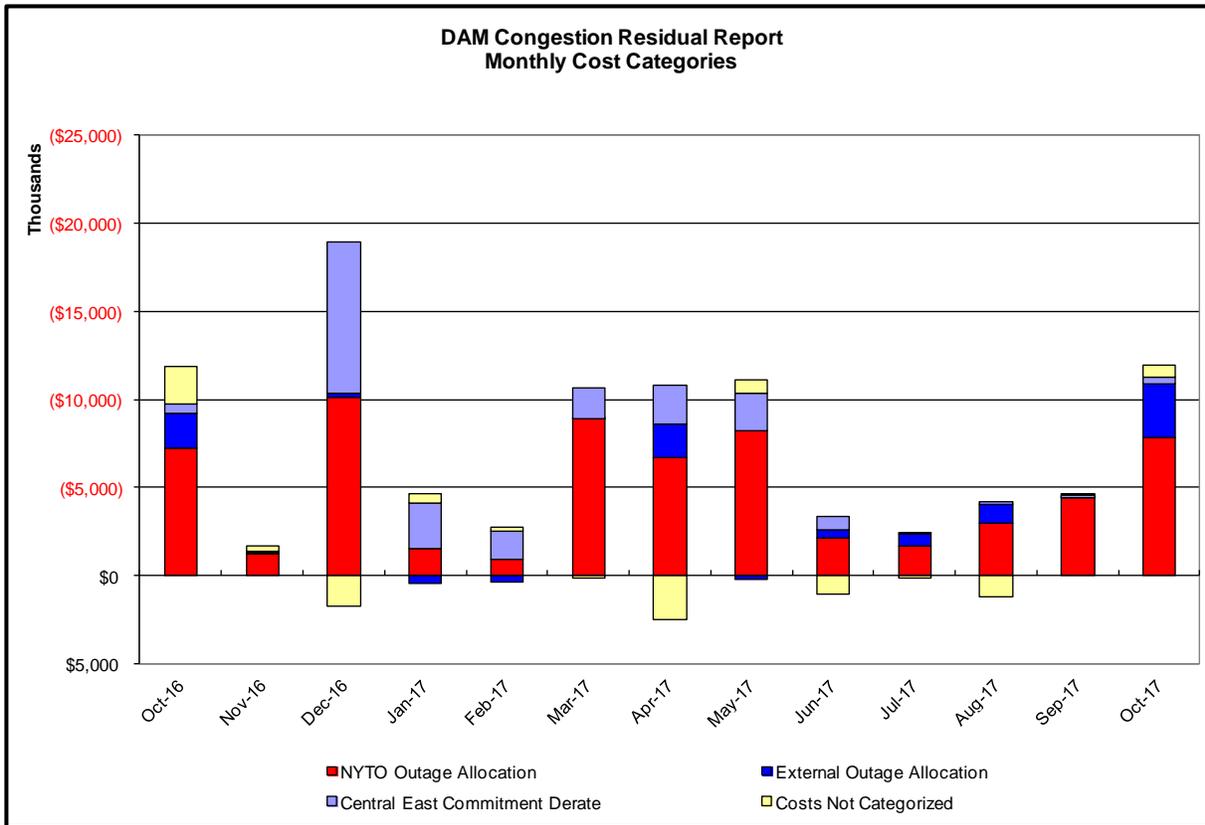
Day's investigated in December: 13,14,16,19,22,26,27,29,30,31			
Event	Date (yyyymmdd)	Hours	Description
	12/13/2017	14	Uprate Central East
	12/13/2017	14,17,18	Uprate East 179th Street - Hellgate 138kV (#15055)
	12/13/2017	20	Derate Gowanus-Greenwood 138kV (#42231) for TWR:GOETHALS 22 & 21
	12/13/2017	20	Derate Athens-Pleasant Valley 345kV (#91) for TWR:UCC2-41&FCC-33
	12/13/2017	14	HQ_CHAT Active DNI Ramp Limit
	12/13/2017	17	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Athens-Pleasant Valley
	12/14/2017	11,12,19-22	Forced Outage of Freeport-Newbridge 138kV (#461)
	12/14/2017	7	NYCA DNI Ramp Limit
	12/14/2017	10	Uprate East 179th Street - Hellgate 138kV (#15055)
	12/14/2017	17,19,20	Derate Athens-Pleasant Valley 345kV (#91) for TWR:UCC2-41&FCC-33
	12/14/2017	10	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/16/2017	0-5,7,9,13-16	Uprate Central East
	12/16/2017	9,13,14,16	NE_AC-NY Scheduling Limit
	12/16/2017	5	NE_AC Active DNI Ramp Limit
	12/16/2017	2-5,7,13-16	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/19/2017	1,7-15,17-23	Early return to service of Marion-Farragut 345kV (#C3403)
	12/19/2017	1,7-15,17-23	Uprate Central East
	12/19/2017	23	NE_AC-NY Scheduling Limit
	12/19/2017	23	NE_AC Active DNI Ramp Limit
	12/19/2017	9,11,17-20	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/22/2017	9-11	NYCA DNI Ramp Limit
	12/22/2017	13-15,20,21	HQ_Cedars-NY Scheduling Limit
	12/22/2017	12-15,20,21	HQ_CHAT-NY Scheduling Limit
	12/22/2017	9,11	HQ_CHAT Active DNI Ramp Limit
	12/22/2017	8	PJM_AC-NY Scheduling Limit
	12/22/2017	8	PJM_AC Active DNI Ramp Limit
	12/22/2017	10	NE_AC Active DNI Ramp Limit
	12/26/2017	0-9,23	Uprate Central East
	12/26/2017	18	HQ_CHAT-NY Scheduling Limit
	12/26/2017	8	PJM_AC-NY Scheduling Limit
	12/26/2017	0-10,12,23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/27/2017	8,9	Forced outage of Marion-Farragut 345kV (#C3403)
	12/27/2017	7,11,13-15,19-21,23	Uprate Central East
	12/27/2017	14,15,19	Uprate East 179th Street-Hellgate 138kV (#15055)
	12/27/2017	11	NYCA DNI Ramp Limit
	12/27/2017	8,9	Derate Central East
	12/27/2017	9	IESO-NY Scheduling Limit
	12/27/2017	11	IESO Active DNI Ramp Limit
	12/27/2017	8,18	NE-NY Scheduling Limit
	12/27/2017	23	PJM_AC-NY Scheduling Limit
	12/27/2017	14,19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/29/2017	7,8,10-13,21,23	Uprate Central East
	12/29/2017	10,18	NE_AC-NY Scheduling Limit
	12/29/2017	23	NE_AC Active DNI Ramp Limit
	12/29/2017	8,10-12	PJM_AC-NY Scheduling Limit
	12/29/2017	13	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/30/2017	0,7,10-12,15,16,18-21	Uprate Central East
	12/30/2017	0	HQ_CHAT-NY Scheduling Limit
	12/30/2017	0,11,22	NE-NY Scheduling Limit
	12/30/2017	0,22	PJM_AC-NY Scheduling Limit
	12/30/2017	1,2,12,15,22,23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/31/2017	1,18	Uprate Central East
	12/31/2017	8-13,15,22	Derate Central East
	12/31/2017	9	NYCA DNI Ramp Limit
	12/31/2017	7,8,11-13,15	NE_AC DNI Ramp Limit
	12/31/2017	6,7	NE-NY Scheduling Limit
	12/31/2017	4,5,18,19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	12/31/2017	18,19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Packard-Sawyer

**Real-Time Balancing Market Congestion Residual (Uplift Cost) Categories**

<u>Category</u>	<u>Cost Assignment</u>	<u>Events Types</u>	<u>Event Examples</u>
Storm Watch	Zone J	Thunderstorm Alert (TSA)	TSA Activations
Unscheduled Transmission Outage	Market-wide	Reduction in DAM to RTM transfers related to unscheduled transmission outage	Forced Line Outage, Unit AVR Outages
Interface Derate - NYISO Security	Market-wide	Reduction in DAM to RTM transfers not related to transmission outage	Interface Derates due to RTM voltages
Interface Derate - External Security	Market-wide	Reduction in DAM to RTM transfers related to External Control Area Security Events	TLR Events, External Transaction Curtailments
Unscheduled Loop Flows	Market-wide	Changes in DAM to RTM unscheduled loop flows impacting NYISO Interface transmission constraints	DAM to RTM Lake Erie Loop Flows exceeding +/- 125 MW
M2M Settlement	Market-wide	Settlement result inclusive of coordinated redispatch and Ramapo flowgates	

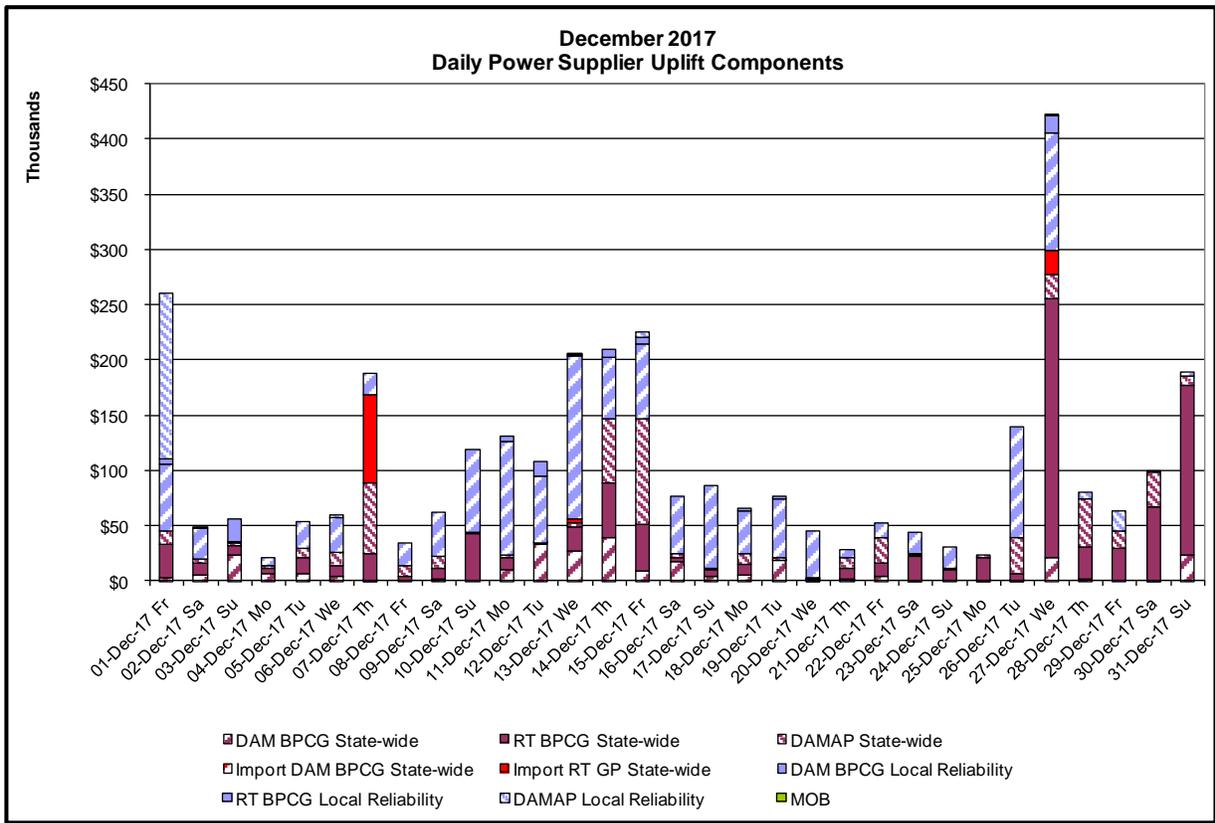
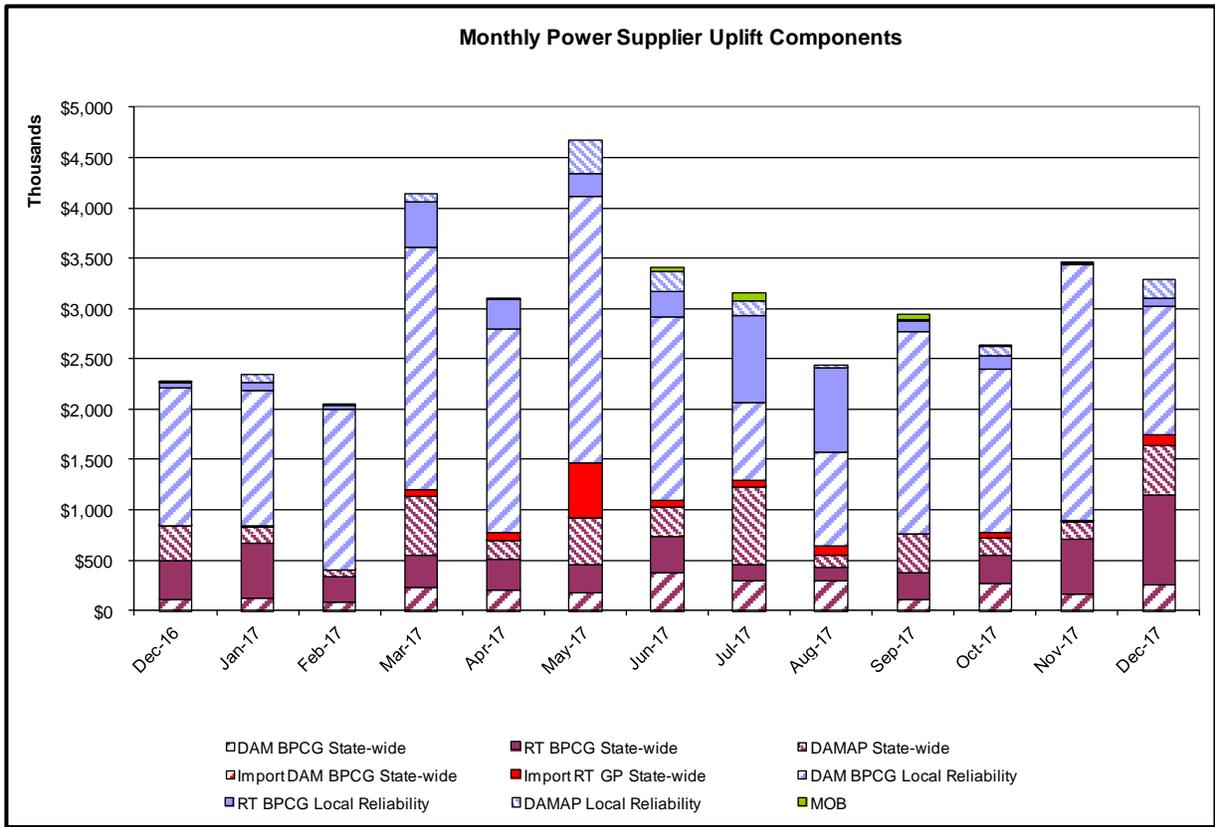
**Monthly Balancing Market Congestion Report Assumptions/Notes**

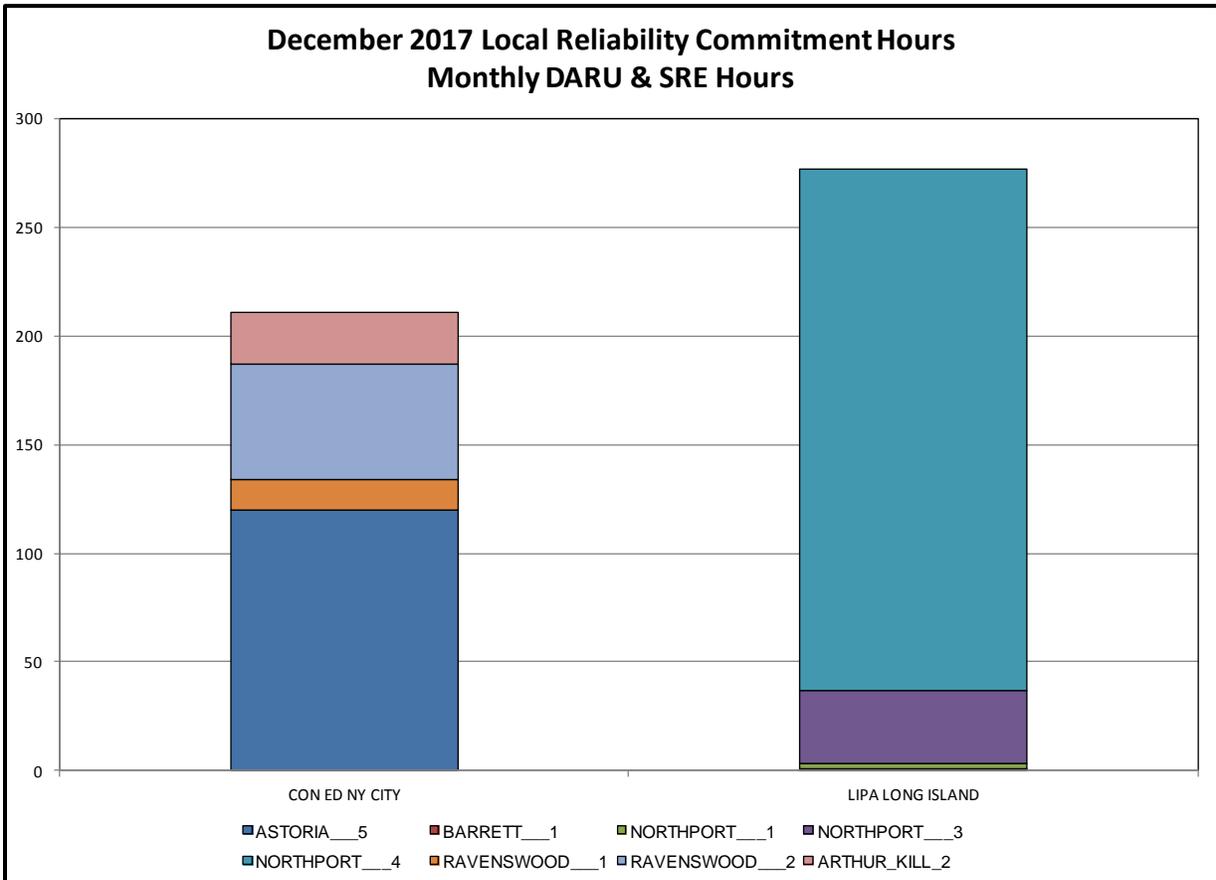
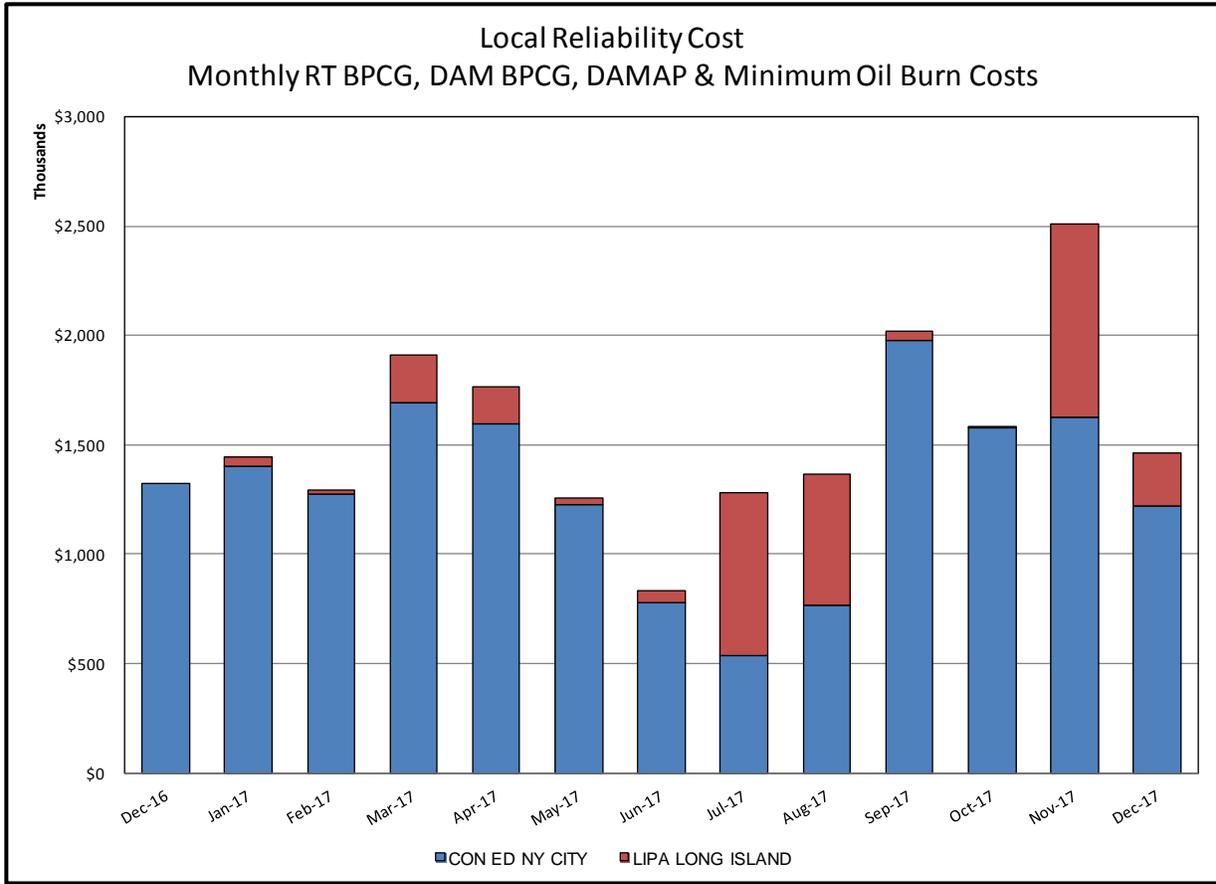
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

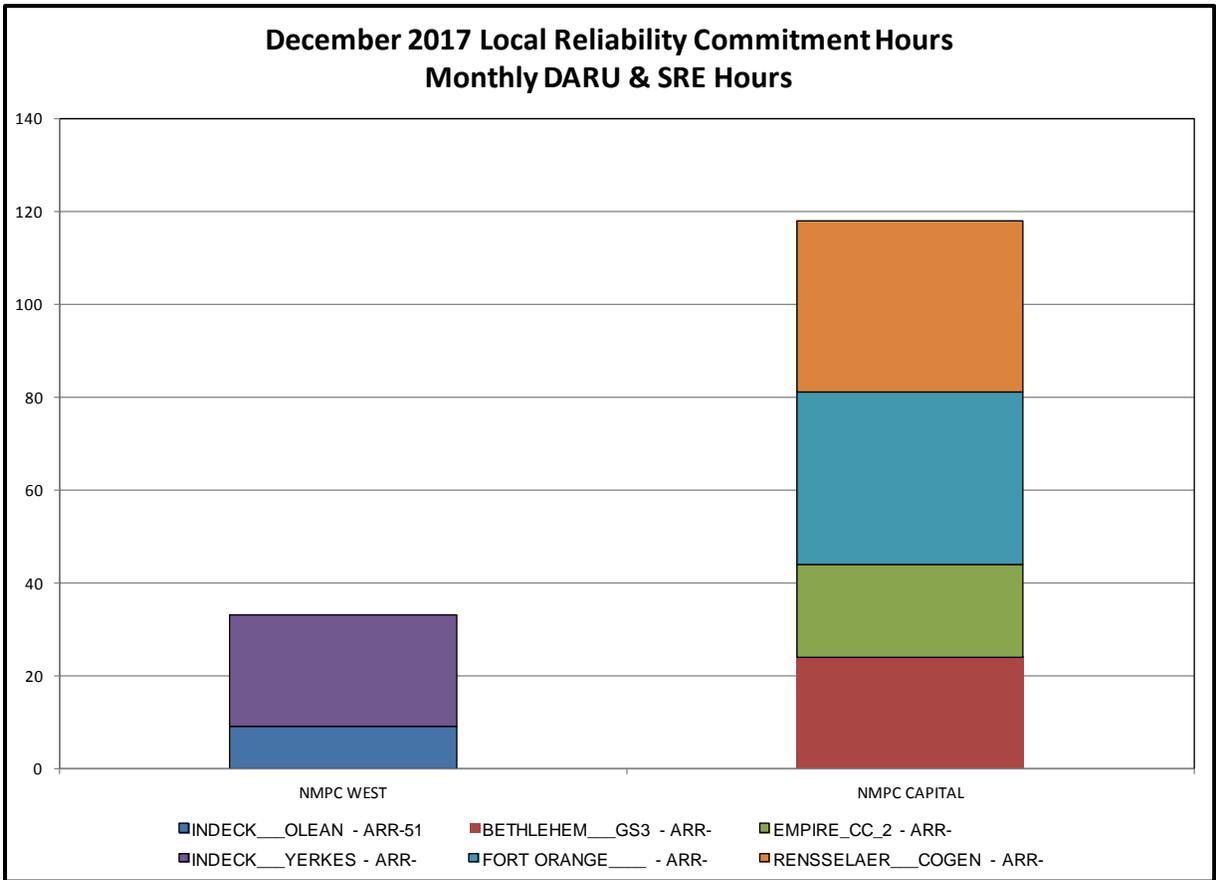
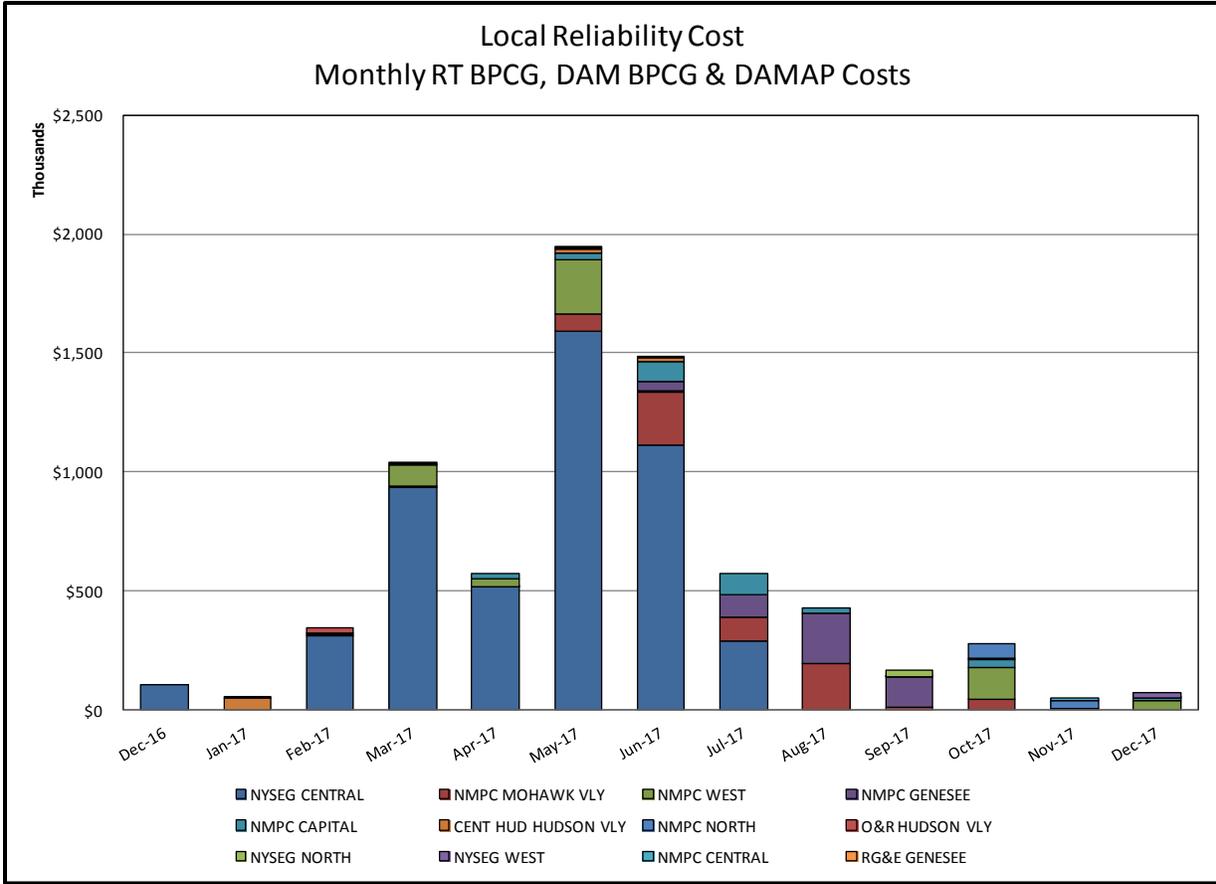


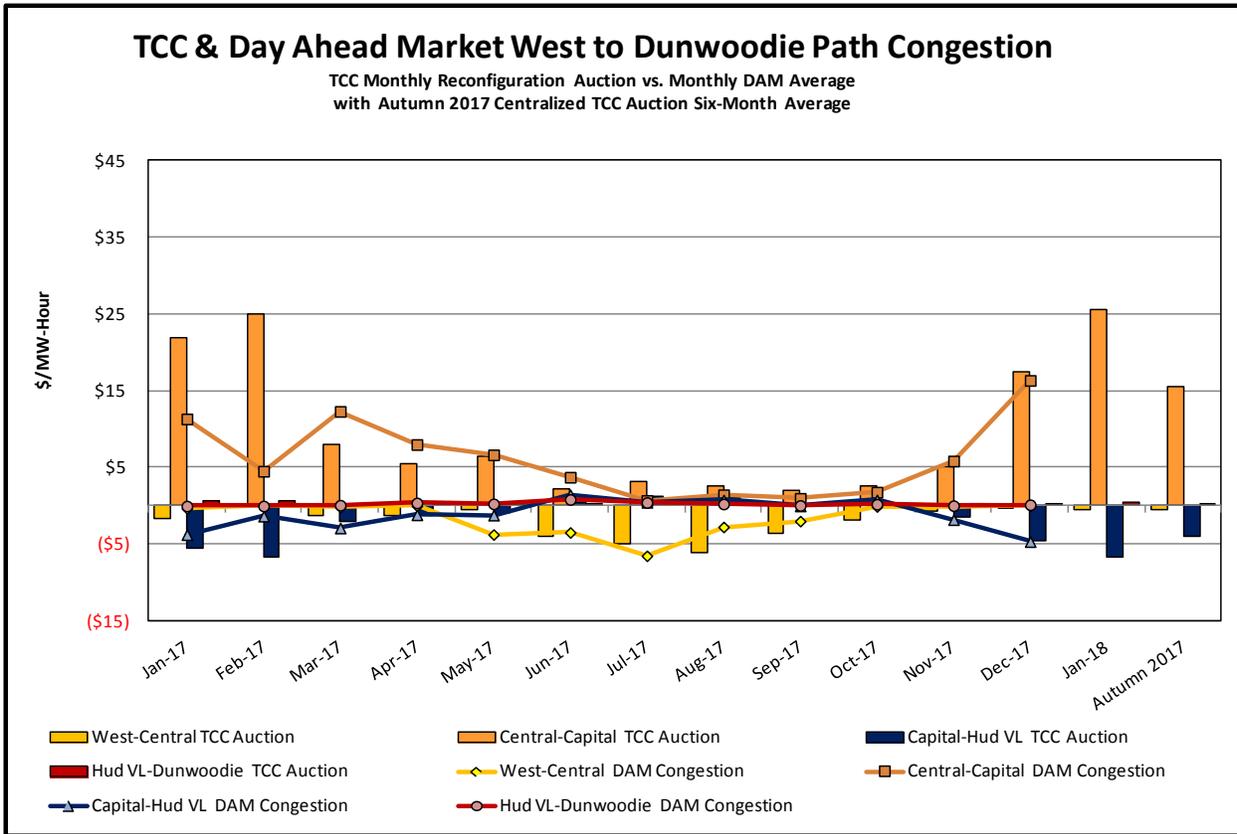
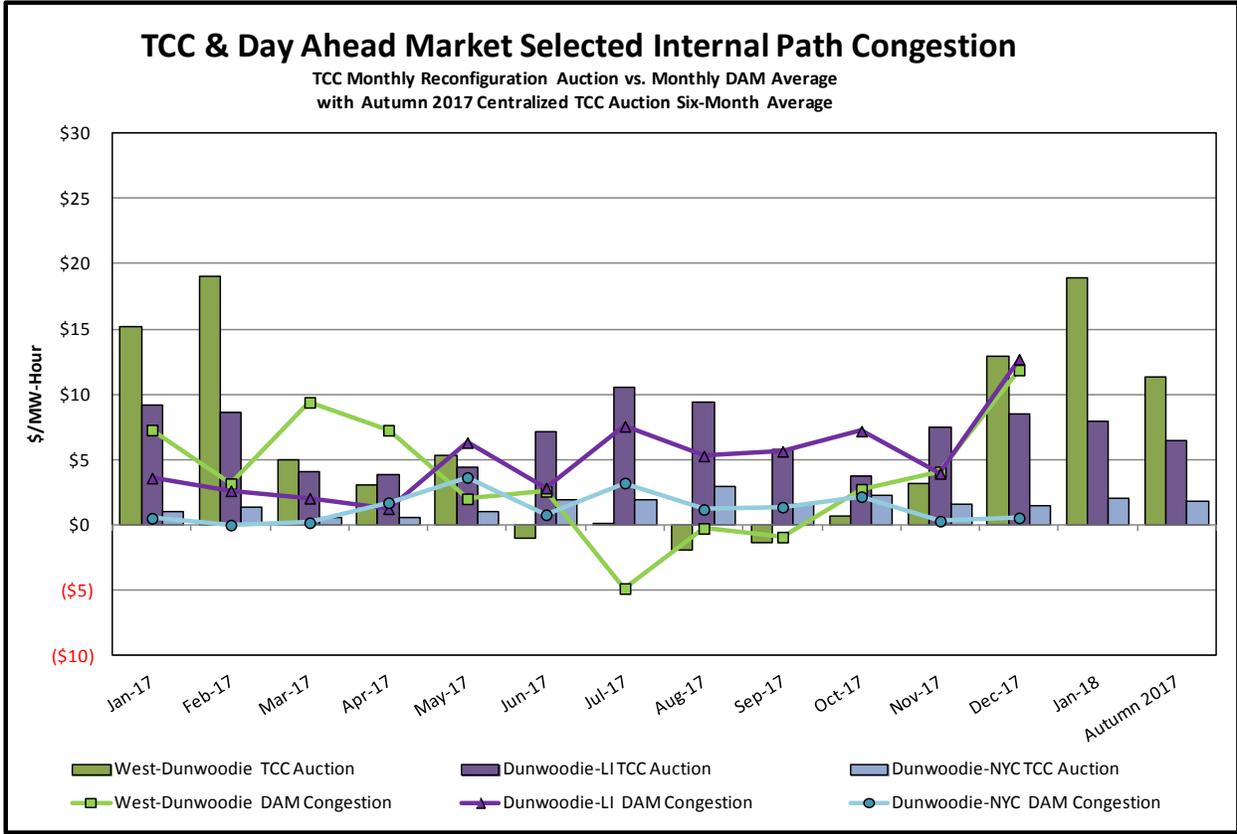
**Day-Ahead Market Congestion Residual Categories**

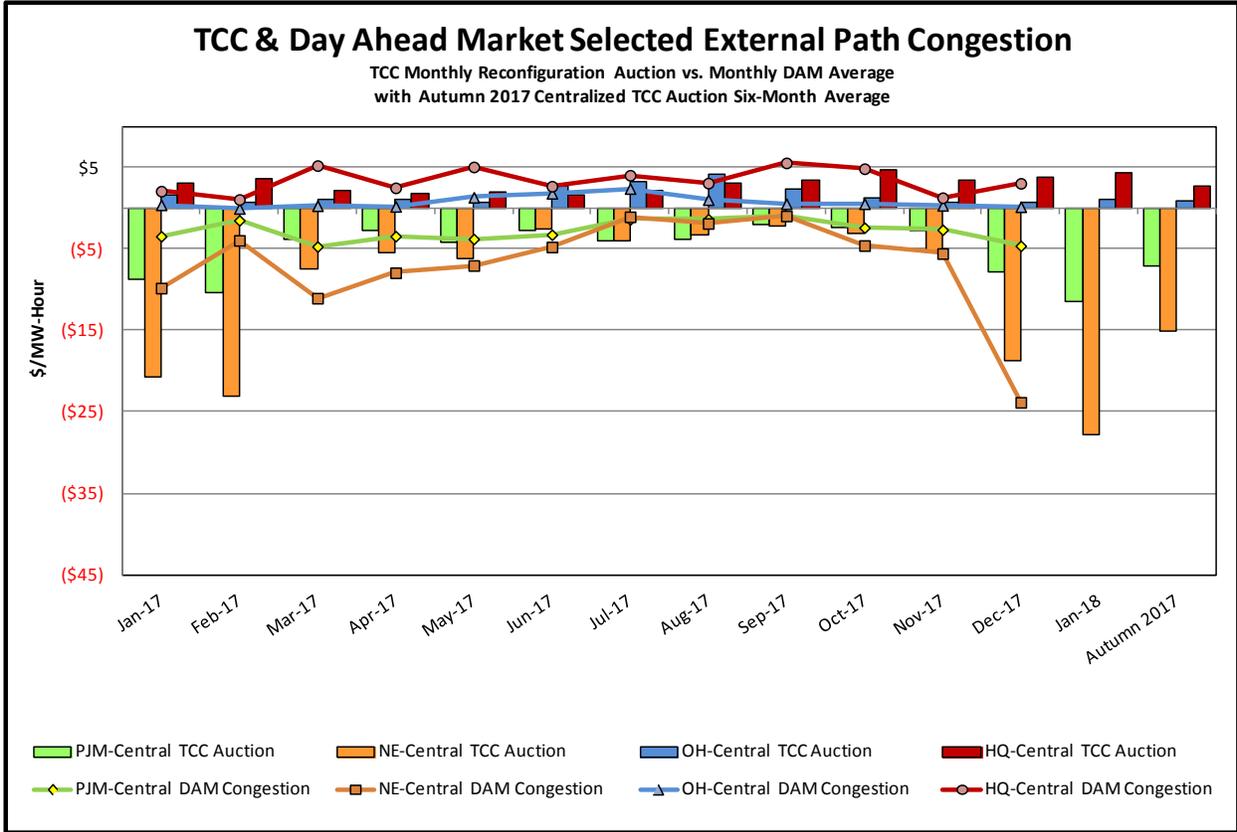
<u>Category</u>	<u>Cost Assignment</u>	<u>Events Types</u>	<u>Event Examples</u>
NYTO Outage Allocation	Responsible TO	Direct allocation to NYTO's responsible for transmission equipment status change.	DAM scheduled outage for equipment modeled in-service for the TCC Auction.
External Outage Allocation	All TO by Monthly Allocation Factor	Direct allocation to transmission equipment status change caused by change in status of external equipment.	Tie line required out-of-service by TO of neighboring control area.
Central East Commitment Derate	All TO by Monthly Allocation Factor	Reductions in the DAM Central East_VC limit as compared to the TCC Auction limit, which are not associated with transmission line outages.	

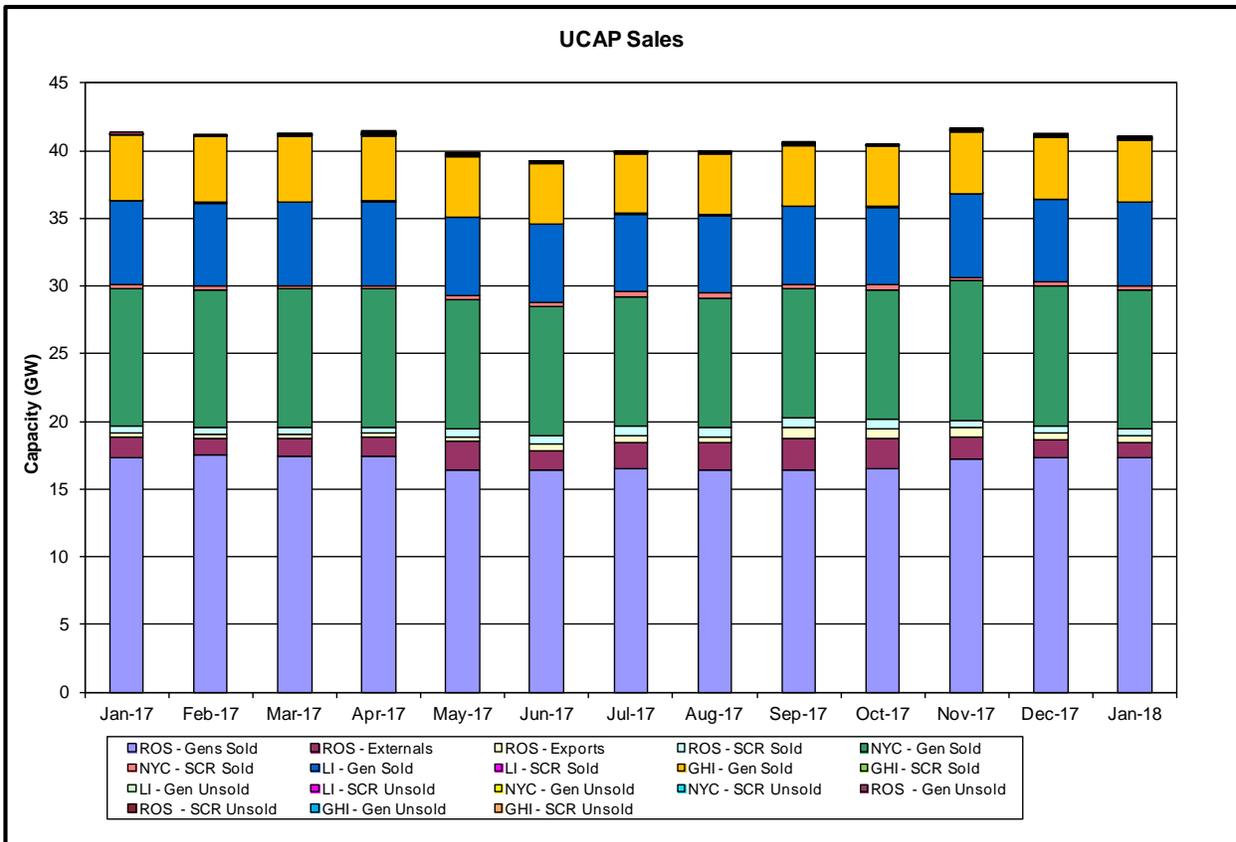
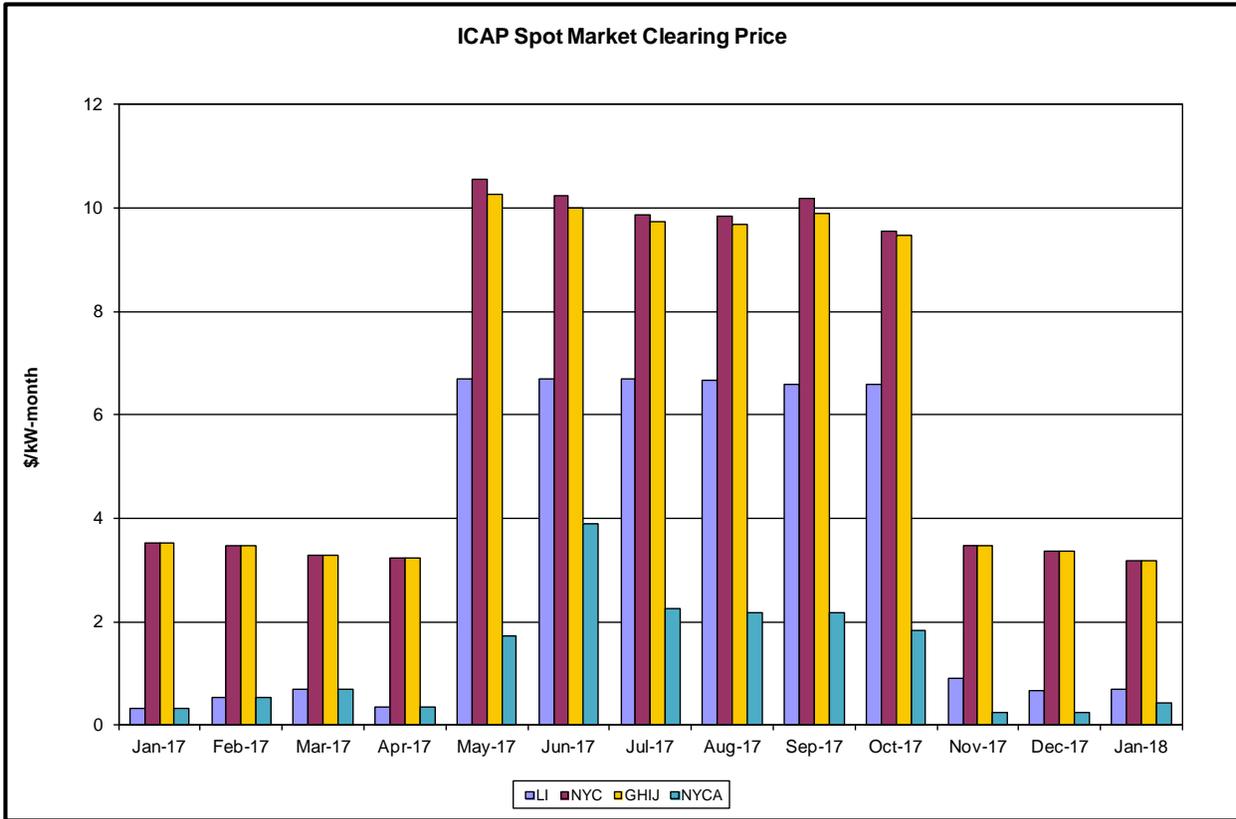










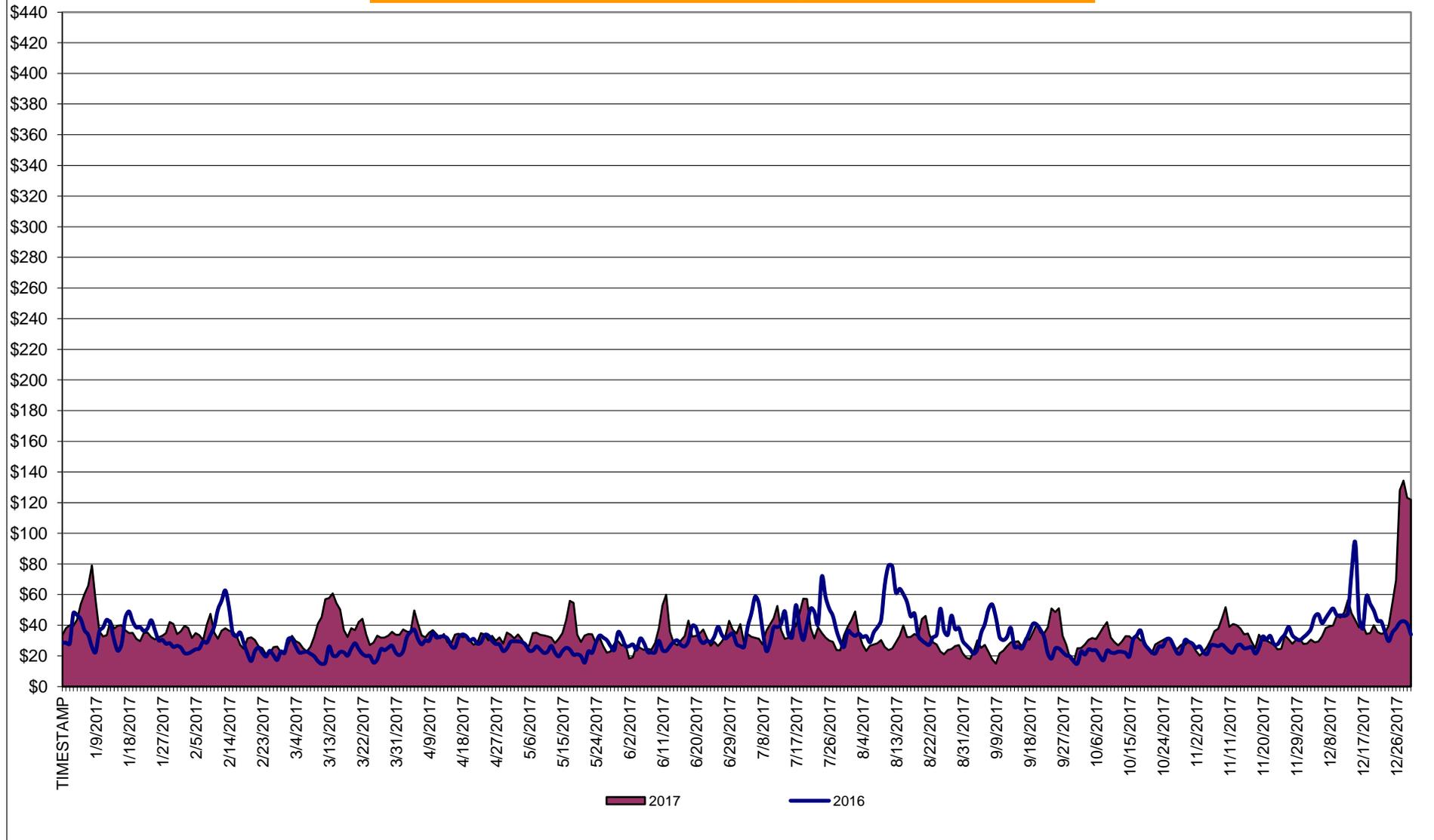


# Market Performance Highlights

## December 2017

- LBMP for December is \$52.63/MWh; higher than \$30.60/MWh in November 2017 and higher than \$43.90/MWh in December 2016.
  - Day Ahead and Real Time Load Weighted LBMPs are higher compared to November.
- December 2017 average year-to-date monthly cost of \$36.56/MWh is a 7% increase from \$34.28/MWh in December 2016.
- Average daily sendout is 444 GWh/day in December; higher than 403 GWh/day in November 2017 and 433 GWh/day in December 2016.
- Natural gas and distillate prices were higher compared to the previous month.
  - Natural Gas (Transco Z6 NY) was \$7.59/MMBtu, up from \$2.92/MMBtu in November.
  - Natural gas prices for the month peaked at \$31.16/MMBtu on December 29, 2017
  - Natural gas prices are up 73.0% year-over-year.
  - Jet Kerosene Gulf Coast was \$13.47/MMBtu, up from \$13.04/MMBtu in November.
  - Ultra Low Sulfur No.2 Diesel NY Harbor was \$13.91/MMBtu, up from \$13.70/MMBtu in November.
  - Distillate prices are up 20.1% year-over-year.
- Uplift per MWh is lower compared to the previous month.
  - Uplift (not including NYISO cost of operations) is (\$0.68)/MWh; lower than (\$0.40)/MWh in November.
    - Local Reliability Share is \$0.09/MWh, lower than \$0.20/MWh in November.
    - Statewide Share is (\$0.78)/MWh, lower than (\$0.60)/MWh in November.
  - TSA \$ per NYC MWh is \$0.00/MWh.
  - Total uplift costs (Schedule 1 components including NYISO Cost of Operations) are lower than November.

**Daily NYISO Average Cost/MWh (Energy & Ancillary Services)\***  
**2016 Annual Average \$34.28/MWh**  
**December 2016 YTD Average \$34.28/MWh**  
**December 2017 YTD Average \$36.56/MWh**



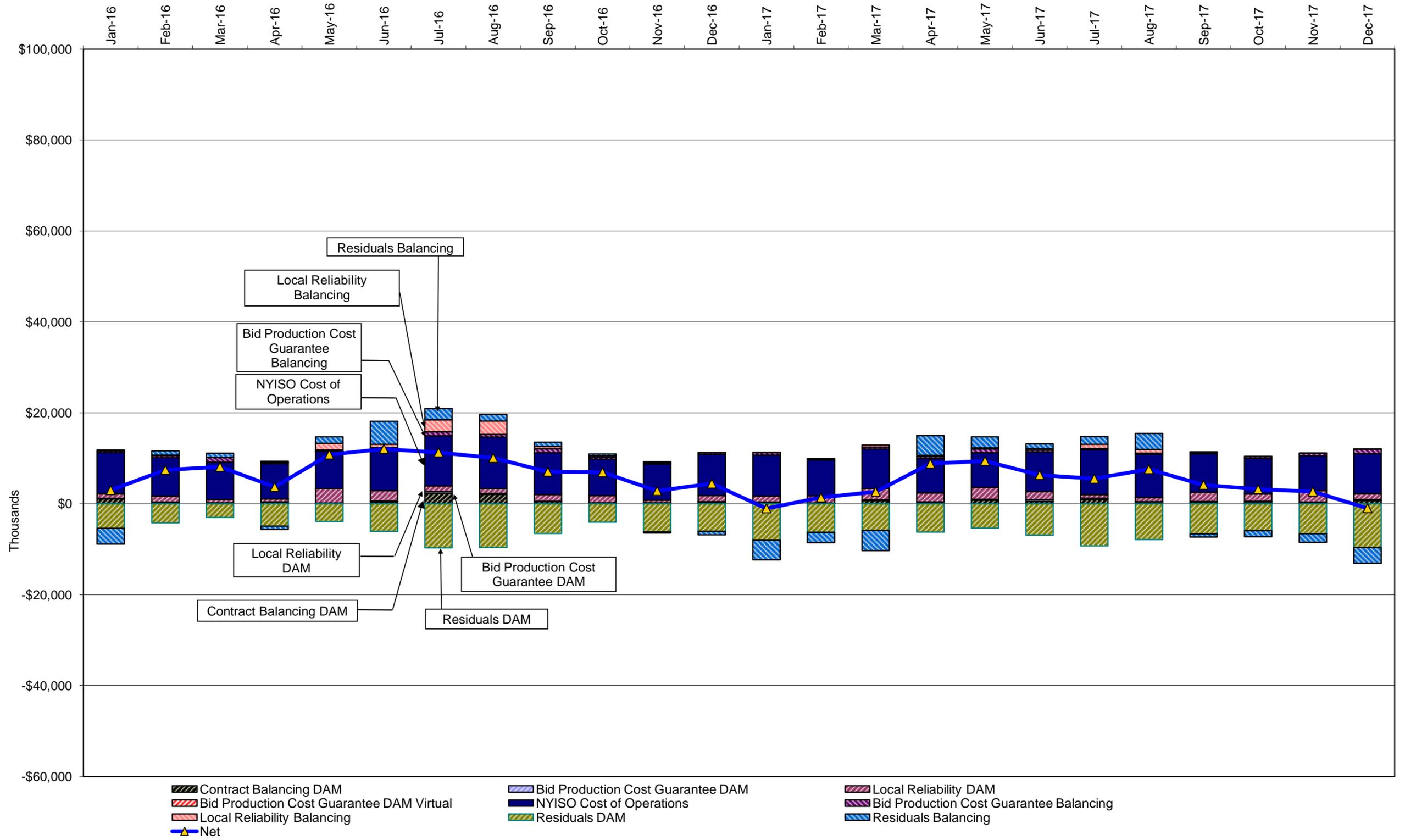
\* Excludes ICAP payments.

**NYISO Average Cost/MWh (Energy and Ancillary Services) \***  
**from the LBMP Customer point of view**

<b>2017</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
LBMP	40.07	30.95	34.97	31.06	31.74	31.76	35.84	30.57	29.57	28.35	30.60	52.63
NTAC	0.66	1.11	0.86	1.05	0.79	0.62	0.87	0.59	0.62	0.50	0.75	0.81
Reserve	0.70	0.67	0.74	0.70	0.61	0.55	0.48	0.44	0.47	0.59	0.55	0.71
Regulation	0.14	0.12	0.13	0.17	0.16	0.13	0.10	0.10	0.11	0.13	0.20	0.15
NYISO Cost of Operations	0.65	0.65	0.65	0.65	0.62	0.63	0.63	0.63	0.63	0.62	0.61	0.60
FERC Fee Recovery	0.09	0.10	0.10	0.12	0.10	0.09	0.07	0.08	0.09	0.10	0.10	0.08
Uplift	(0.73)	(0.54)	(0.46)	0.12	0.10	(0.37)	(0.43)	(0.19)	(0.34)	(0.36)	(0.40)	(0.68)
Uplift: Local Reliability Share	0.10	0.13	0.21	0.20	0.24	0.15	0.11	0.12	0.16	0.14	0.20	0.09
Uplift: Statewide Share	(0.83)	(0.67)	(0.67)	(0.08)	(0.13)	(0.52)	(0.54)	(0.31)	(0.50)	(0.50)	(0.60)	(0.78)
Voltage Support and Black Start	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.37	0.37
<b>Avg Monthly Cost</b>	<b>41.96</b>	<b>33.44</b>	<b>37.38</b>	<b>34.26</b>	<b>34.52</b>	<b>33.80</b>	<b>37.94</b>	<b>32.60</b>	<b>31.54</b>	<b>30.31</b>	<b>32.79</b>	<b>54.67</b>
Avg YTD Cost	41.96	38.02	37.81	37.05	36.54	36.01	36.35	35.80	35.34	34.89	34.72	36.56
TSA \$ per NYC MWh	0.00	0.00	0.00	0.08	0.12	0.56	0.42	0.23	0.00	0.00	0.00	0.00
<b>2016</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
LBMP	34.29	28.71	20.66	27.96	23.31	27.35	40.01	42.99	30.89	22.33	26.31	43.90
NTAC	0.59	0.78	0.62	1.14	1.10	0.93	0.78	0.54	0.55	0.86	0.79	0.97
Reserve	0.77	0.73	0.73	0.87	0.71	0.59	0.67	0.68	0.69	0.77	0.68	0.63
Regulation	0.12	0.12	0.12	0.12	0.11	0.12	0.10	0.10	0.10	0.15	0.13	0.17
NYISO Cost of Operations	0.64	0.65	0.65	0.64	0.65	0.66	0.65	0.65	0.64	0.64	0.64	0.64
FERC Fee Recovery	0.09	0.10	0.11	0.10	0.09	0.09	0.07	0.06	0.08	0.10	0.10	0.08
Uplift	(0.43)	(0.07)	(0.03)	(0.34)	0.19	0.20	(0.26)	(0.63)	(0.15)	(0.09)	(0.42)	(0.33)
Uplift: Local Reliability Share	0.09	0.11	0.06	0.07	0.35	0.21	0.23	0.22	0.14	0.15	0.07	0.10
Uplift: Statewide Share	(0.52)	(0.18)	(0.09)	(0.41)	(0.16)	(0.01)	(0.49)	(0.86)	(0.29)	(0.24)	(0.49)	(0.43)
Voltage Support and Black Start	0.35	0.36	0.36	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.35
<b>Avg Monthly Cost</b>	<b>36.42</b>	<b>31.37</b>	<b>23.23</b>	<b>30.84</b>	<b>26.52</b>	<b>30.29</b>	<b>42.40</b>	<b>44.75</b>	<b>33.16</b>	<b>25.12</b>	<b>28.61</b>	<b>46.42</b>
Avg YTD Cost	36.42	34.02	30.68	30.71	29.85	29.93	32.32	34.43	34.31	33.54	33.16	34.28
TSA \$ per NYC MWh	0.00	0.00	0.05	0.00	0.00	0.02	0.84	1.64	0.00	0.00	0.00	0.00
<b>2015</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
LBMP	59.61	114.37	52.09	28.36	32.98	28.20	34.77	33.09	34.40	30.05	24.83	20.91
NTAC	0.32	0.35	0.41	0.64	0.56	0.80	0.54	0.60	0.63	0.53	0.68	1.05
Reserve	0.27	0.37	0.56	0.36	0.38	0.24	0.27	0.20	0.28	0.28	0.47	0.60
Regulation	0.10	0.18	0.11	0.12	0.10	0.13	0.12	0.12	0.10	0.12	0.13	0.13
NYISO Cost of Operations	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.69	0.70	0.69
Uplift	(0.48)	(1.08)	(0.68)	(0.15)	0.26	0.33	0.04	0.03	(0.15)	0.10	0.44	(0.07)
Uplift: Local Reliability Share	0.25	0.33	0.13	0.27	0.30	0.37	0.35	0.36	0.22	0.33	0.20	0.12
Uplift: Statewide Share	(0.73)	(1.41)	(0.81)	(0.42)	(0.05)	(0.04)	(0.30)	(0.33)	(0.37)	(0.23)	0.25	(0.18)
Voltage Support and Black Start	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.38
<b>Avg Monthly Cost</b>	<b>60.91</b>	<b>115.27</b>	<b>53.58</b>	<b>30.41</b>	<b>35.37</b>	<b>30.79</b>	<b>36.84</b>	<b>35.14</b>	<b>36.35</b>	<b>32.18</b>	<b>27.64</b>	<b>23.71</b>
Avg YTD Cost	60.91	87.74	76.64	66.82	60.96	56.02	52.77	50.20	48.59	47.17	45.66	44.10
TSA \$ per NYC MWh	0.00	0.00	0.00	0.00	0.17	0.50	0.07	0.06	0.01	0.00	0.00	0.00

\* Excludes ICAP payments.  
Market Mitigation and Analysis  
Prepared: 1/8/2018 2:34 PM

## NYISO Dollar Flows - Uplift - OATT Schedule 1 components - Data through December 31, 2017



DAM Contract Balancing amounts are for payments made to generating units to make them whole for being dispatched below their Day-Ahead schedule, as a result of out-of-merit dispatches.  
 DAM Bid Production Cost Guarantees for Virtual Transactions are included in the chart and are shown from the inception of Virtual Transactions. These values are small and cannot be identified on the chart.  
 DAM residuals consist of both energy and loss revenue collections and payments. By design, there is a net over collection of revenues due to the difference between the marginal losses paid to generation and the average losses charged to loads.

## NYISO Markets Transactions

<b>2017</b>	January	February	March	April	May	June	July	August	September	October	November	December
<b>Day Ahead Market MWh</b>	14,135,019	12,565,206	13,983,865	12,061,475	12,966,981	14,406,180	16,505,801	15,948,927	14,100,695	13,252,368	13,042,826	14,829,403
DAM LSE Internal LBMP Energy Sales	57%	57%	55%	54%	58%	60%	62%	61%	57%	55%	53%	55%
DAM External TC LBMP Energy Sales	2%	2%	1%	1%	1%	1%	1%	1%	1%	2%	3%	5%
DAM Bilateral - Internal Bilaterals	32%	32%	34%	35%	33%	31%	29%	29%	32%	34%	34%	32%
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	6%	4%	5%	4%	5%	5%	5%	5%	5%
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	2%
DAM Bilateral - Wheel Through Bilaterals	2%	2%	2%	2%	2%	2%	3%	3%	4%	2%	3%	2%
<b>Balancing Energy Market MWh</b>	-256,448	-407,284	-509,053	-466,426	-666,048	-564,312	-747,473	-853,898	-633,990	-510,721	-410,072	-254,003
Balancing Energy LSE Internal LBMP Energy Sales	-157%	-132%	-148%	-115%	-120%	-114%	-100%	-87%	-76%	-102%	-108%	-99%
Balancing Energy External TC LBMP Energy Sales	64%	39%	44%	22%	28%	23%	18%	13%	12%	26%	45%	25%
Balancing Energy Bilateral - Internal Bilaterals	15%	8%	12%	5%	1%	4%	3%	2%	3%	5%	5%	-1%
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	10%	7%	5%	4%	3%	3%	1%	1%	1%	4%	7%	9%
Balancing Energy Bilateral - Wheel Through Bilaterals	-32%	-26%	-13%	-15%	-12%	-16%	-22%	-29%	-40%	-33%	-49%	-34%
<b>Transactions Summary</b>												
LBMP	58%	57%	55%	54%	58%	60%	62%	61%	58%	56%	56%	60%
Internal Bilaterals	33%	34%	36%	37%	34%	32%	30%	31%	33%	36%	36%	32%
Import Bilaterals	5%	5%	5%	6%	4%	5%	5%	5%	5%	5%	5%	5%
Export Bilaterals	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Wheels Through	2%	2%	2%	2%	2%	1%	2%	2%	2%	1%	1%	1%
<b>Market Share of Total Load</b>												
Day Ahead Market	101.8%	103.3%	103.8%	104.0%	105.4%	104.1%	104.7%	105.7%	104.7%	104.0%	103.2%	101.7%
Balancing Energy +	-1.8%	-3.3%	-3.8%	-4.0%	-5.4%	-4.1%	-4.7%	-5.7%	-4.7%	-4.0%	-3.2%	-1.7%
Total MWh	13,878,571	12,157,922	13,474,812	11,595,049	12,300,933	13,841,868	15,758,328	15,095,029	13,466,705	12,741,647	12,632,754	14,575,400
Average Daily Energy Sendout/Month GWh	431	418	419	377	383	454	498	477	437	398	403	444
<b>2016</b>	January	February	March	April	May	June	July	August	September	October	November	December
<b>Day Ahead Market MWh</b>	14,760,915	13,614,754	13,413,781	12,496,141	12,959,886	14,095,904	16,950,819	17,413,898	14,563,318	13,014,354	12,770,775	14,245,185
DAM LSE Internal LBMP Energy Sales	54%	55%	55%	57%	58%	60%	64%	63%	60%	56%	56%	58%
DAM External TC LBMP Energy Sales	4%	2%	1%	5%	2%	1%	1%	3%	3%	2%	2%	3%
DAM Bilateral - Internal Bilaterals	34%	34%	35%	28%	31%	30%	28%	27%	30%	33%	32%	31%
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	6%	5%	5%	4%	4%	5%	5%	5%	5%
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%	1%	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%
DAM Bilateral - Wheel Through Bilaterals	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%
<b>Balancing Energy Market MWh</b>	-522,919	-580,900	-741,701	-303,313	-180,848	-143,015	-86,025	224,316	-250,802	-477,109	-394,575	-127,836
Balancing Energy LSE Internal LBMP Energy Sales	-125%	-114%	-118%	-76%	-147%	-203%	-347%	42%	-139%	-111%	-102%	-269%
Balancing Energy External TC LBMP Energy Sales	12%	13%	19%	-13%	55%	77%	204%	56%	49%	21%	28%	138%
Balancing Energy Bilateral - Internal Bilaterals	19%	9%	4%	8%	27%	47%	62%	28%	18%	6%	9%	65%
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	6%	5%	3%	5%	7%	10%	15%	5%	5%	4%	6%	27%
Balancing Energy Bilateral - Wheel Through Bilaterals	-12%	-12%	-8%	-24%	-42%	-32%	-34%	-31%	-32%	-21%	-40%	-66%
<b>Transactions Summary</b>												
LBMP	56%	56%	54%	62%	59%	61%	65%	66%	62%	57%	57%	60%
Internal Bilaterals	36%	36%	37%	29%	32%	31%	28%	27%	30%	35%	34%	32%
Import Bilaterals	5%	5%	6%	6%	5%	5%	4%	4%	5%	5%	6%	5%
Export Bilaterals	2%	2%	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Wheels Through	1%	1%	1%	1%	2%	2%	1%	1%	2%	1%	2%	2%
<b>Market Share of Total Load</b>												
Day Ahead Market	103.7%	104.5%	105.9%	102.5%	101.4%	101.0%	100.5%	98.7%	101.8%	103.8%	103.2%	100.9%
Balancing Energy +	-3.7%	-4.5%	-5.9%	-2.5%	-1.4%	-1.0%	-0.5%	1.3%	-1.8%	-3.8%	-3.2%	-0.9%
Total MWh	14,237,996	13,033,853	12,672,080	12,192,828	12,779,038	13,952,889	16,864,794	17,638,213	14,312,516	12,537,245	12,376,200	14,117,349
Average Daily Energy Sendout/Month GWh	439	436	397	385	397	456	532	548	458	391	398	433

+ Balancing Energy: Load(MW) purchased at Real Time LBMP.

\* The signs for the detail section intuitively reflect the direction of power flow eliminating the use of double negatives when Balancing Energy is negative.

Notes: Percent totals may not equal 100% due to rounding.

Virtual Transactions are not reflected in this chart.

### NYISO Markets 2017 Energy Statistics

	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b><u>DAY AHEAD LBMP</u></b>												
Price *	\$37.22	\$28.84	\$32.04	\$27.70	\$27.66	\$27.37	\$31.64	\$27.28	\$25.05	\$25.49	\$27.88	\$45.46
Standard Deviation	\$13.20	\$7.97	\$11.95	\$7.66	\$9.47	\$12.37	\$13.51	\$10.60	\$12.09	\$8.53	\$9.87	\$31.56
Load Weighted Price **	\$38.42	\$29.66	\$32.96	\$28.56	\$28.95	\$29.52	\$33.78	\$29.00	\$26.95	\$26.57	\$28.83	\$47.90
<b><u>RTC LBMP</u></b>												
Price *	\$32.87	\$24.09	\$28.86	\$26.19	\$26.19	\$26.40	\$30.84	\$25.26	\$27.97	\$26.91	\$27.35	\$47.75
Standard Deviation	\$14.57	\$9.52	\$13.70	\$10.36	\$21.29	\$14.76	\$18.14	\$13.08	\$27.14	\$13.40	\$10.54	\$37.33
Load Weighted Price **	\$33.96	\$24.81	\$29.67	\$26.98	\$28.10	\$28.39	\$33.13	\$26.65	\$30.98	\$28.13	\$28.15	\$50.39
<b><u>REAL TIME LBMP</u></b>												
Price *	\$34.61	\$25.14	\$31.21	\$29.61	\$26.56	\$26.16	\$29.47	\$24.36	\$26.08	\$25.95	\$27.91	\$48.42
Standard Deviation	\$18.20	\$14.21	\$25.02	\$39.82	\$26.11	\$19.00	\$20.25	\$14.03	\$25.72	\$14.49	\$15.86	\$42.66
Load Weighted Price **	\$35.80	\$25.84	\$32.21	\$30.81	\$28.64	\$28.67	\$32.11	\$25.95	\$29.13	\$27.33	\$28.90	\$51.49
Average Daily Energy Sendout/Month GWh	431	418	419	377	383	454	498	477	437	398	403	444

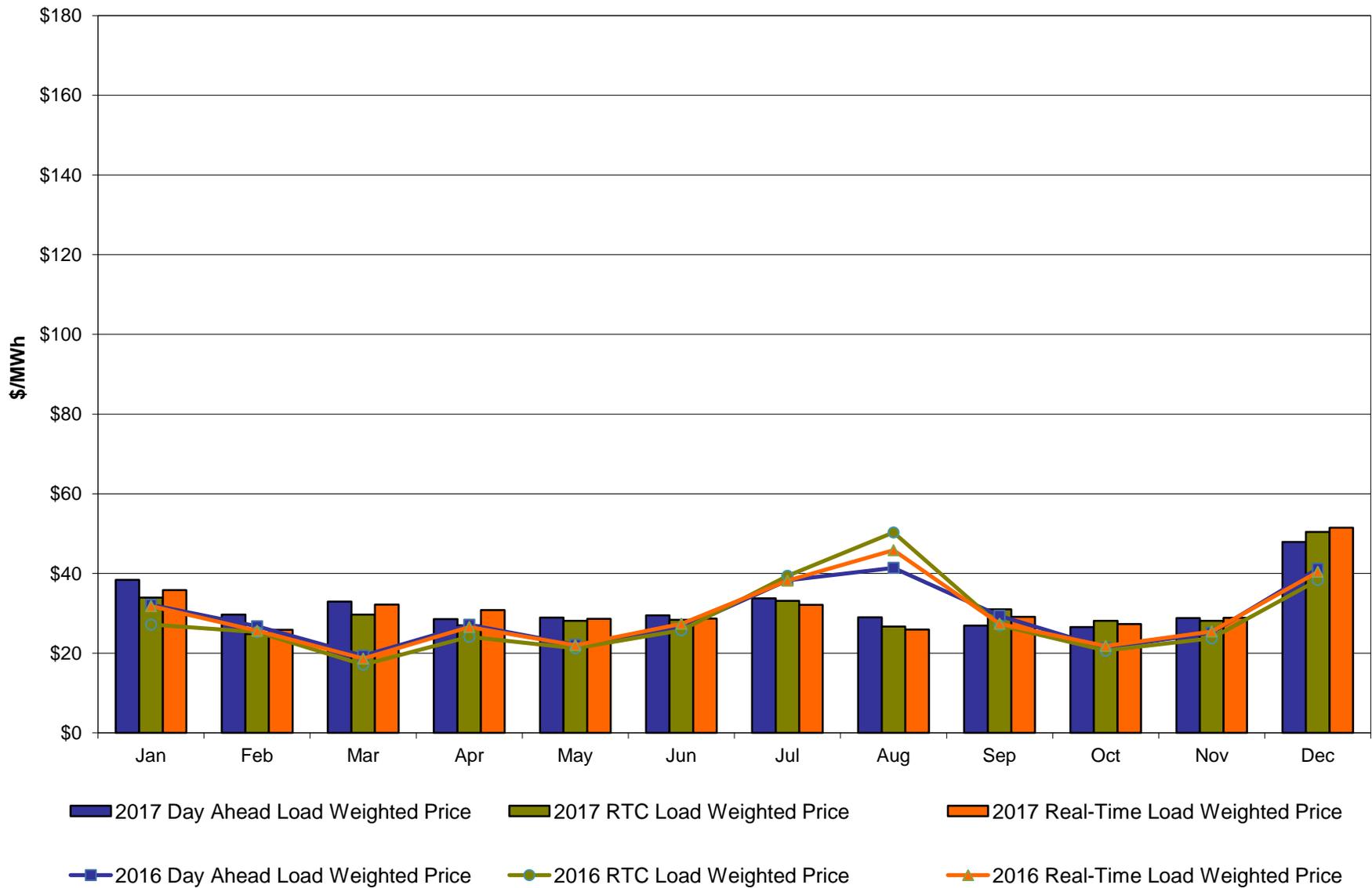
### NYISO Markets 2016 Energy Statistics

	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b><u>DAY AHEAD LBMP</u></b>												
Price *	\$31.01	\$25.76	\$18.63	\$26.39	\$21.07	\$24.83	\$35.24	\$38.25	\$27.15	\$20.37	\$24.35	\$39.83
Standard Deviation	\$10.86	\$12.46	\$6.99	\$6.95	\$7.04	\$9.21	\$18.37	\$20.59	\$13.55	\$7.48	\$7.32	\$15.08
Load Weighted Price **	\$32.13	\$26.75	\$19.37	\$27.14	\$22.12	\$26.30	\$38.29	\$41.41	\$29.38	\$21.29	\$25.15	\$41.22
<b><u>RTC LBMP</u></b>												
Price *	\$26.12	\$24.10	\$16.41	\$23.41	\$19.96	\$24.29	\$36.22	\$45.03	\$24.70	\$19.76	\$23.02	\$37.08
Standard Deviation	\$16.06	\$17.89	\$11.32	\$9.09	\$11.44	\$16.58	\$38.04	\$70.57	\$17.46	\$8.96	\$9.49	\$16.72
Load Weighted Price **	\$27.16	\$25.29	\$17.11	\$24.10	\$21.23	\$25.73	\$39.42	\$50.28	\$26.97	\$20.64	\$23.73	\$38.35
<b><u>REAL TIME LBMP</u></b>												
Price *	\$30.15	\$24.28	\$17.84	\$25.71	\$20.67	\$25.87	\$34.40	\$40.87	\$24.90	\$20.91	\$24.72	\$39.00
Standard Deviation	\$60.09	\$18.19	\$15.06	\$16.59	\$12.84	\$19.27	\$38.56	\$52.85	\$20.70	\$12.15	\$12.71	\$20.92
Load Weighted Price **	\$31.80	\$25.61	\$18.64	\$26.57	\$21.99	\$27.39	\$38.20	\$45.82	\$27.38	\$21.81	\$25.45	\$40.42
Average Daily Energy Sendout/Month GWh	439	436	397	385	397	456	532	548	458	391	398	433

\* Average zonal load weighted prices.

\*\* Average zonal load weighted prices, load weighted in each hour.

### NYISO Monthly Average Internal LBMPs 2016- 2017

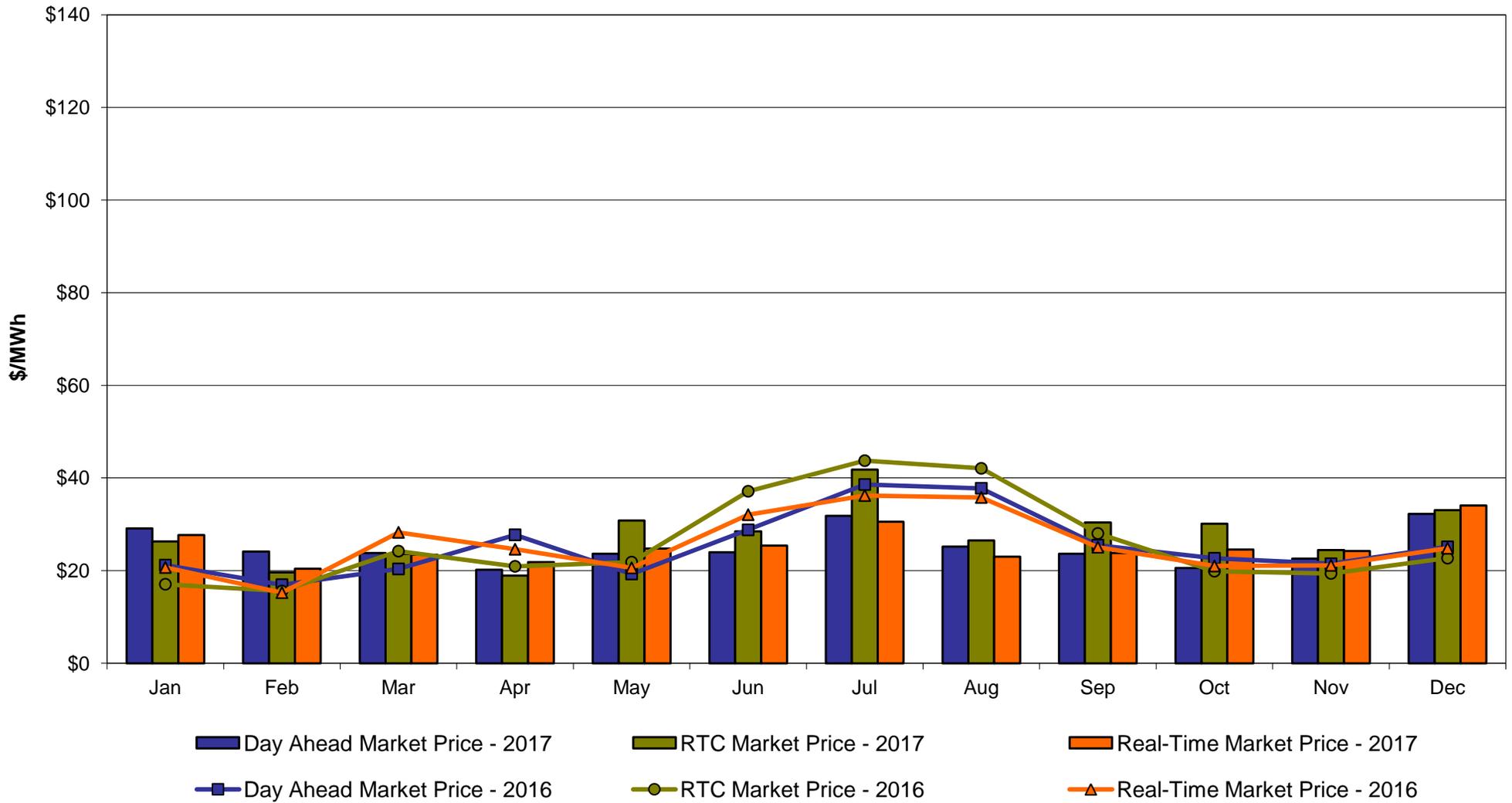


**December 2017 Zonal LBMP Statistics for NYISO (\$/MWh)**

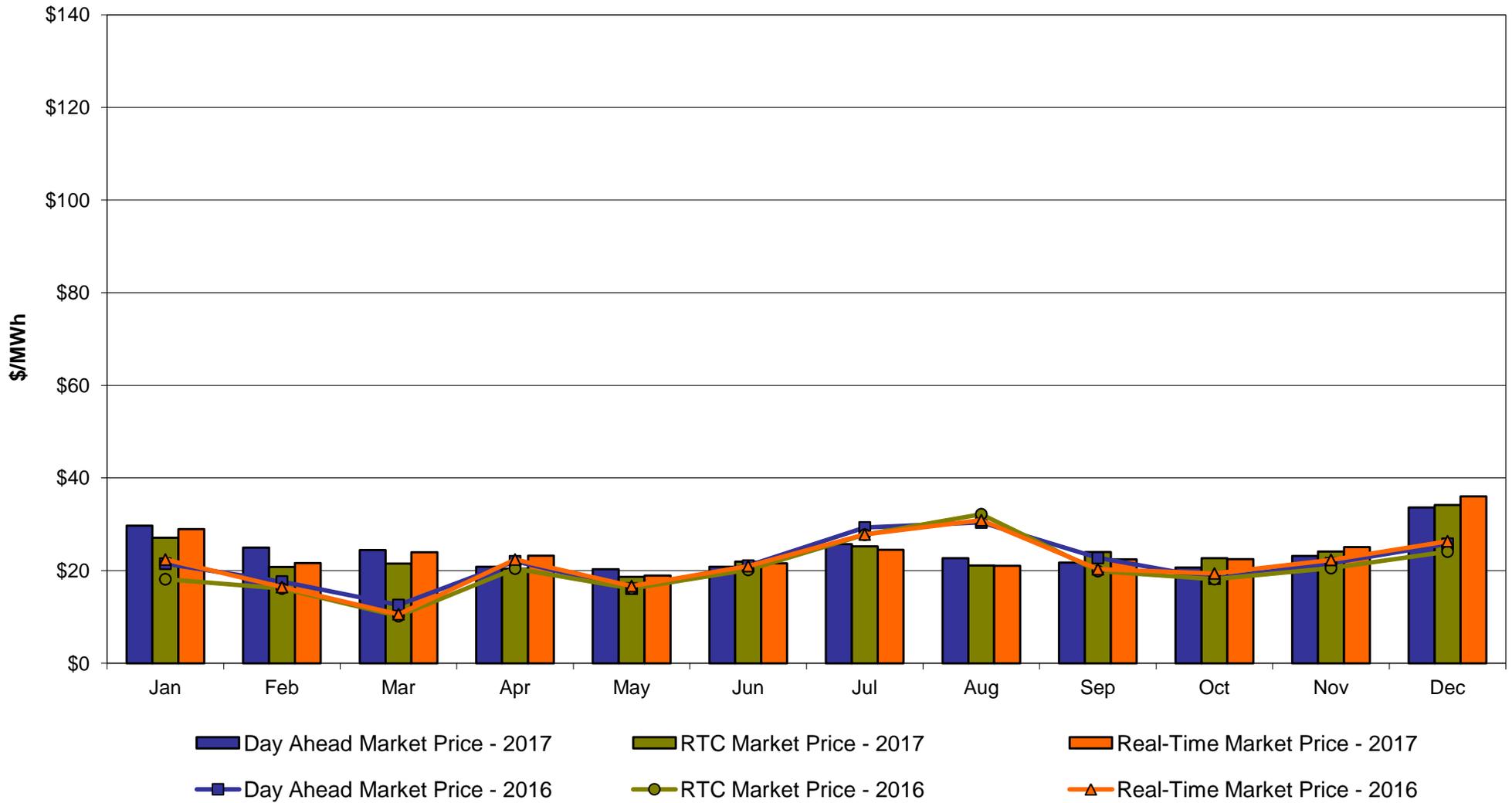
	<u>WEST Zone A</u>	<u>GENESEE Zone B</u>	<u>NORTH Zone D</u>	<u>CENTRAL Zone C</u>	<u>MOHAWK VALLEY Zone E</u>	<u>CAPITAL Zone F</u>	<u>HUDSON VALLEY Zone G</u>	<u>MILLWOOD Zone H</u>	<u>DUNWOODIE Zone I</u>	<u>NEW YORK CITY Zone J</u>	<u>LONG ISLAND Zone K</u>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	32.24	32.08	30.39	33.62	34.63	52.35	48.35	48.89	48.70	49.54	62.31
Standard Deviation	22.66	23.31	24.81	24.45	25.93	40.41	35.14	35.47	35.26	36.21	38.82
<b><u>RTC LBMP</u></b>											
Unweighted Price *	33.07	32.04	30.82	34.16	35.87	57.16	51.57	51.94	51.63	52.02	66.24
Standard Deviation	32.16	28.37	32.02	30.00	32.87	48.27	41.24	41.54	41.23	41.40	71.92
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	34.07	33.95	32.48	36.00	37.58	57.93	52.89	53.27	52.98	53.49	63.19
Standard Deviation	34.71	35.29	38.10	36.97	39.19	53.49	47.42	47.79	47.49	47.84	56.39
	<u>ONTARIO IESO Zone O</u>	<u>HYDRO QUEBEC (Wheel) Zone M</u>	<u>HYDRO QUEBEC (Import/Export) Zone M</u>	<u>PJM Zone P</u>	<u>NEW ENGLAND Zone N</u>	<u>CROSS SOUND CABLE Controllable Line</u>	<u>NORTHPORT- NORWALK Controllable Line</u>	<u>NEPTUNE Controllable Line</u>	<u>LINDEN VFT Controllable Line</u>	<u>HUDSON Controllable Line</u>	<u>Dennison Controllable Line</u>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	31.31	29.86	29.86	39.35	60.19	59.98	59.48	53.23	49.23	49.08	30.09
Standard Deviation	22.30	24.92	24.92	26.79	38.62	35.96	35.60	34.96	36.11	35.84	24.72
<b><u>RTC LBMP</u></b>											
Unweighted Price *	30.93	26.56	26.55	39.74	74.13	62.15	61.69	54.78	51.45	49.84	31.71
Standard Deviation	25.92	30.42	30.42	33.01	54.84	68.49	68.23	45.71	40.88	39.86	41.21
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	33.25	28.97	28.95	41.20	65.44	59.70	59.18	54.17	52.97	53.02	31.58
Standard Deviation	34.07	37.29	37.29	40.10	52.43	53.88	53.43	48.10	47.70	47.65	40.21

\* Straight LBMP averages

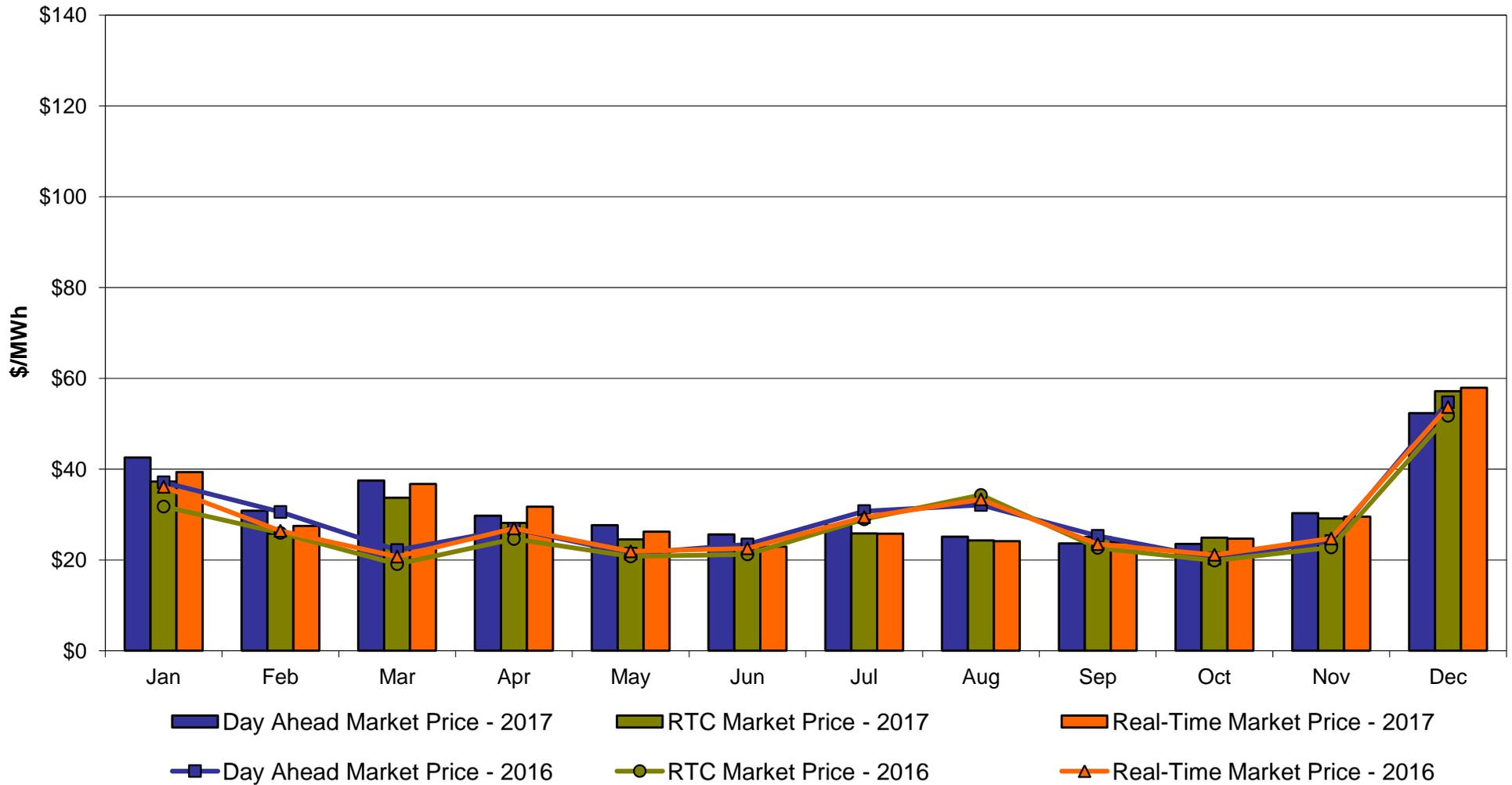
**West Zone A  
Monthly Average LBMP Prices 2016 - 2017**



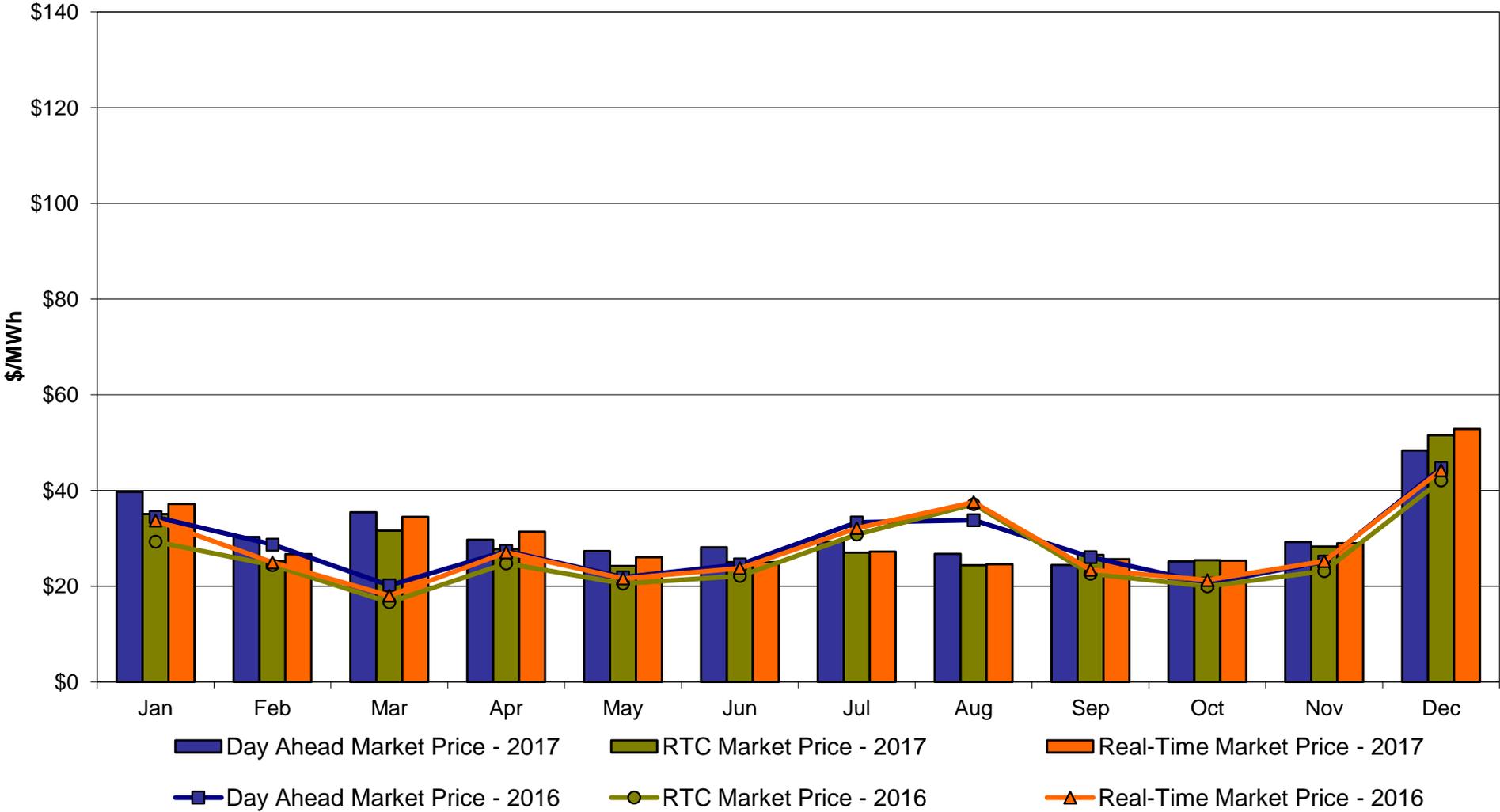
**Central Zone C  
Monthly Average LBMP Prices 2016 - 2017**



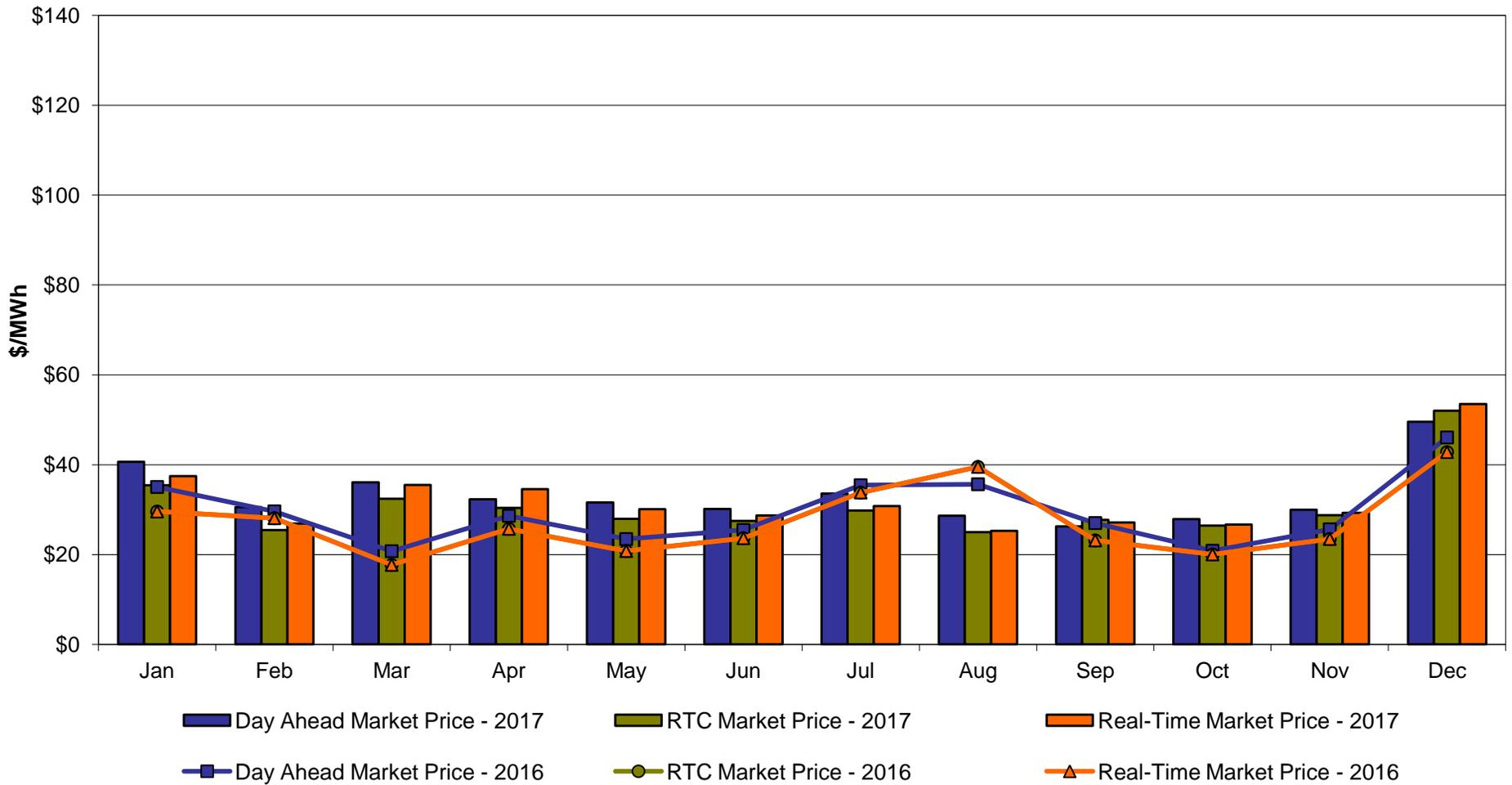
## Capital Zone F Monthly Average LBMP Prices 2016 - 2017



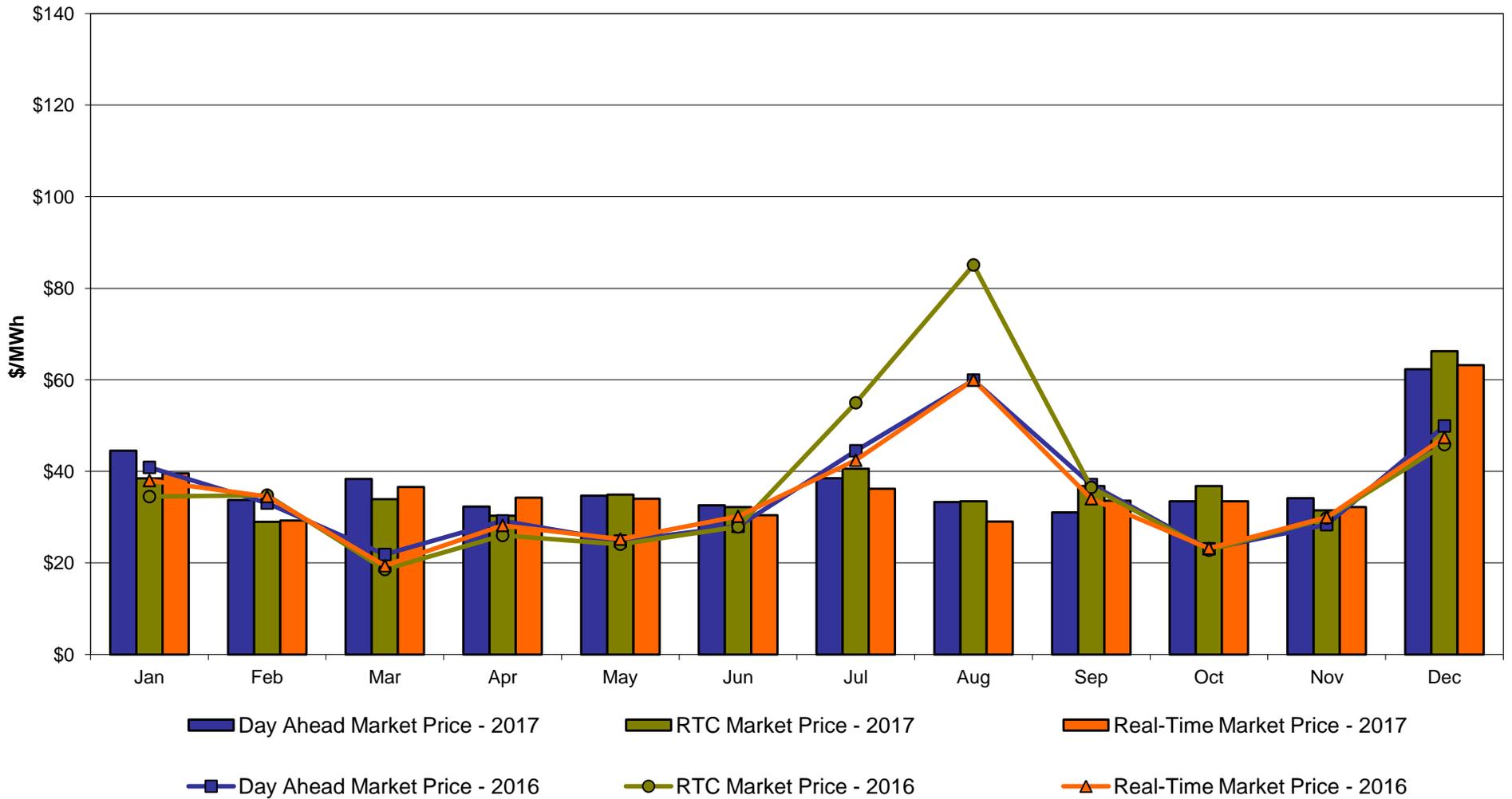
### Hudson Valley Zone G Monthly Average LBMP Prices 2016 - 2017



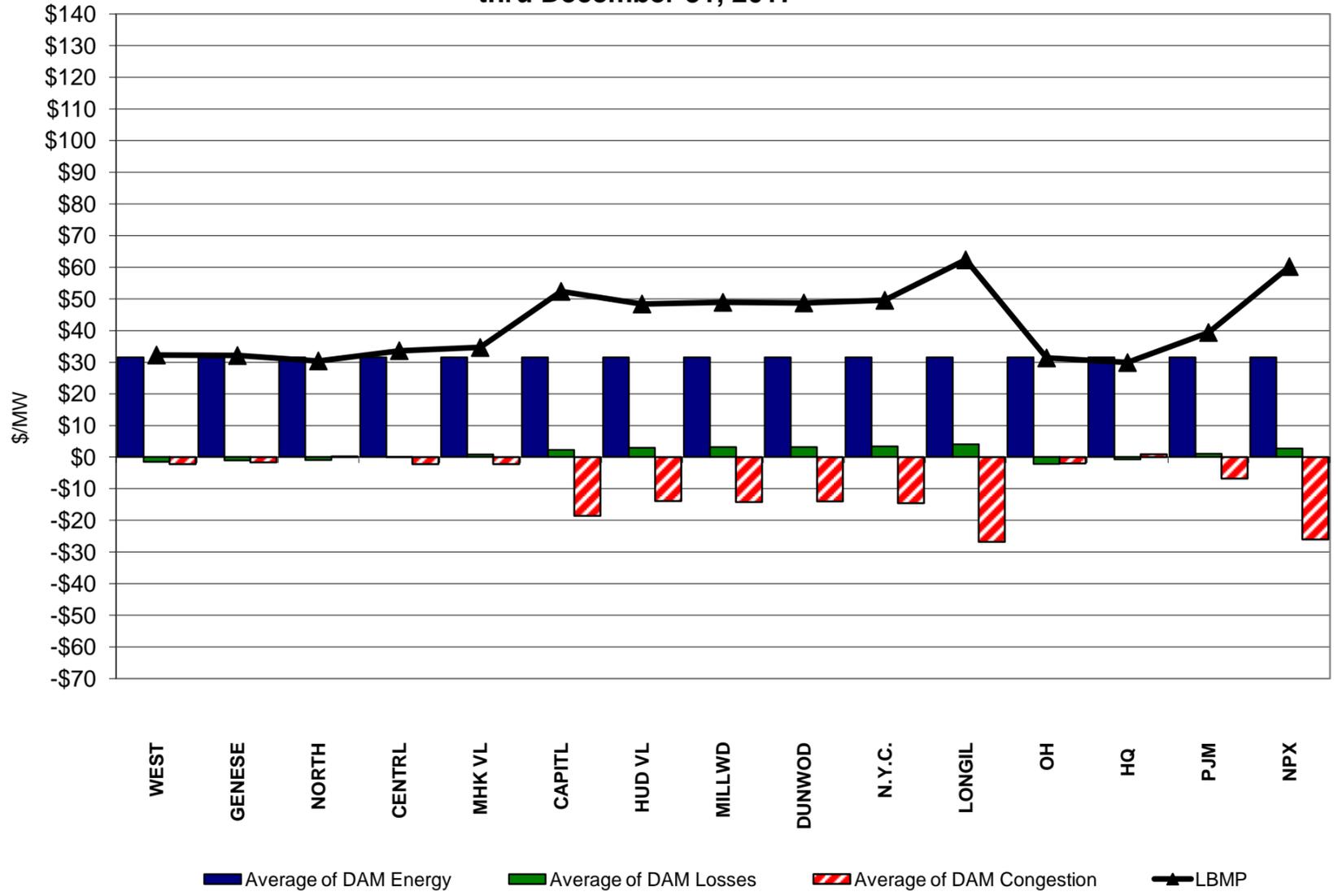
## NYC Zone J Monthly Average LBMP Prices 2016 - 2017



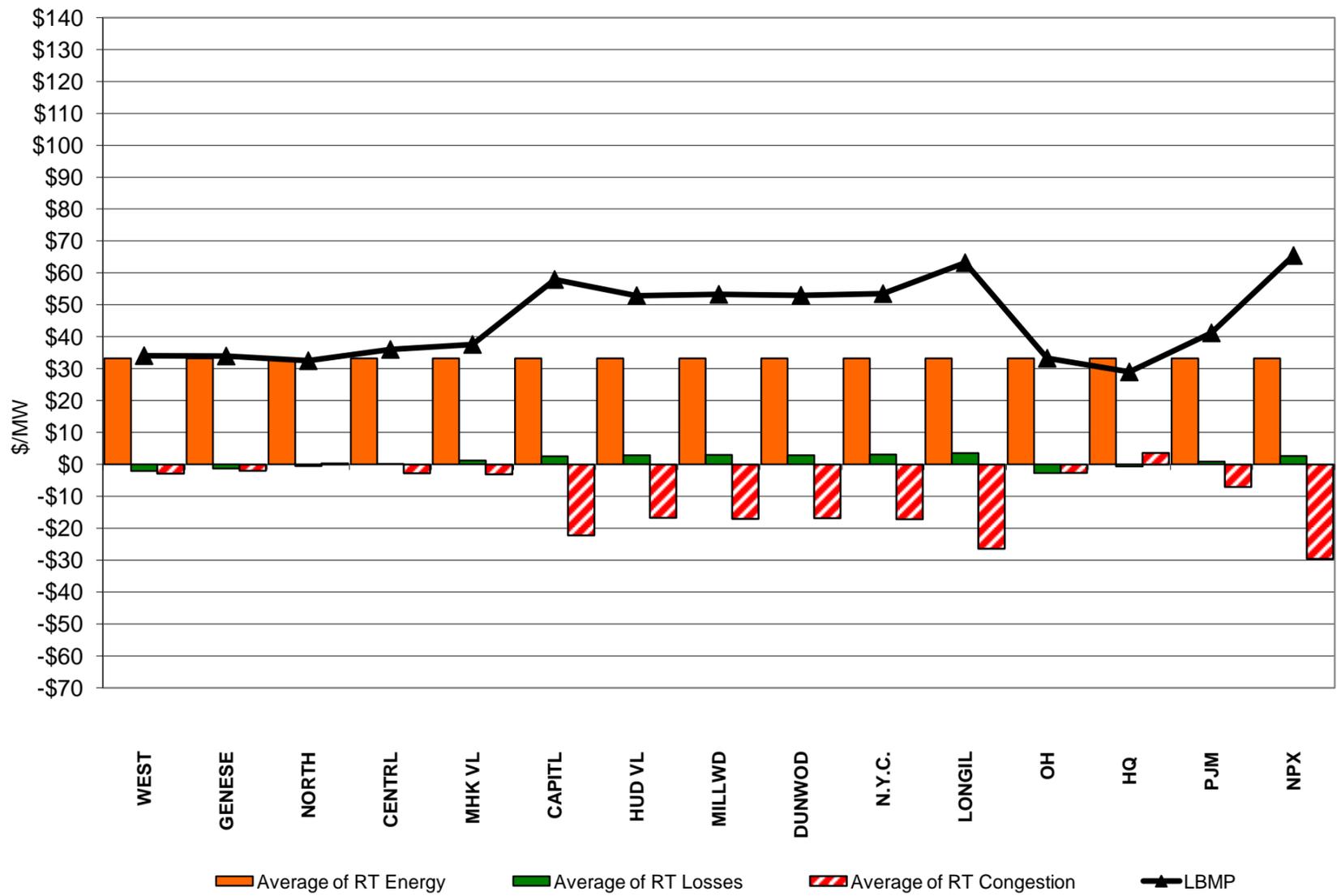
## Long Island Zone K Monthly Average LBMP Prices 2016 - 2017



**DAM Zonal Unweighted Monthly Average LBMP Components  
thru December 31, 2017**

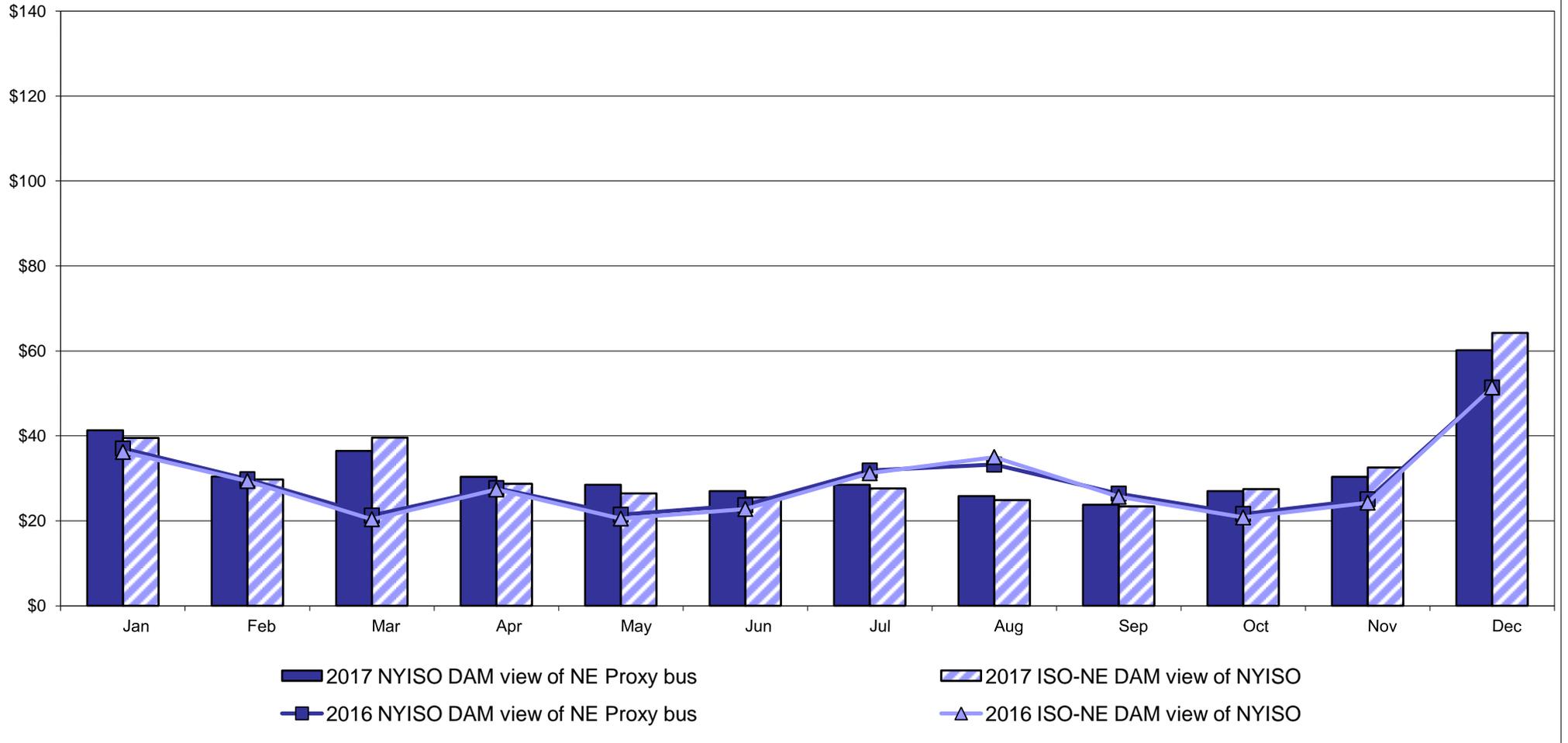


**RT Zonal Unweighted Monthly Average LBMP Components  
thru December 31, 2017**

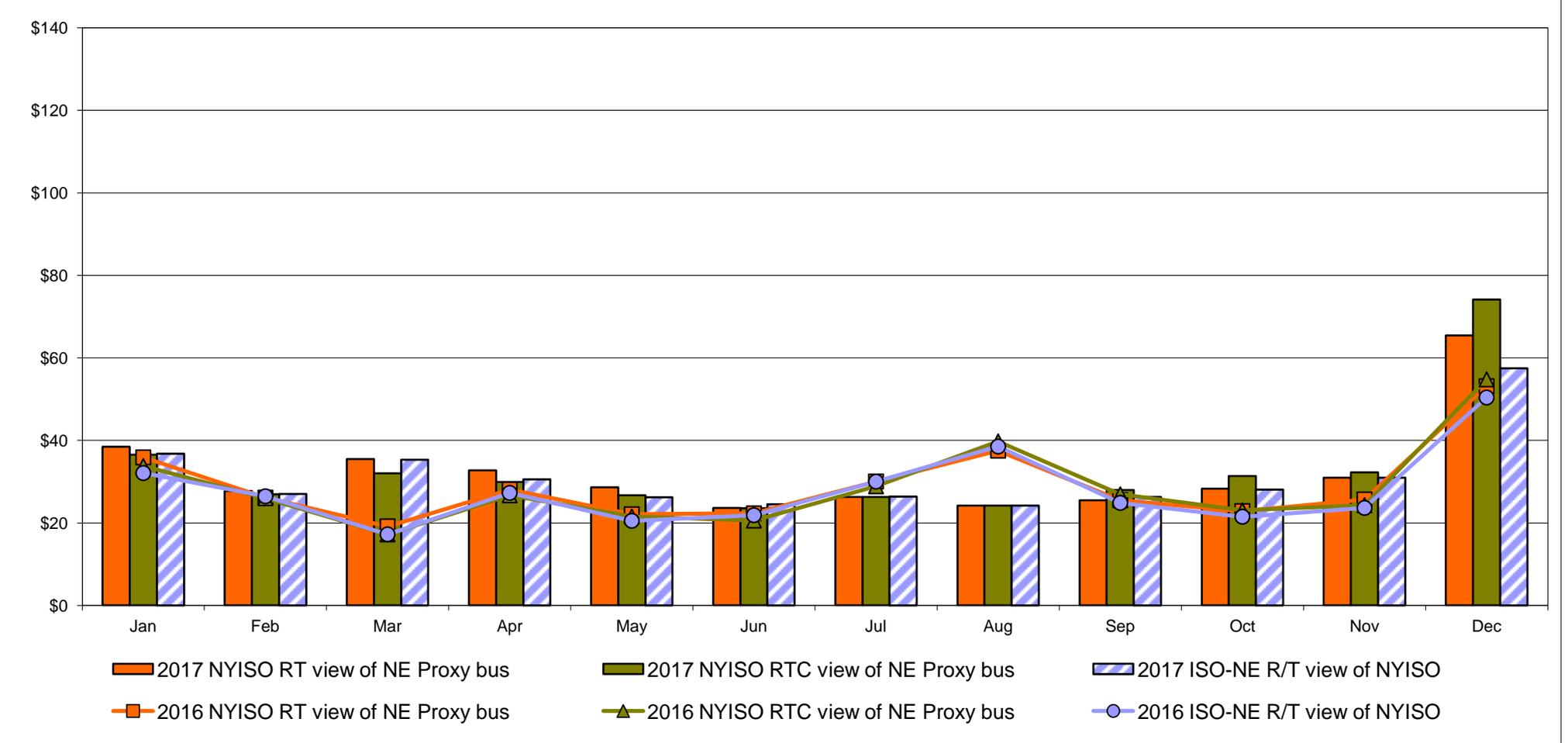


# External Comparison ISO-New England

## Day Ahead Market External Zone Comparison: ISO-NE (\$/MWh)

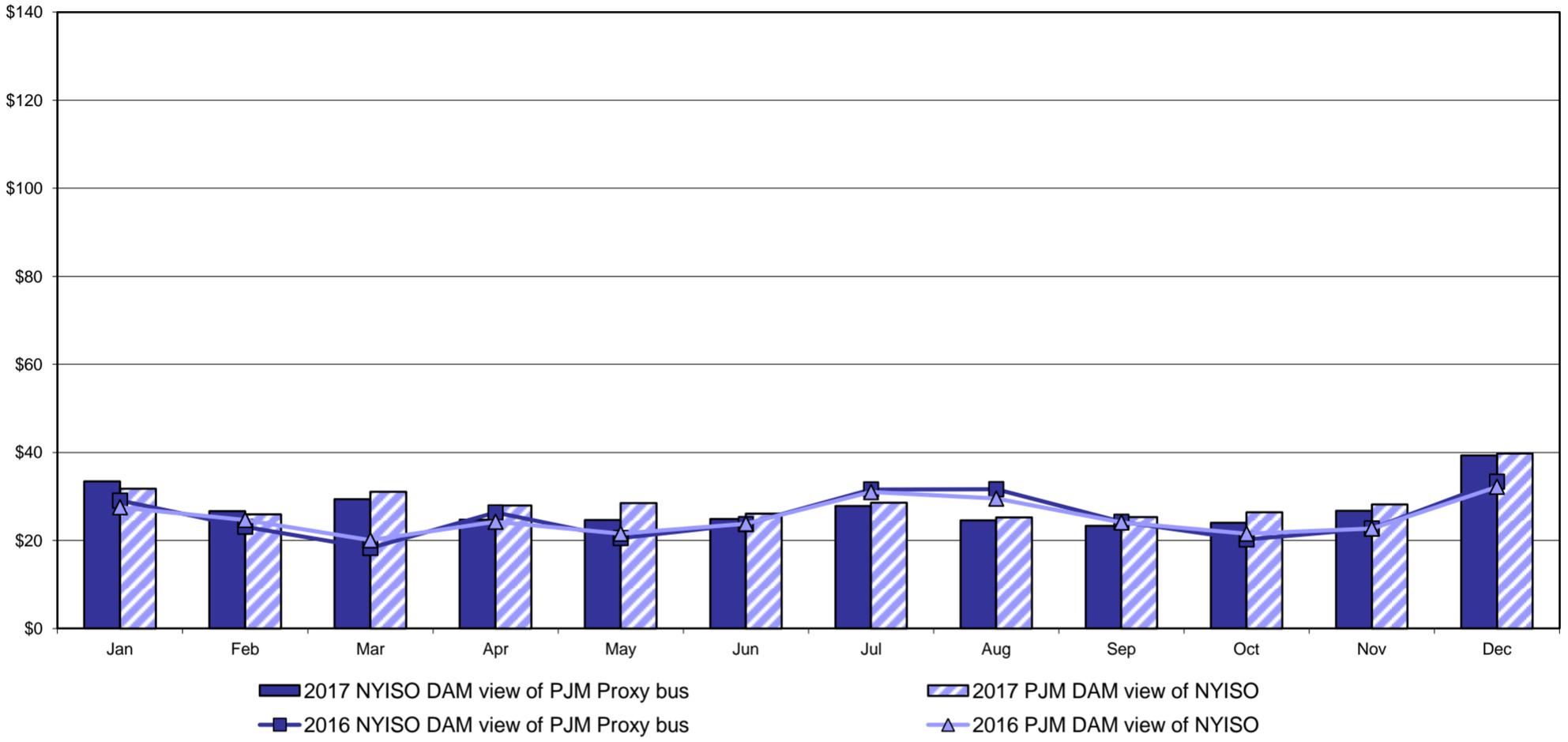


## Real Time Market External Zone Comparison: ISO-NE (\$/MWh)

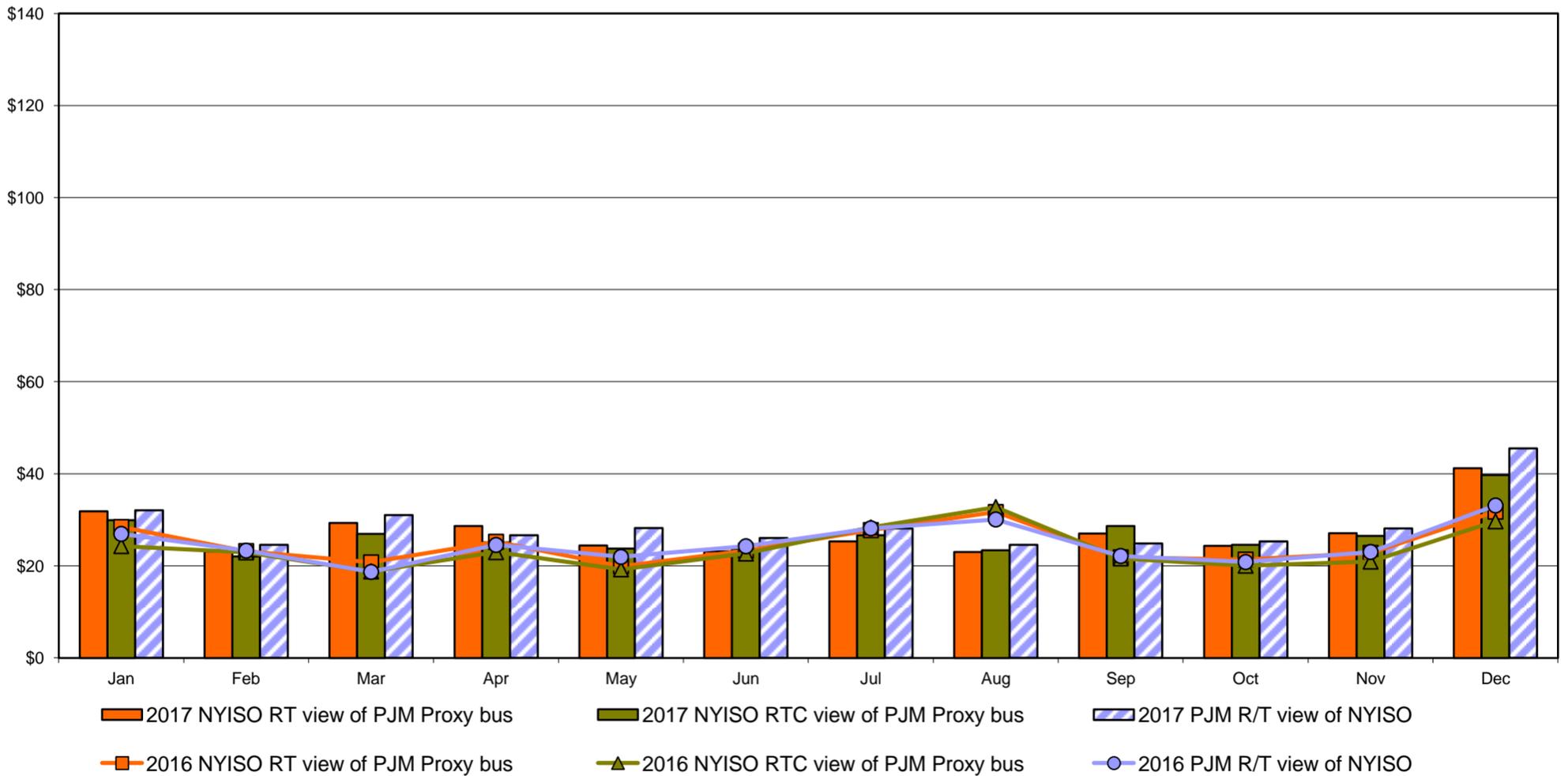


# External Comparison PJM

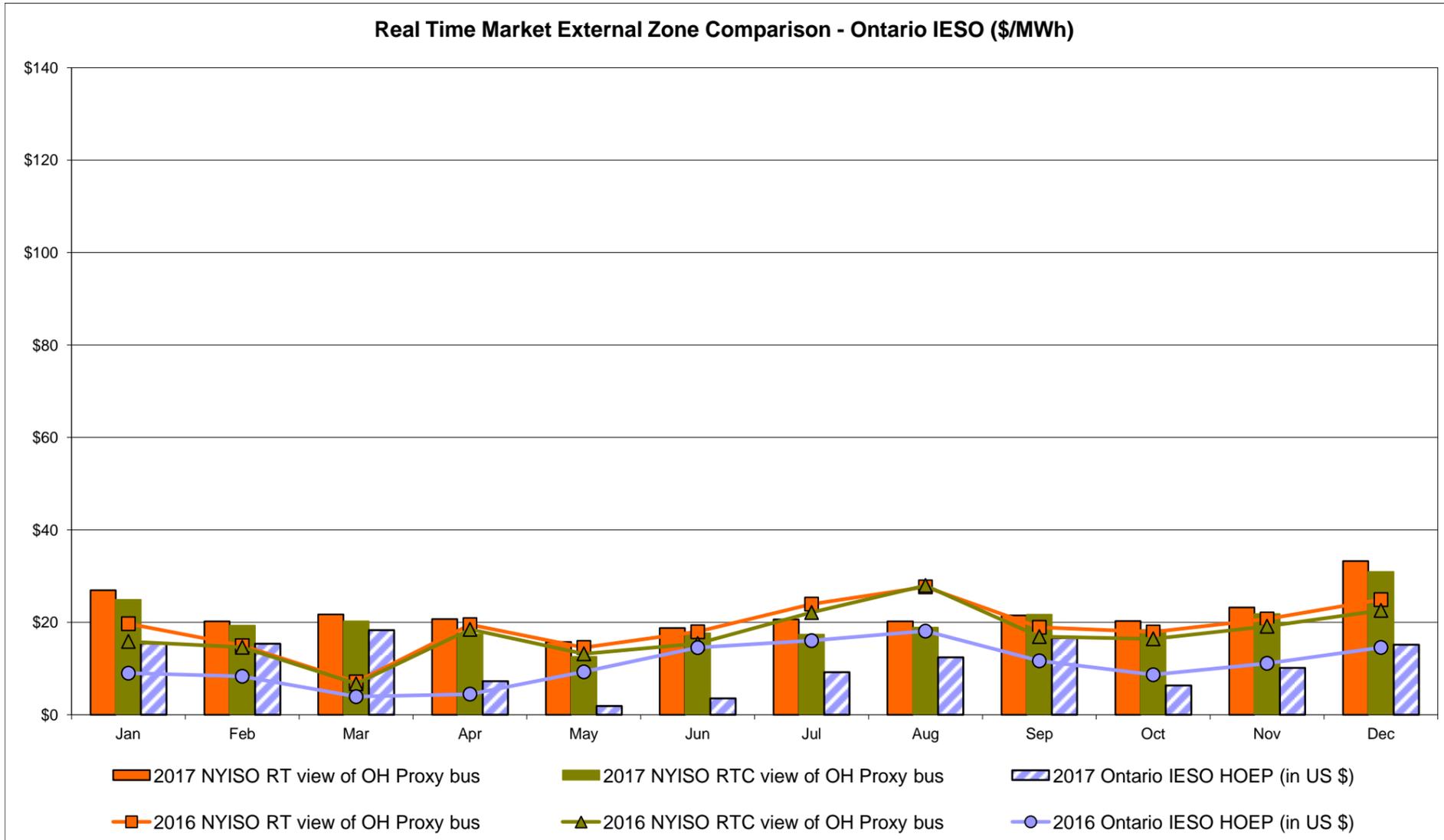
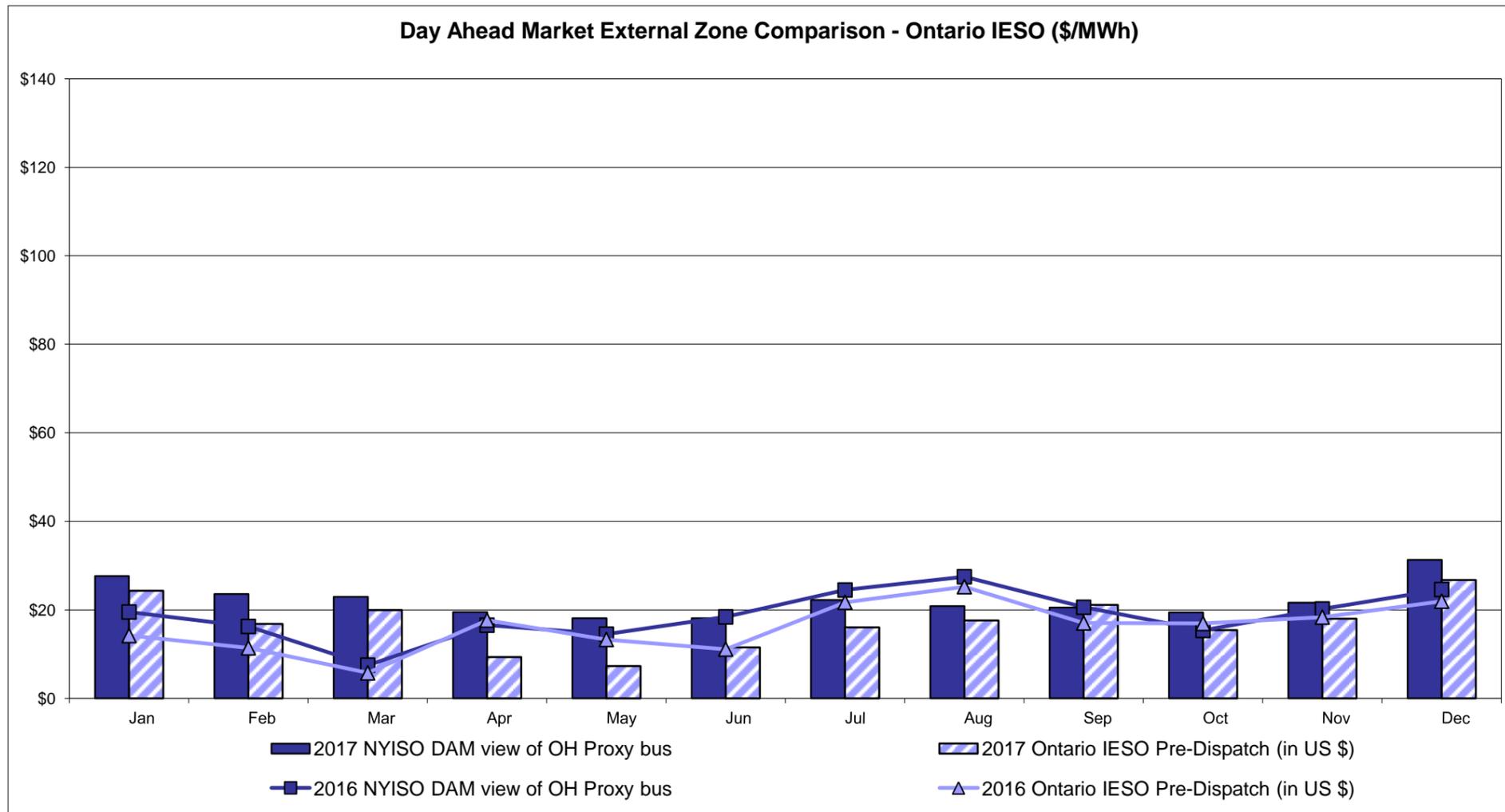
## Day Ahead Market External Zone Comparison - PJM (\$/MWh)



## Real Time Market External Zone Comparison - PJM (\$/MWh)

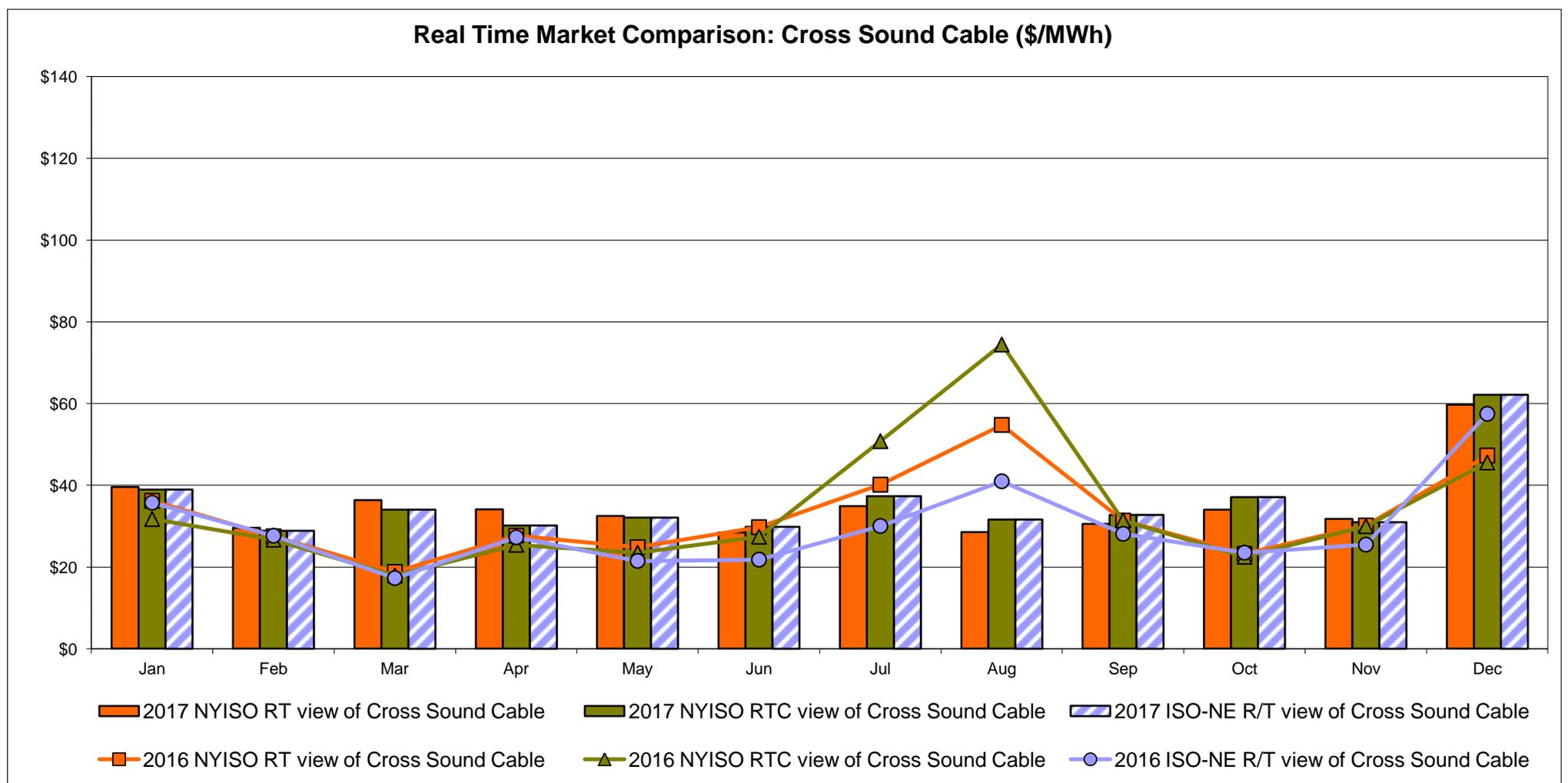
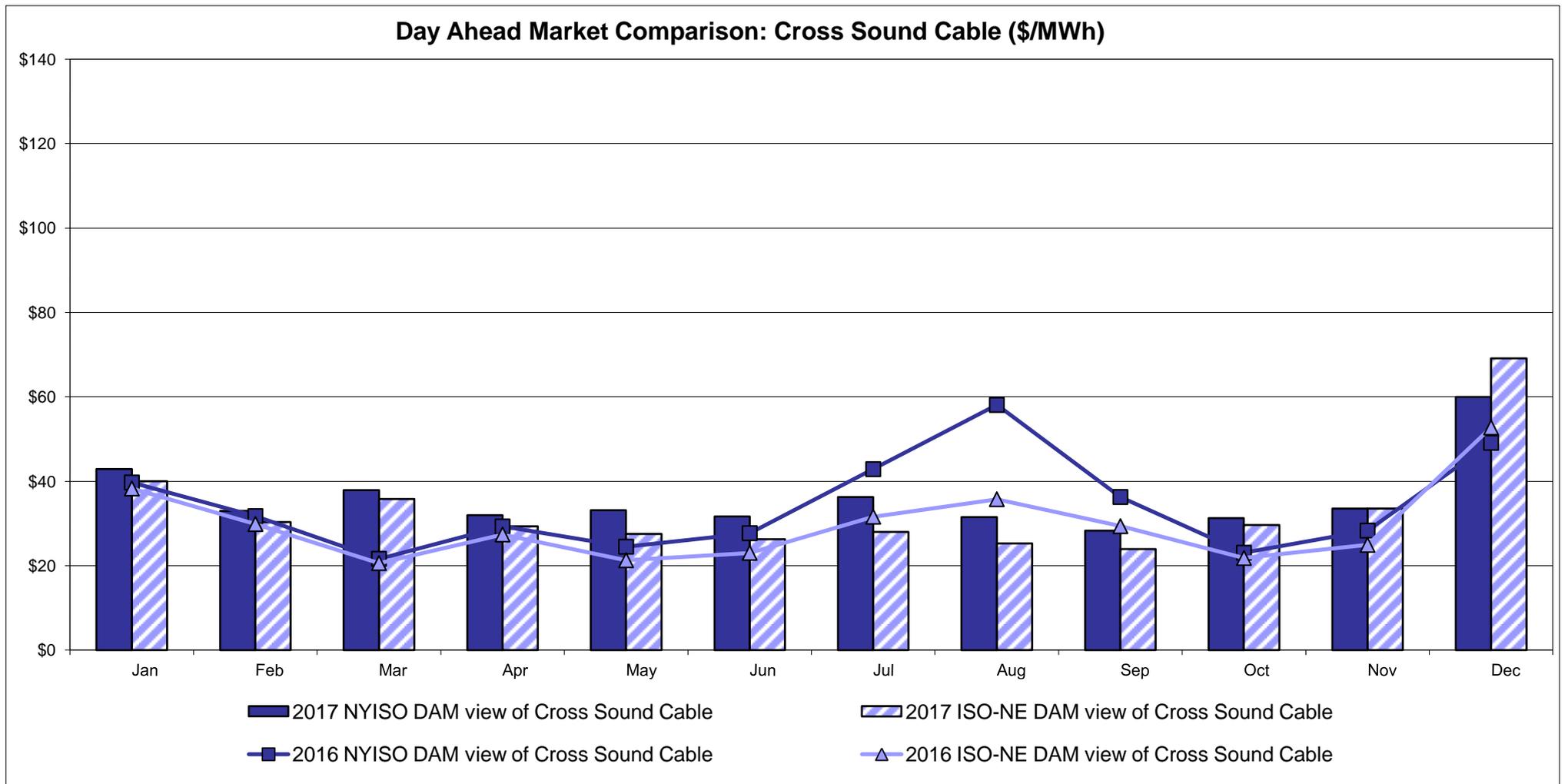


# External Comparison Ontario IESO



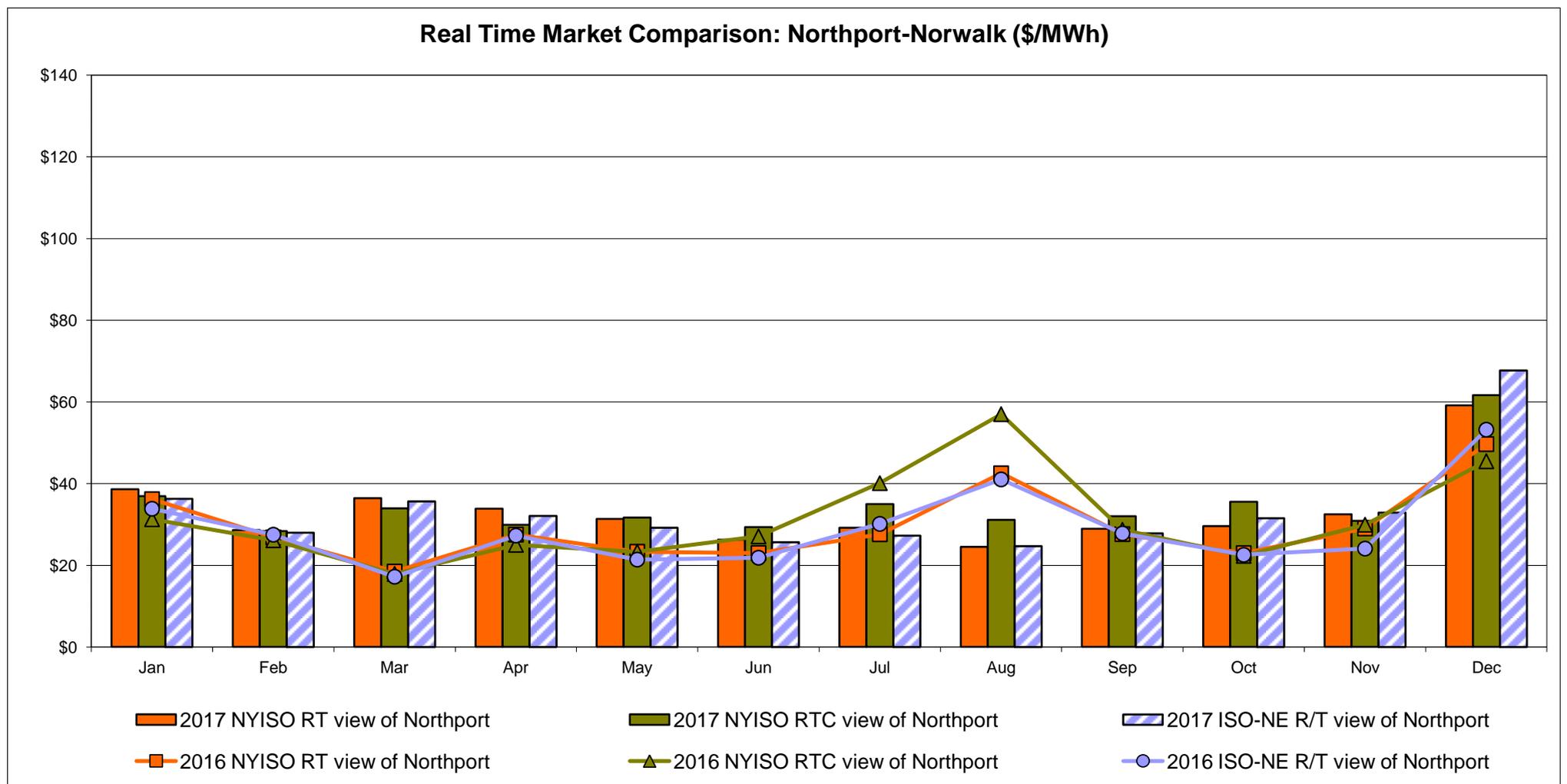
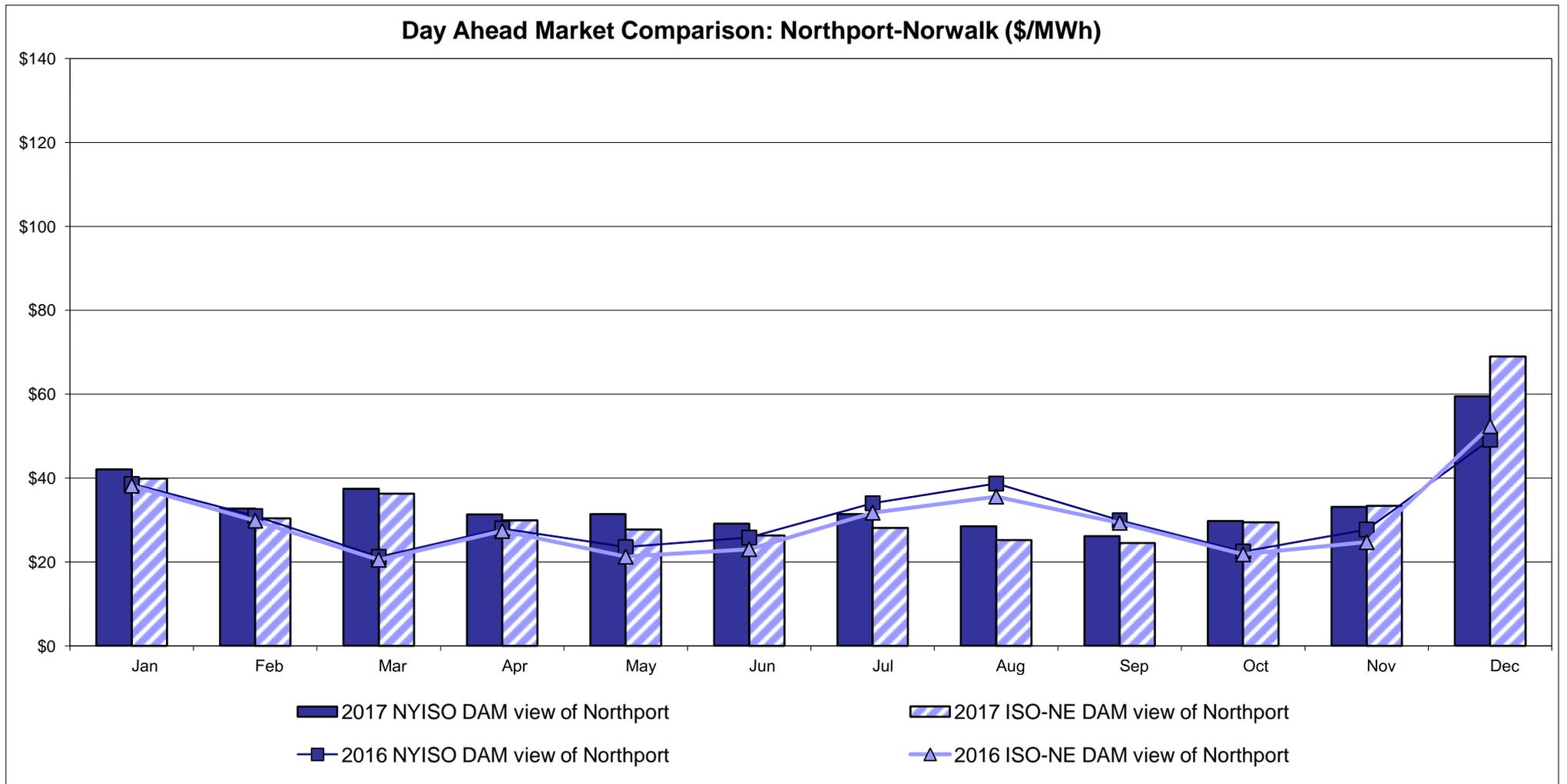
Notes: Exchange factor used for December 2017 was 0.783146683373796 to US  
 HOEP: Hourly Ontario Energy Price  
 Pre-Dispatch: Projected Energy Price

# External Controllable Line: Cross Sound Cable (New England)



Note:  
 ISO-NE Forecast is an advisory posting @ 18:00 day before.  
 The DAM and R/T prices at the Shorham 13899 interface are used for ISO-NE.  
 The DAM and R/T prices at the CSC interface are used for NYISO.

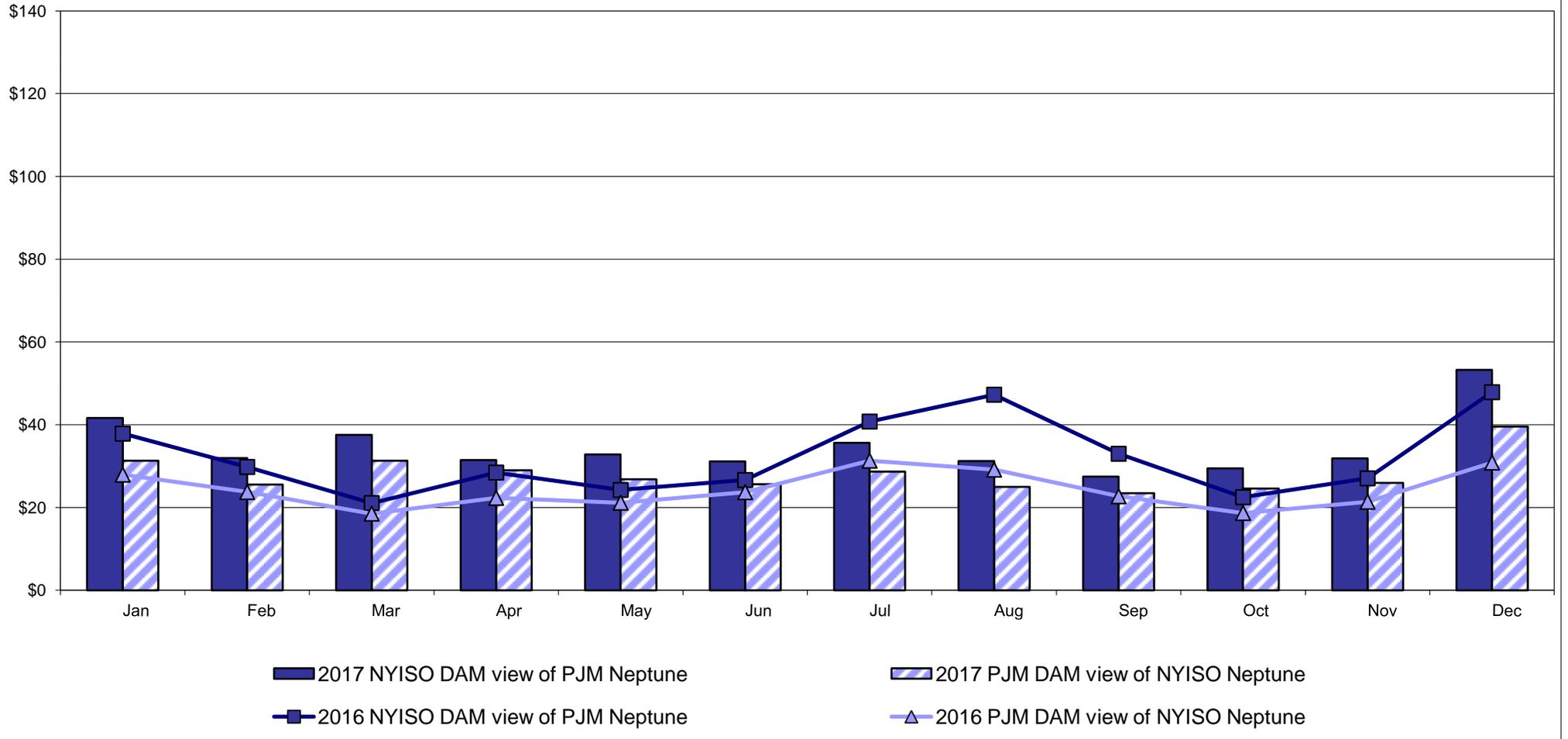
# External Controllable Line: Northport - Norwalk (New England)



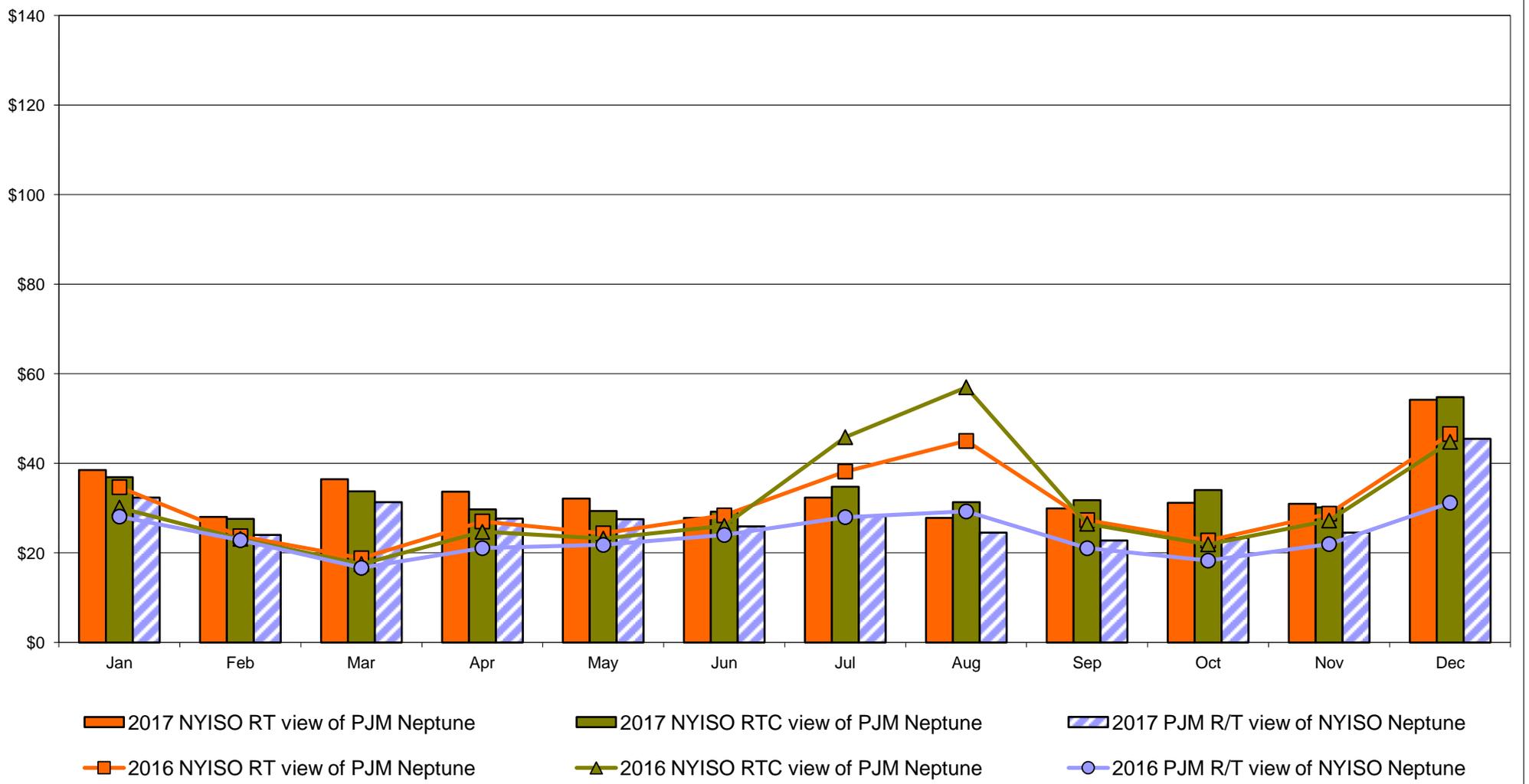
Note:  
 ISO-NE Forecast is an advisory posting @ 18:00 day before.  
 The DAM and R/T prices at the Northport 138 interface are used for ISO-NE.  
 The DAM and R/T prices at the 1385 interface are used for NYISO.

# External Controllable Line: Neptune (PJM)

## Day Ahead Market Comparison: Neptune (\$/MWh)

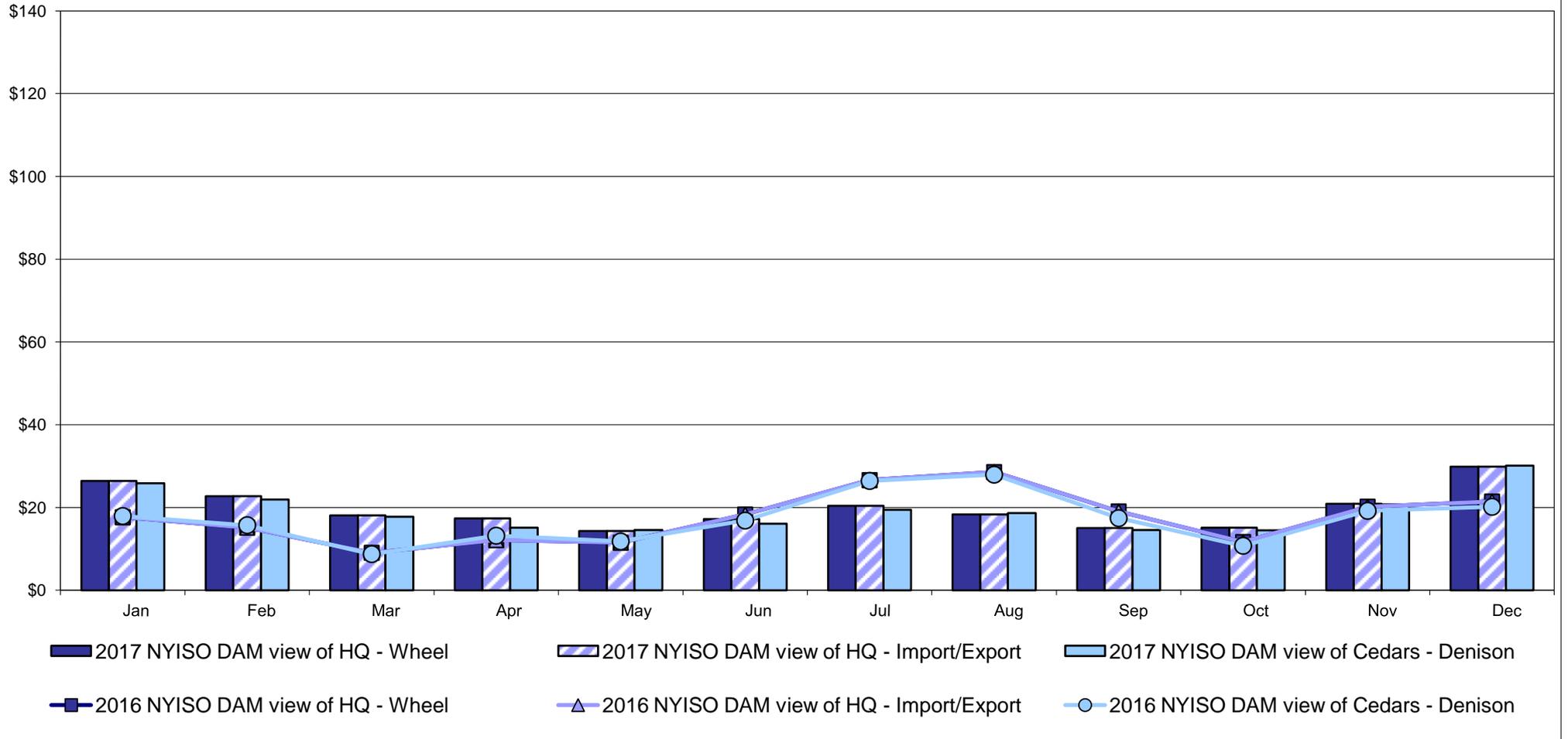


## Real Time Market Comparison: Neptune (\$/MWh)

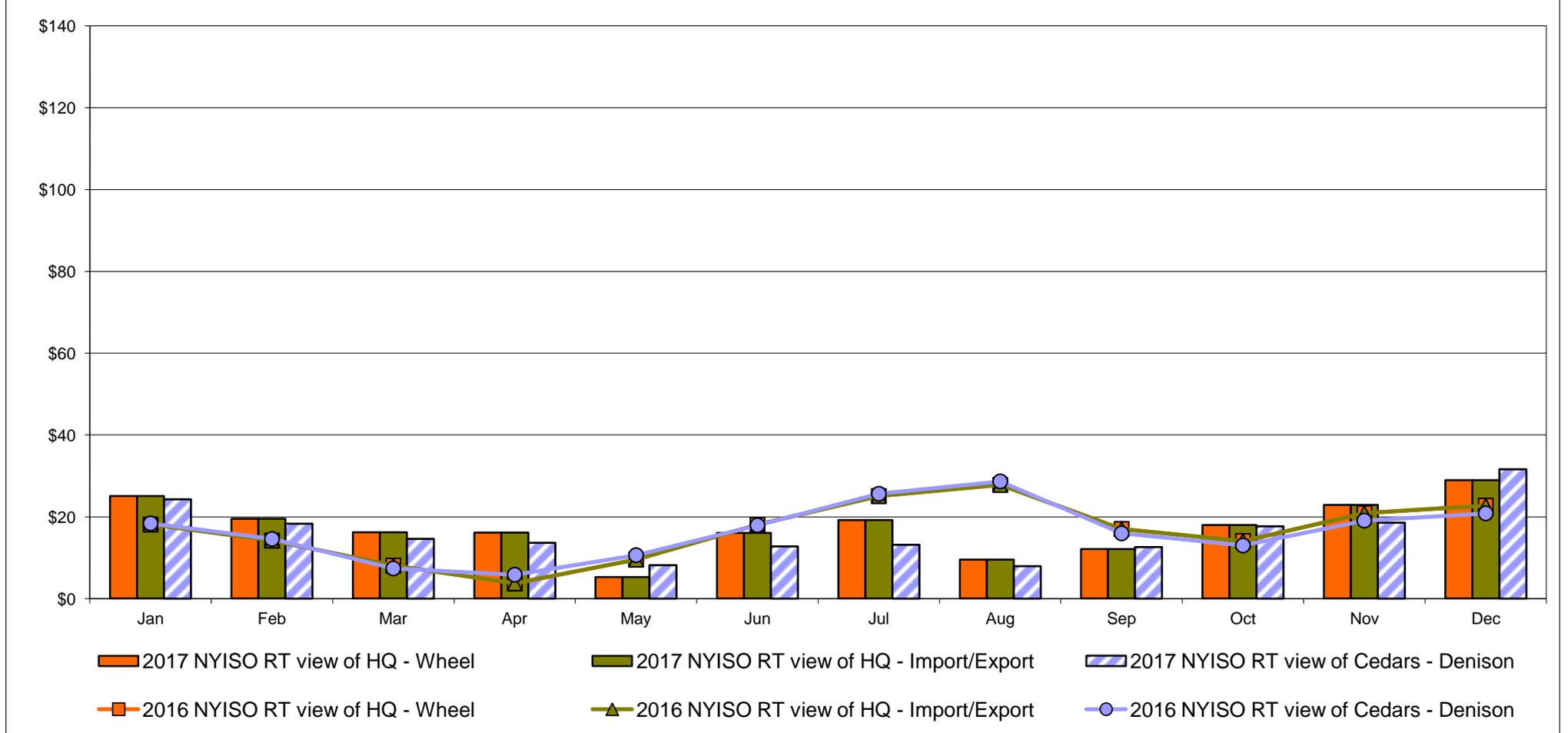


# External Comparison Hydro-Quebec

## Day Ahead Market External Zone Comparison - HQ (\$/MWh)

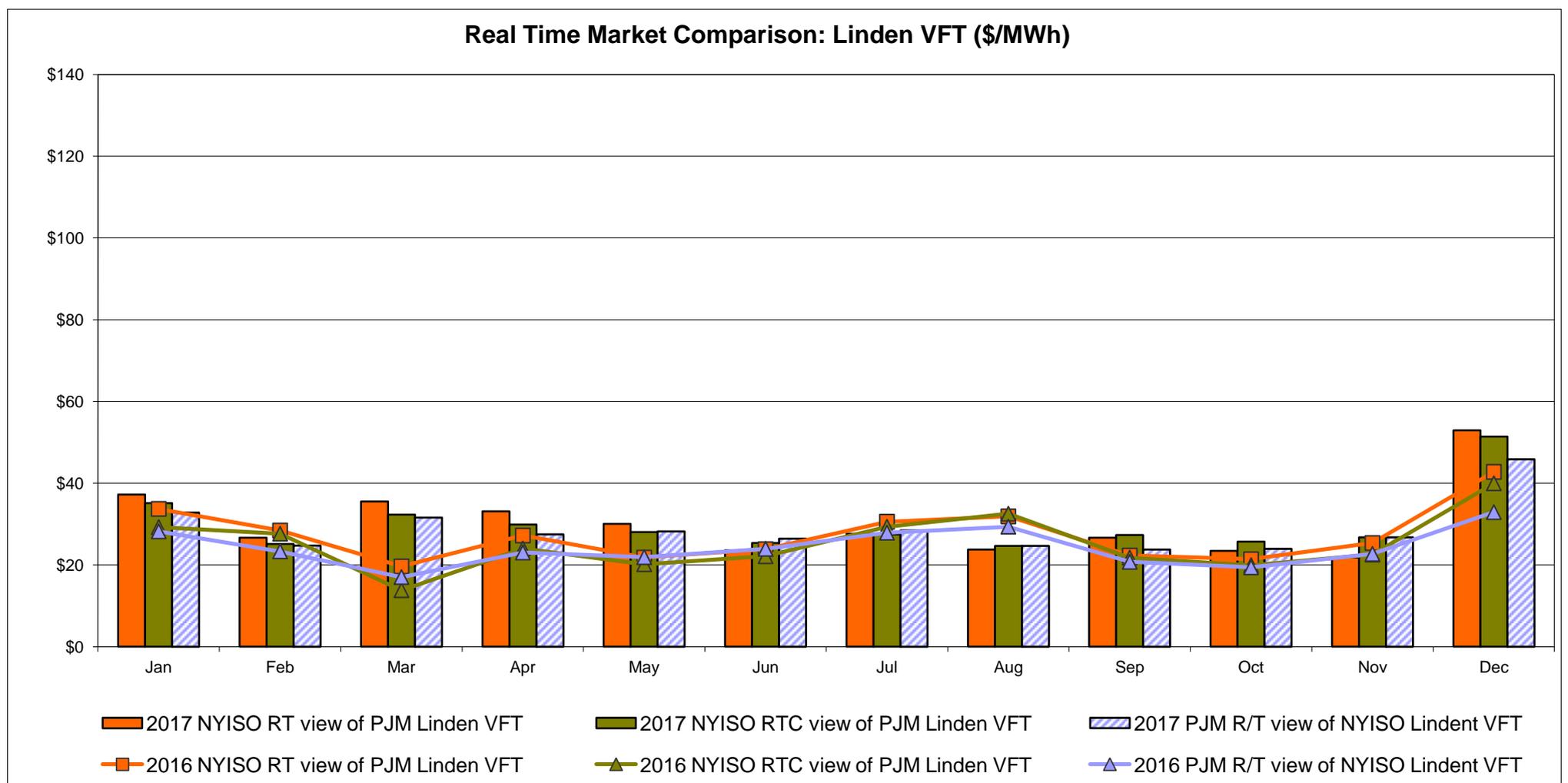
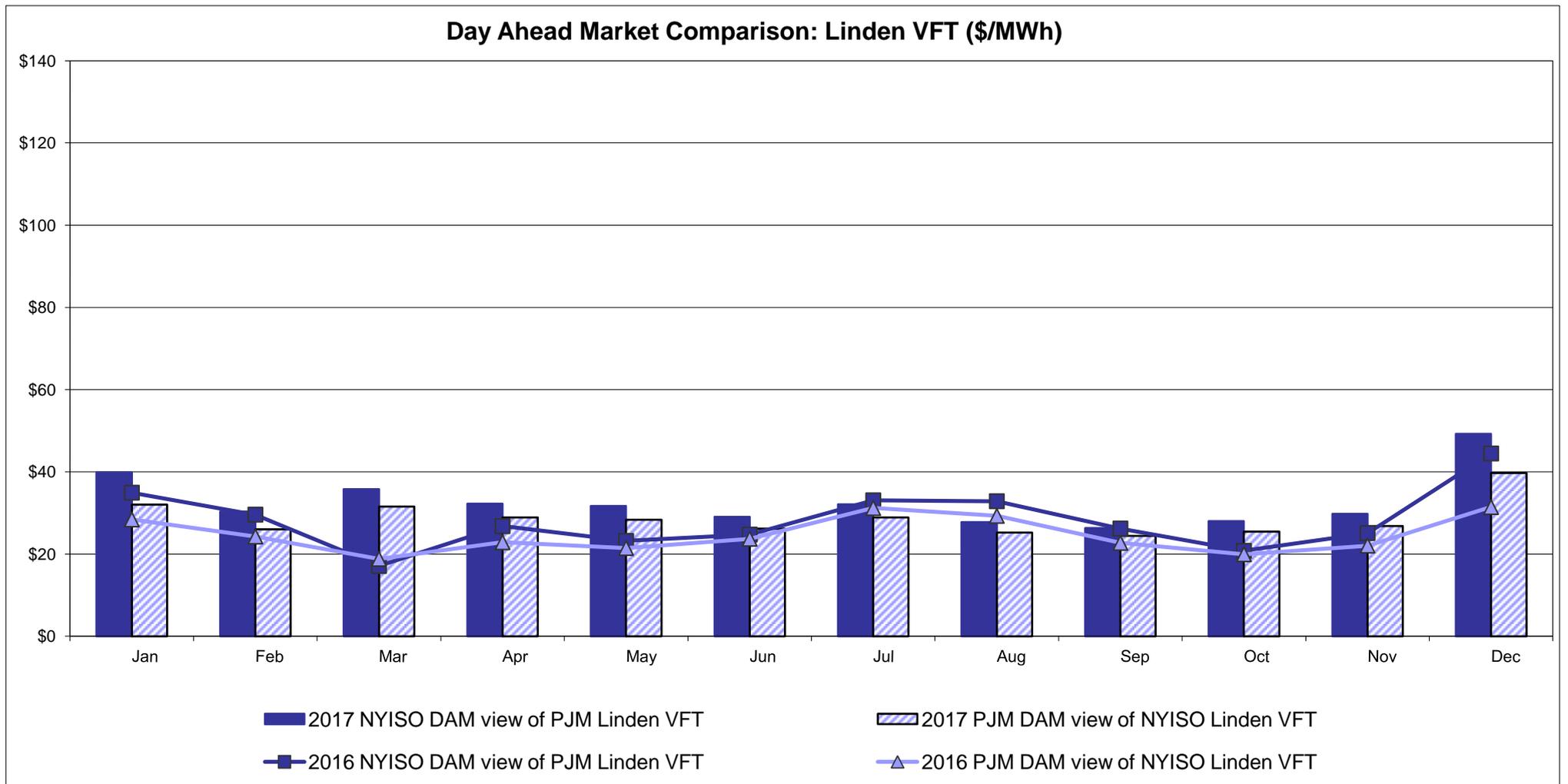


## Real Time Market External Zone Comparison - HQ (\$/MWh)

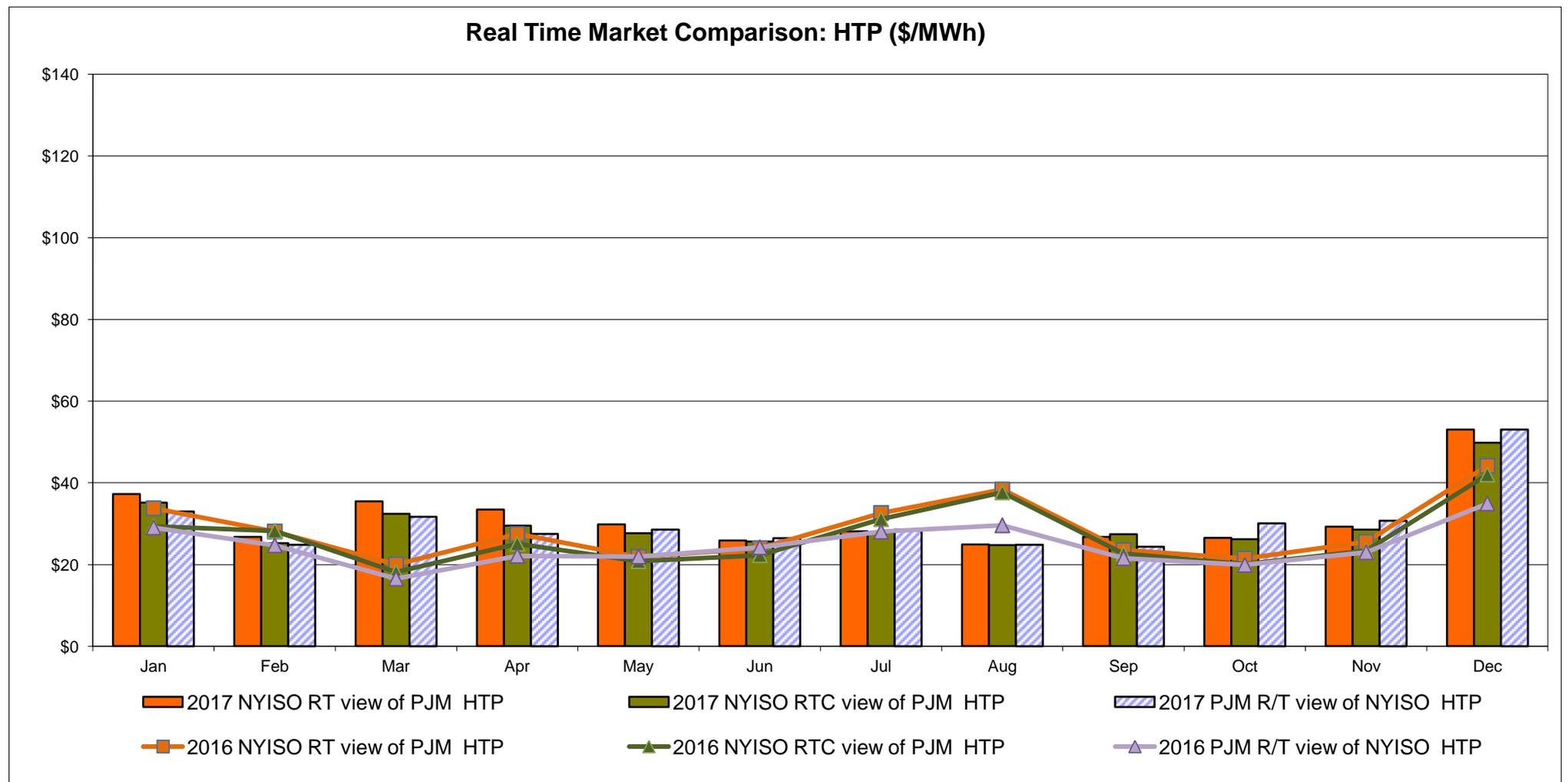
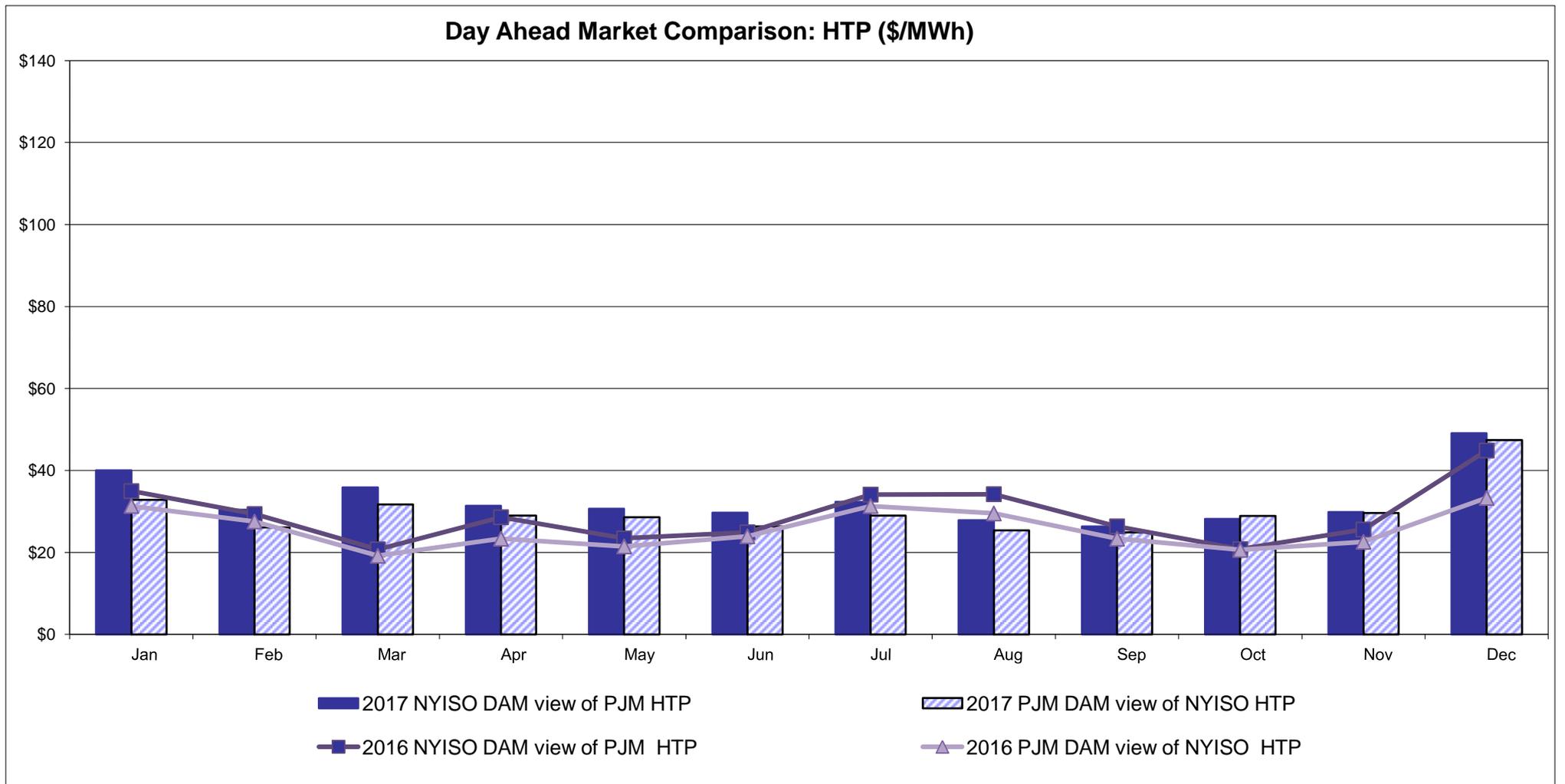


Note:  
Hydro-Quebec Prices are unavailable.

# External Controllable Line: Linden VFT (PJM)



# External Controllable Line: Hudson (PJM)

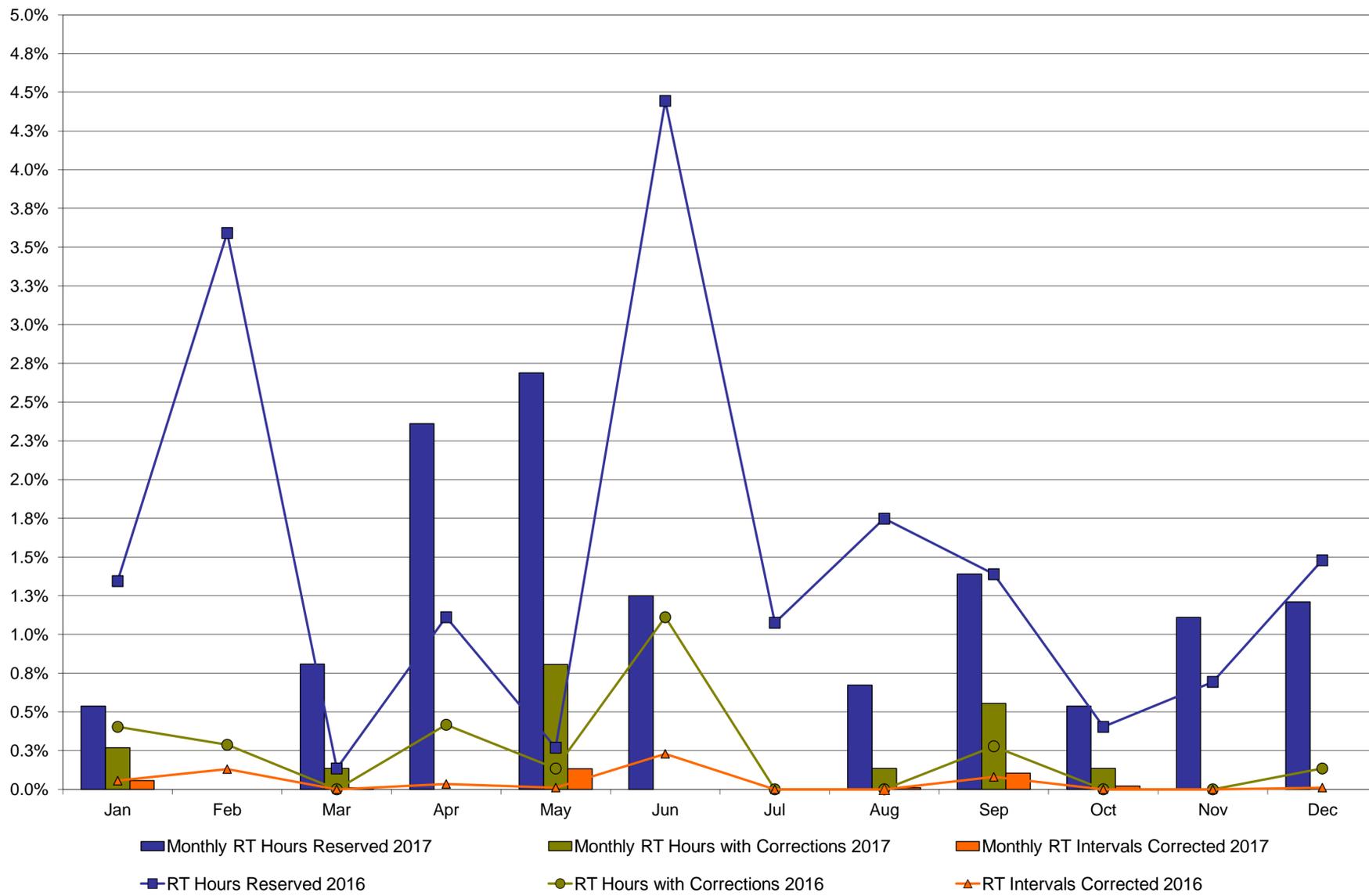


### NYISO Real Time Price Correction Statistics

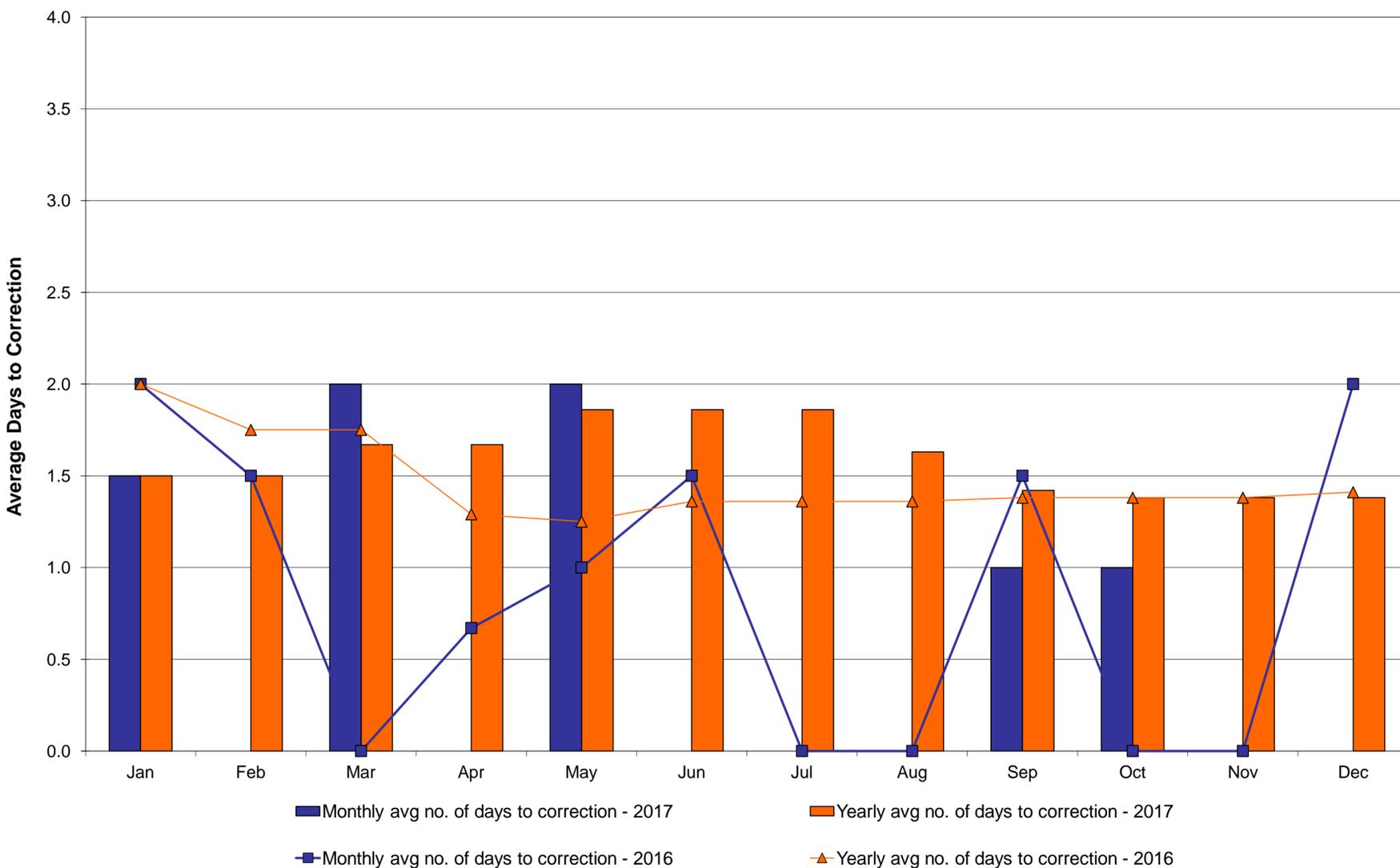
2017		January	February	March	April	May	June	July	August	September	October	November	December
<b>Hour Corrections</b>													
Number of hours with corrections	in the month	2	0	1	0	6	0	0	1	4	1	0	0
Number of hours	in the month	744	672	743	720	744	720	744	744	720	744	721	744
% of hours with corrections	in the month	0.27%	0.00%	0.13%	0.00%	0.81%	0.00%	0.00%	0.13%	0.56%	0.13%	0.00%	0.00%
% of hours with corrections	year-to-date	0.27%	0.14%	0.14%	0.10%	0.25%	0.21%	0.18%	0.17%	0.21%	0.21%	0.19%	0.17%
<b>Interval Corrections</b>													
Number of intervals corrected	in the month	5	0	1	0	12	0	0	1	9	2	0	0
Number of intervals	in the month	8,983	8,101	9,026	8,745	9,004	8,712	8,968	8,980	8,701	9,006	8,712	9,063
% of intervals corrected	in the month	0.06%	0.00%	0.01%	0.00%	0.13%	0.00%	0.00%	0.01%	0.10%	0.02%	0.00%	0.00%
% of intervals corrected	year-to-date	0.06%	0.03%	0.02%	0.02%	0.04%	0.03%	0.03%	0.03%	0.04%	0.03%	0.03%	0.03%
<b>Hours Reserved</b>													
Number of hours reserved	in the month	4	0	6	17	20	9	0	5	10	4	8	9
Number of hours	in the month	744	672	743	720	744	720	744	744	720	744	721	744
% of hours reserved	in the month	0.54%	0.00%	0.81%	2.36%	2.69%	1.25%	0.00%	0.67%	1.39%	0.54%	1.11%	1.21%
% of hours reserved	year-to-date	0.54%	0.28%	0.46%	0.94%	1.30%	1.29%	1.10%	1.05%	1.08%	1.03%	1.04%	1.05%
<b>Days to Correction *</b>													
Avg. number of days to correction	in the month	1.50	0.00	2.00	0.00	2.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00
Avg. number of days to correction	year-to-date	1.50	1.50	1.67	1.67	1.86	1.86	1.86	1.63	1.42	1.38	1.38	1.38
<b>Days Without Corrections</b>													
Days without corrections	in the month	29	28	30	30	27	30	31	30	26	30	30	31
Days without corrections	year-to-date	29	57	87	117	144	174	205	235	261	291	321	352
2016		January	February	March	April	May	June	July	August	September	October	November	December
<b>Hour Corrections</b>													
Number of hours with corrections	in the month	3	2	0	3	1	8	0	0	2	0	0	1
Number of hours	in the month	744	696	743	720	744	720	744	744	720	744	721	744
% of hours with corrections	in the month	0.40%	0.29%	0.00%	0.42%	0.13%	1.11%	0.00%	0.00%	0.28%	0.00%	0.00%	0.13%
% of hours with corrections	year-to-date	0.40%	0.35%	0.23%	0.28%	0.25%	0.39%	0.33%	0.29%	0.29%	0.26%	0.24%	0.23%
<b>Interval Corrections</b>													
Number of intervals corrected	in the month	5	11	0	3	1	20	0	0	7	0	0	1
Number of intervals	in the month	9,000	8,440	8,995	8,724	8,987	8,725	9,038	9,048	8,713	8,960	8,724	9,034
% of intervals corrected	in the month	0.06%	0.13%	0.00%	0.03%	0.01%	0.23%	0.00%	0.00%	0.08%	0.00%	0.00%	0.01%
% of intervals corrected	year-to-date	0.06%	0.09%	0.06%	0.05%	0.05%	0.08%	0.06%	0.06%	0.06%	0.05%	0.05%	0.05%
<b>Hours Reserved</b>													
Number of hours reserved	in the month	10	25	1	8	2	32	8	13	10	3	5	11
Number of hours	in the month	744	696	743	720	744	720	744	744	720	744	721	744
% of hours reserved	in the month	1.34%	3.59%	0.13%	1.11%	0.27%	4.44%	1.08%	1.75%	1.39%	0.40%	0.69%	1.48%
% of hours reserved	year-to-date	1.34%	2.43%	1.65%	1.52%	1.26%	1.79%	1.68%	1.69%	1.66%	1.53%	1.46%	1.46%
<b>Days to Correction *</b>													
Avg. number of days to correction	in the month	2.00	1.50	0.00	0.67	1.00	1.50	0.00	0.00	1.50	0.00	0.00	2.00
Avg. number of days to correction	year-to-date	2.00	1.75	1.75	1.29	1.25	1.36	1.36	1.36	1.38	1.38	1.38	1.41
<b>Days Without Corrections</b>													
Days without corrections	in the month	29	27	31	27	30	24	31	31	28	31	30	30
Days without corrections	year-to-date	29	56	87	114	144	168	199	230	258	289	319	349

\* Calendar days from reservation date.

### Percentage of Real-Time Corrections

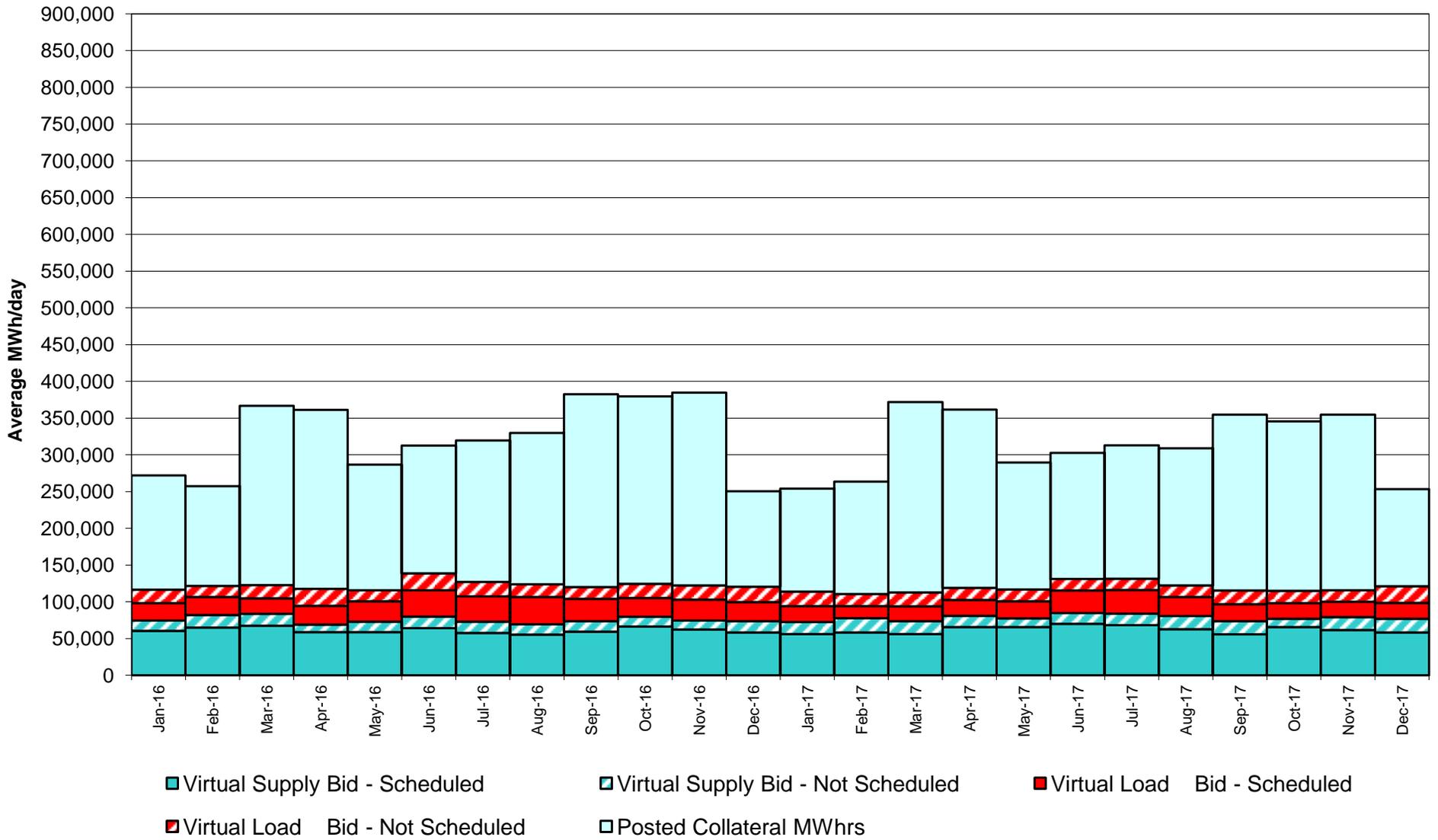


### Annual average time period for making Price Corrections (from reservation date) \*

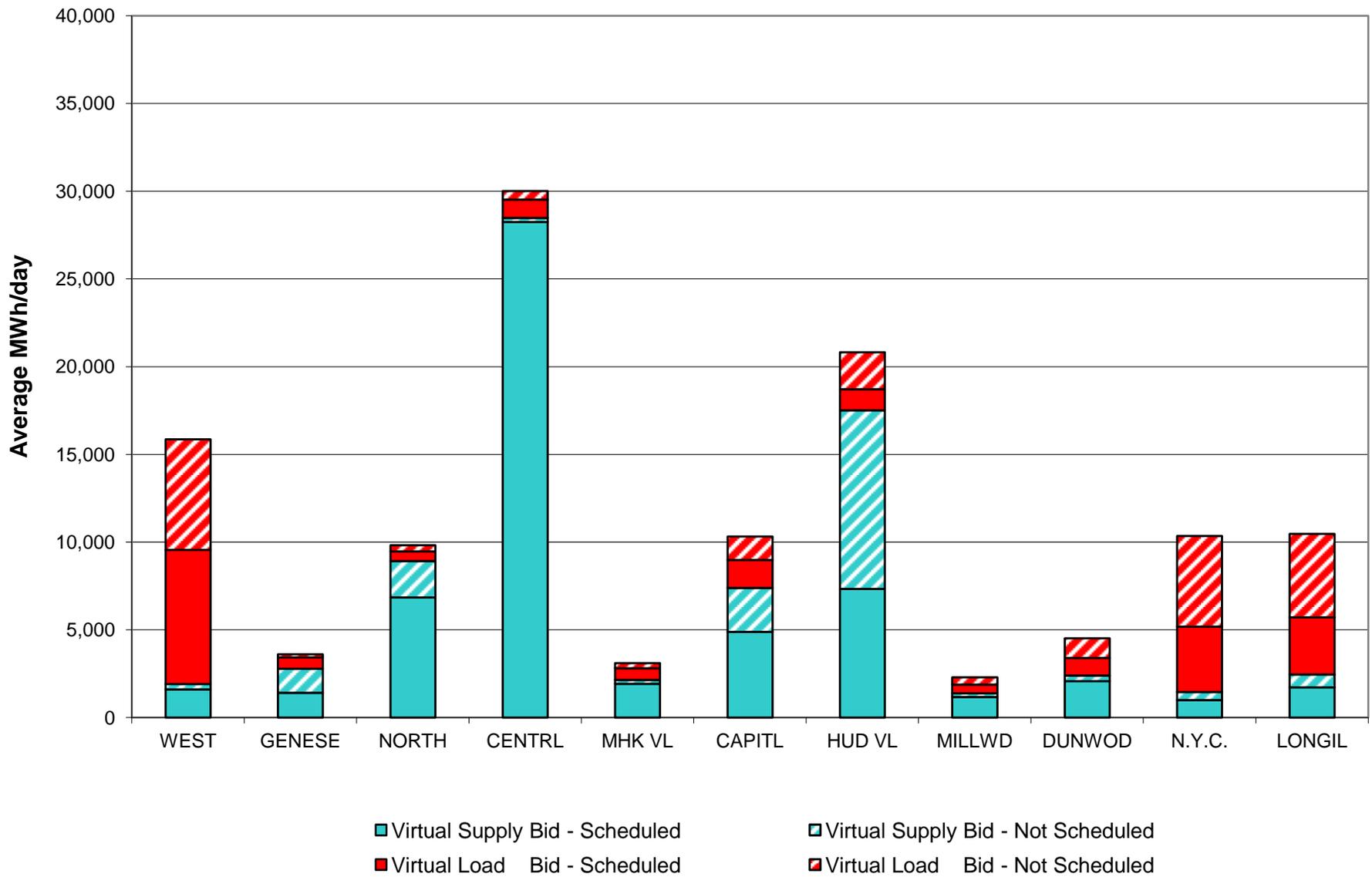


\* Calendar days from reservation date.

## NYISO Virtual Trading Average MWh per day



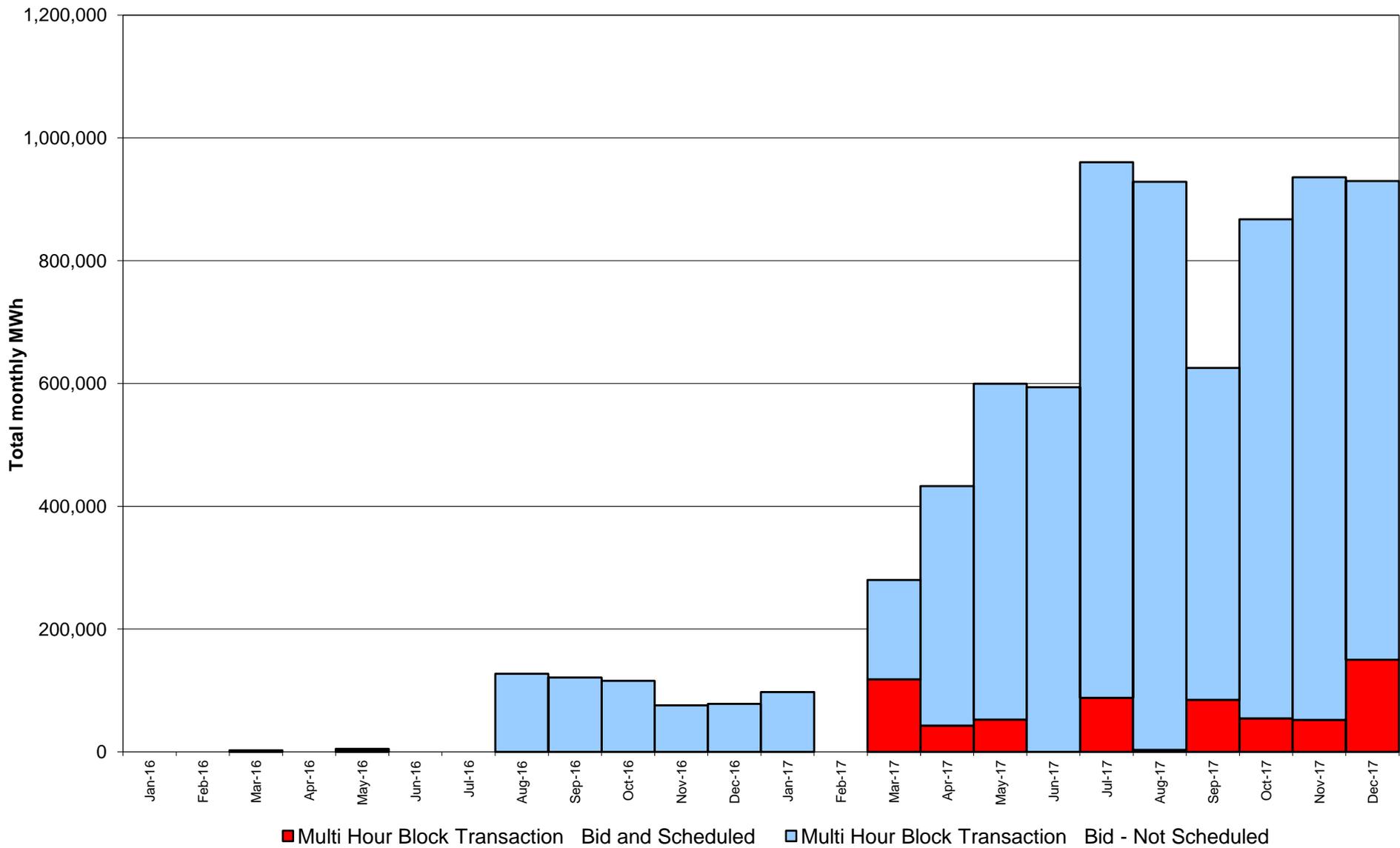
### Virtual Load and Supply Zonal Statistics through December 31, 2017



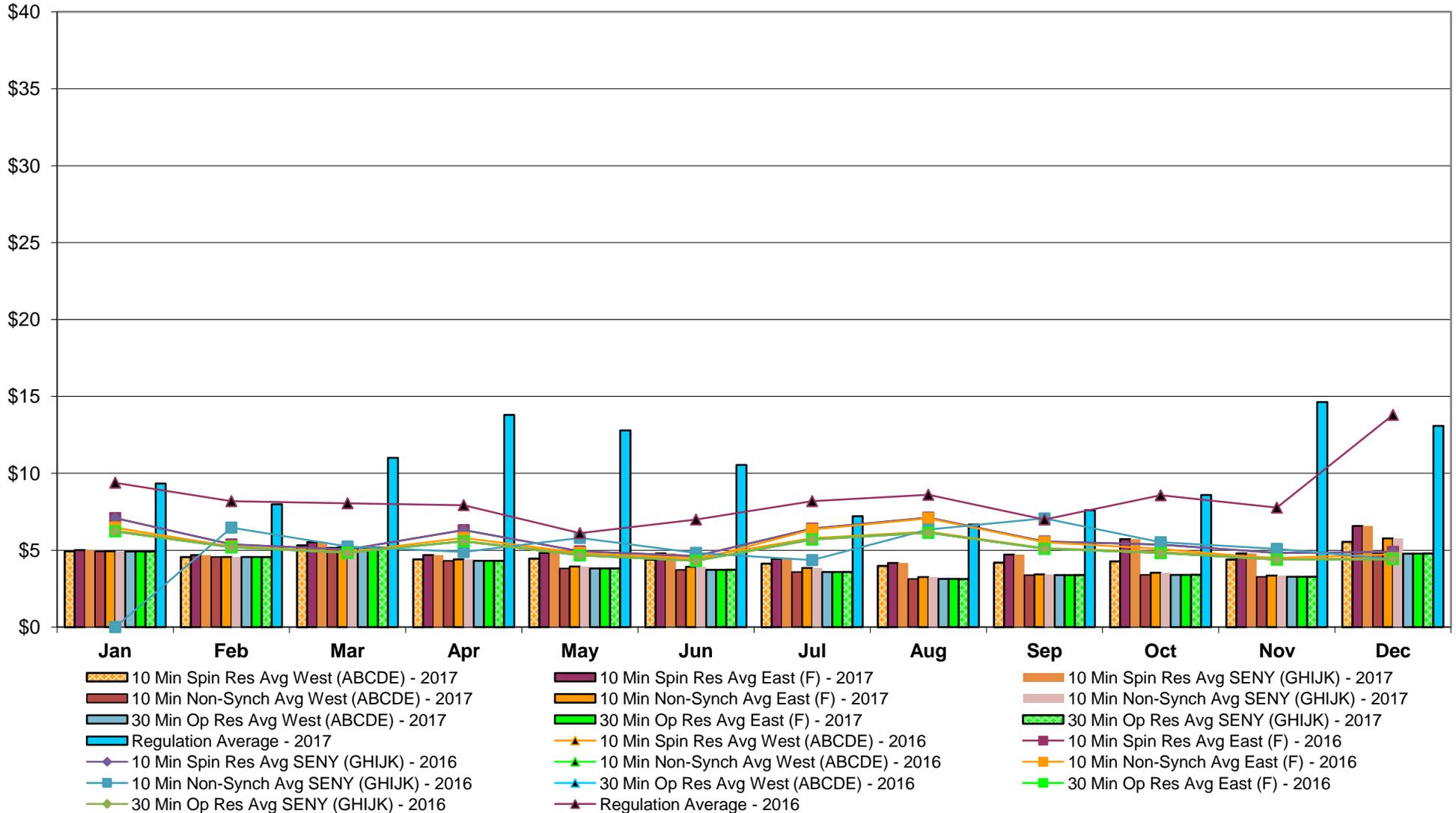
**Virtual Load and Supply Zonal Statistics (Average MWh/day) - 2017**

		Virtual Load Bid		Virtual Supply Bid				Virtual Load Bid		Virtual Supply Bid				Virtual Load Bid		Virtual Supply Bid	
Zone	Date	Scheduled	Not Scheduled	Scheduled	Not Scheduled	Zone	Date	Scheduled	Not Scheduled	Scheduled	Not Scheduled	Zone	Date	Scheduled	Not Scheduled	Scheduled	Not Scheduled
<b>WEST</b>	Jan-17	6,094	5,795	2,019	337	<b>MHK VL</b>	Jan-17	566	202	2,022	131	<b>DUNWOD</b>	Jan-17	304	832	5,708	389
	Feb-17	3,771	4,772	3,346	567		Feb-17	422	100	2,459	293		Feb-17	193	585	5,966	424
	Mar-17	6,522	4,960	2,386	616		Mar-17	407	186	3,594	378		Mar-17	436	763	4,871	439
	Apr-17	6,956	5,390	1,934	699		Apr-17	457	102	2,856	430		Apr-17	1,097	406	3,517	232
	May-17	8,468	5,775	1,261	546		May-17	532	105	2,786	401		May-17	1,215	155	1,863	276
	Jun-17	10,776	5,128	1,497	512		Jun-17	516	149	2,492	586		Jun-17	1,117	287	3,281	383
	Jul-17	10,883	6,588	2,341	538		Jul-17	625	174	3,324	468		Jul-17	2,287	281	2,848	246
	Aug-17	9,289	6,104	3,043	595		Aug-17	667	98	2,915	694		Aug-17	875	500	2,611	160
	Sep-17	8,186	6,774	1,056	334		Sep-17	700	125	2,432	892		Sep-17	987	526	2,397	469
	Oct-17	6,899	4,604	1,404	341		Oct-17	544	146	2,429	316		Oct-17	2,900	990	2,337	193
	Nov-17	8,471	5,925	1,255	447		Nov-17	636	99	1,920	437		Nov-17	804	602	2,097	191
	Dec-17	7,637	6,302	1,605	308		Dec-17	664	296	1,931	212		Dec-17	998	1,125	2,074	324
<b>GENESE</b>	Jan-17	654	1,282	3,652	2,482	<b>CAPITL</b>	Jan-17	1,291	666	3,990	3,861	<b>N.Y.C.</b>	Jan-17	5,761	5,474	1,543	1,008
	Feb-17	276	600	3,782	3,206		Feb-17	1,115	409	3,432	3,798		Feb-17	4,622	5,309	1,712	1,219
	Mar-17	480	838	3,806	3,419		Mar-17	1,409	528	5,186	2,484		Mar-17	4,052	5,826	1,561	1,058
	Apr-17	353	656	4,074	2,880		Apr-17	1,160	549	5,589	1,973		Apr-17	4,374	4,331	1,161	529
	May-17	393	128	4,096	2,027		May-17	1,232	454	5,697	1,635		May-17	3,357	4,679	1,434	569
	Jun-17	516	169	2,920	2,119		Jun-17	779	372	6,479	1,916		Jun-17	8,293	4,163	1,050	608
	Jul-17	335	190	3,494	1,622		Jul-17	450	290	5,972	2,754		Jul-17	8,732	2,726	1,728	902
	Aug-17	505	119	3,186	1,912		Aug-17	818	399	6,112	2,682		Aug-17	5,911	2,890	1,284	430
	Sep-17	541	230	2,105	1,132		Sep-17	1,093	240	4,943	2,426		Sep-17	3,224	3,937	1,972	1,027
	Oct-17	262	143	3,393	1,130		Oct-17	1,132	280	5,055	1,578		Oct-17	2,251	3,626	6,178	1,547
	Nov-17	542	142	2,741	1,193		Nov-17	1,422	433	5,858	2,645		Nov-17	2,734	3,637	1,659	672
	Dec-17	644	183	1,416	1,364		Dec-17	1,587	1,348	4,887	2,505		Dec-17	3,714	5,174	998	462
<b>NORTH</b>	Jan-17	655	316	6,415	3,473	<b>HUD VL</b>	Jan-17	911	817	5,317	3,064	<b>LONGIL</b>	Jan-17	3,559	3,788	1,354	1,367
	Feb-17	465	338	7,504	4,006		Feb-17	1,292	915	6,266	3,873		Feb-17	3,341	3,127	1,653	1,667
	Mar-17	426	311	7,227	4,576		Mar-17	659	1,048	5,427	2,652		Mar-17	4,133	3,779	1,958	1,463
	Apr-17	414	138	7,520	4,435		Apr-17	1,575	871	5,708	2,333		Apr-17	3,706	3,309	1,748	1,232
	May-17	555	280	7,848	2,436		May-17	1,202	1,006	6,608	2,378		May-17	4,232	2,893	1,740	998
	Jun-17	552	468	6,955	2,920		Jun-17	836	823	6,861	3,317		Jun-17	4,848	2,532	1,402	1,398
	Jul-17	586	533	6,883	2,889		Jul-17	1,140	726	6,184	4,114		Jul-17	4,846	2,137	1,320	1,535
	Aug-17	625	294	7,799	4,744		Aug-17	1,059	1,617	7,576	5,051		Aug-17	4,257	2,711	1,379	1,012
	Sep-17	626	396	6,315	5,216		Sep-17	1,623	1,874	5,422	4,625		Sep-17	4,083	3,980	1,355	645
	Oct-17	533	456	7,470	3,864		Oct-17	1,721	1,116	6,240	1,414		Oct-17	3,842	4,887	1,676	348
	Nov-17	326	252	7,726	2,190		Nov-17	926	1,172	7,281	8,210		Nov-17	3,338	2,757	1,643	507
	Dec-17	541	359	6,845	2,079		Dec-17	1,216	2,108	7,335	10,170		Dec-17	3,251	4,750	1,721	739
<b>CENTRL</b>	Jan-17	1,482	455	22,561	196	<b>MILLWD</b>	Jan-17	435	91	1,422	128	<b>NYISO</b>	Jan-17	21,713	19,719	56,001	16,436
	Feb-17	707	177	20,639	320		Feb-17	202	74	1,555	164		Feb-17	16,405	16,406	58,312	19,537
	Mar-17	979	605	18,610	518		Mar-17	454	157	1,452	158		Mar-17	19,956	19,002	56,078	17,759
	Apr-17	1,079	505	30,148	519		Apr-17	595	328	1,228	149		Apr-17	21,767	16,586	65,484	15,411
	May-17	1,472	492	30,724	312		May-17	662	255	1,474	195		May-17	23,320	16,222	65,531	11,774
	Jun-17	1,839	672	35,205	380		Jun-17	663	1,057	2,019	340		Jun-17	30,736	15,820	70,160	14,480
	Jul-17	1,687	435	32,177	303		Jul-17	809	1,316	1,865	361		Jul-17	32,377	15,396	68,136	15,732
	Aug-17	1,566	174	25,045	258		Aug-17	514	643	1,923	272		Aug-17	26,086	15,550	62,874	17,809
	Sep-17	1,275	291	26,053	381		Sep-17	574	561	1,815	701		Sep-17	22,912	18,933	55,865	17,846
	Oct-17	738	233	27,605	188		Oct-17	608	377	1,956	212		Oct-17	21,430	16,857	65,743	11,133
	Nov-17	1,151	290	27,934	440		Nov-17	573	283	1,653	401		Nov-17	20,922	15,591	61,766	17,332
	Dec-17	1,054	485	28,243	236		Dec-17	498	416	1,177	209		Dec-17	21,804	22,545	58,231	18,609

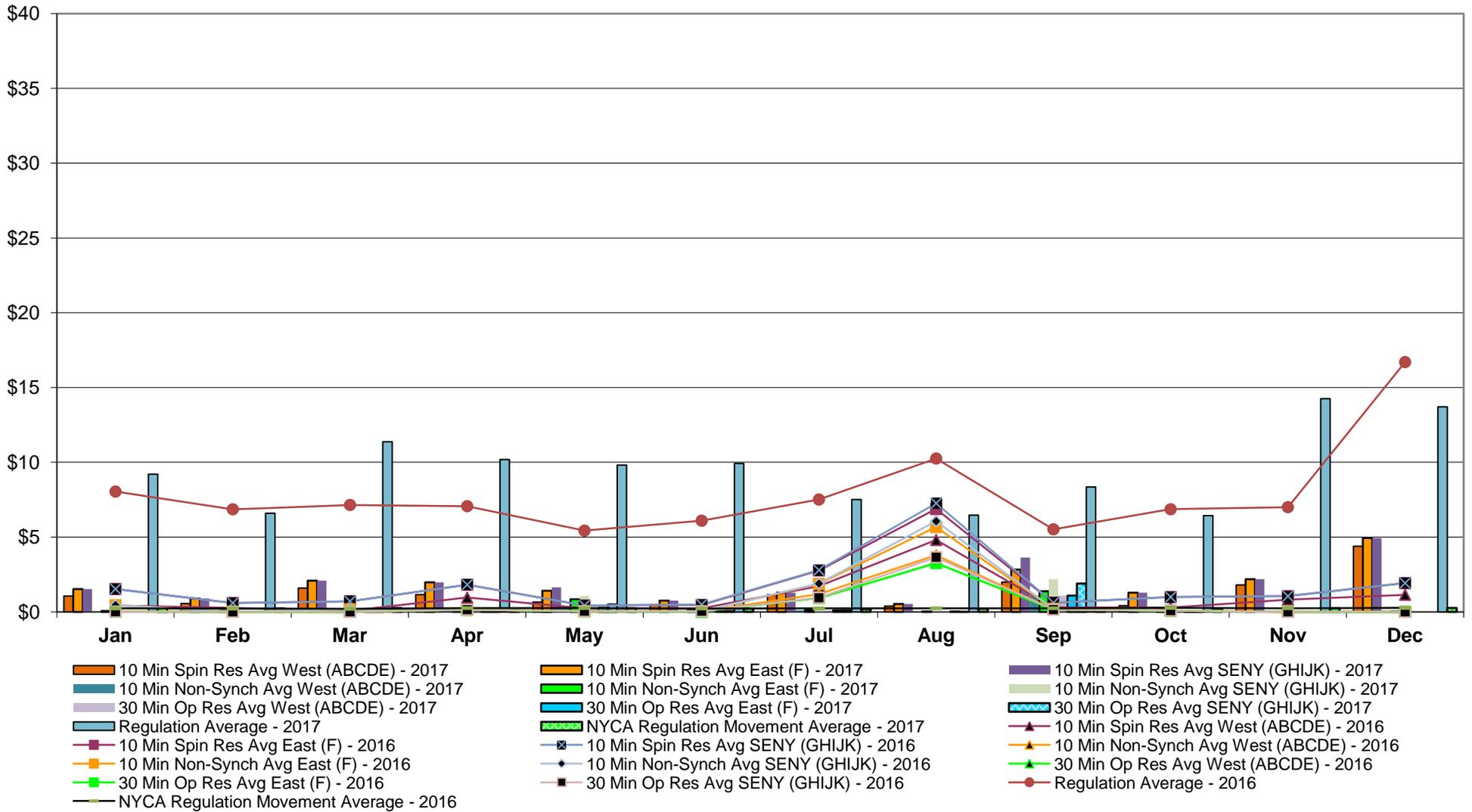
## NYISO Multi Hour Block Transactions Monthly Total MWh



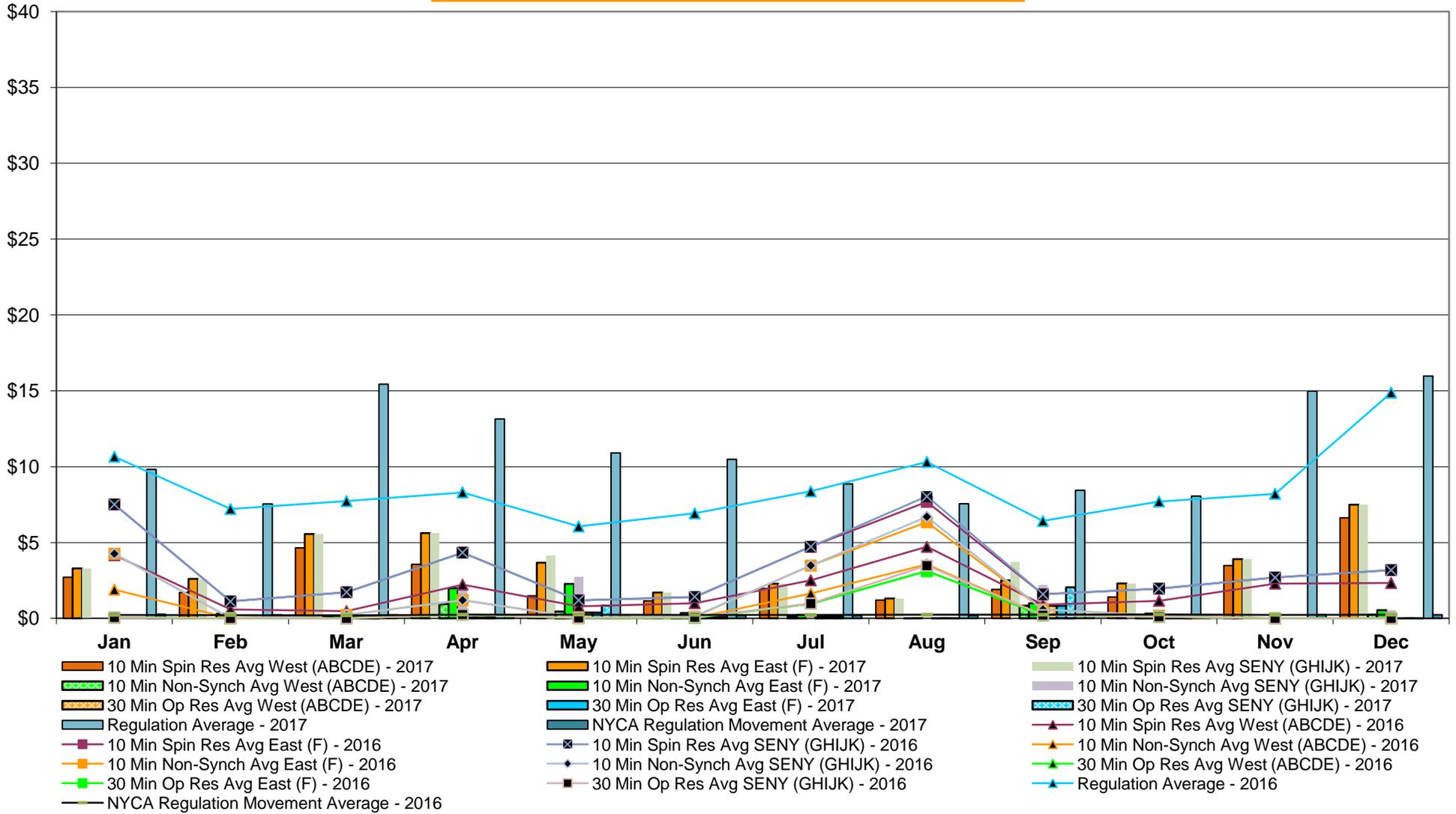
## NYISO Monthly Average Ancillary Service Prices Day Ahead Market 2016 - 2017



## NYISO Monthly Average Ancillary Service Prices RTC Market 2016 - 2017



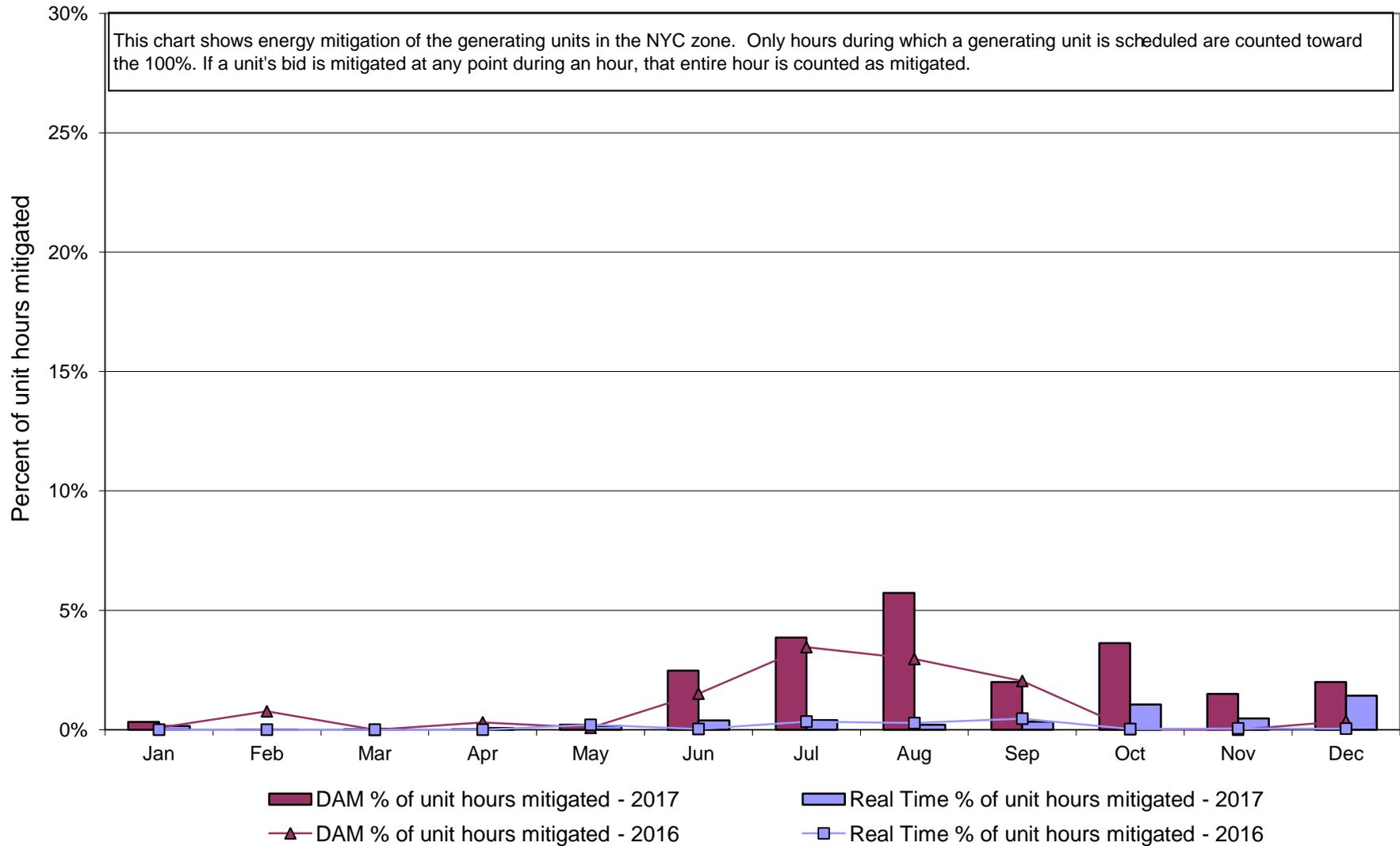
## NYISO Monthly Average Ancillary Service Prices Real Time Market 2016 - 2017



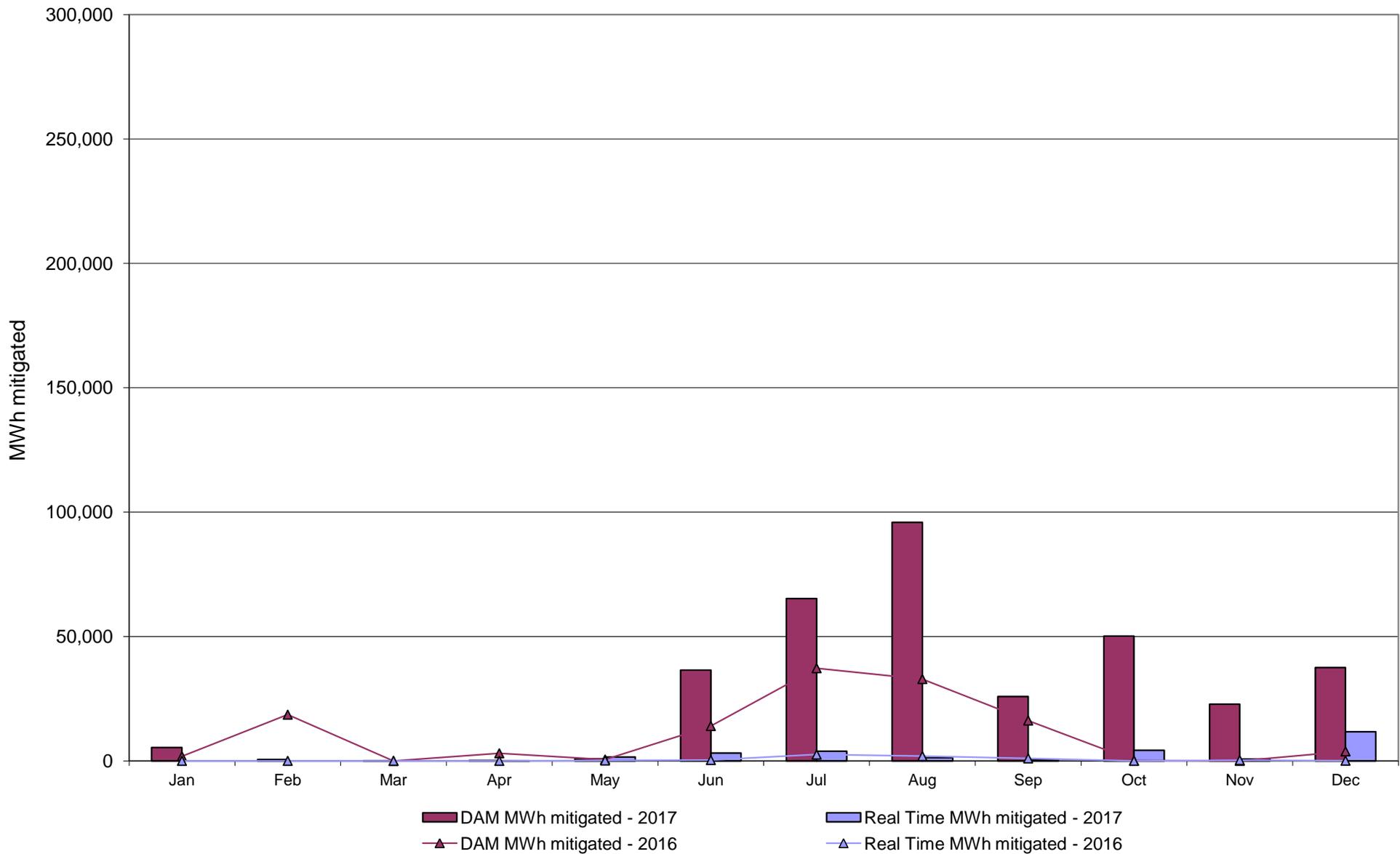
## NYISO Markets Ancillary Services Statistics - Unweighted Price (\$/MWH)

<b>2017</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b>Day Ahead Market</b>												
10 Min Spin SENY (GHIJK)	5.01	4.68	5.53	4.68	4.82	4.79	4.44	4.18	4.72	5.73	4.80	6.57
10 Min Spin East (F)	5.01	4.68	5.53	4.68	4.82	4.79	4.44	4.18	4.72	5.73	4.80	6.57
10 Min Spin West (ABCDE)	4.94	4.56	5.31	4.41	4.45	4.39	4.13	3.98	4.19	4.27	4.39	5.54
10 Min Non Synch SENY (GHIJK)	4.94	4.57	5.20	4.41	3.95	3.92	3.85	3.26	3.43	3.54	3.35	5.77
10 Min Non Synch East (F)	4.94	4.57	5.20	4.41	3.95	3.92	3.85	3.26	3.43	3.54	3.35	5.77
10 Min Non Synch West (ABCDE)	4.92	4.56	5.17	4.31	3.82	3.73	3.59	3.13	3.39	3.40	3.27	4.79
30 Min SENY (GHIJK)	4.92	4.56	5.17	4.31	3.82	3.73	3.59	3.13	3.39	3.40	3.27	4.78
30 Min East (F)	4.92	4.56	5.17	4.31	3.82	3.73	3.59	3.13	3.39	3.40	3.27	4.78
30 Min West (ABCDE)	4.92	4.56	5.17	4.31	3.82	3.73	3.59	3.13	3.39	3.40	3.27	4.78
Regulation	9.34	7.99	11.01	13.80	12.79	10.55	7.22	6.67	7.60	8.59	14.64	13.09
<b>RTC Market</b>												
10 Min Spin SENY (GHIJK)	1.53	0.89	2.08	1.97	1.64	0.75	1.28	0.52	3.63	1.28	2.19	4.93
10 Min Spin East (F)	1.53	0.89	2.08	1.97	1.41	0.75	1.28	0.52	2.83	1.28	2.19	4.93
10 Min Spin West (ABCDE)	1.06	0.55	1.58	1.16	0.65	0.47	1.13	0.38	1.99	0.42	1.79	4.39
10 Min Non Synch SENY (GHIJK)	0.06	0.06	0.10	0.14	1.08	0.13	0.13	0.02	2.18	0.11	0.00	0.05
10 Min Non Synch East (F)	0.06	0.06	0.10	0.14	0.85	0.13	0.13	0.02	1.38	0.11	0.00	0.05
10 Min Non Synch West (ABCDE)	0.00	0.00	0.10	0.07	0.31	0.05	0.11	0.02	1.09	0.07	0.00	0.00
30 Min SENY (GHIJK)	0.00	0.00	0.10	0.03	0.50	0.05	0.11	0.02	1.89	0.05	0.00	0.00
30 Min East (F)	0.00	0.00	0.10	0.03	0.27	0.05	0.11	0.02	1.09	0.05	0.00	0.00
30 Min West (ABCDE)	0.00	0.00	0.10	0.03	0.27	0.05	0.11	0.02	1.09	0.05	0.00	0.00
Regulation	9.21	6.59	11.37	10.18	9.82	9.92	7.51	6.47	8.35	6.44	14.26	13.71
NYCA Regulation Movement	0.27	0.24	0.25	0.22	0.24	0.21	0.19	0.20	0.21	0.22	0.24	0.25
<b>Real Time Market</b>												
10 Min Spin SENY (GHIJK)	3.29	2.61	5.56	5.62	4.14	1.71	2.29	1.31	3.72	2.30	3.91	7.50
10 Min Spin East (F)	3.29	2.61	5.56	5.62	3.67	1.71	2.29	1.31	2.51	2.30	3.91	7.50
10 Min Spin West (ABCDE)	2.71	1.71	4.65	3.56	1.48	1.15	1.98	1.20	1.91	1.40	3.49	6.63
10 Min Non Synch SENY (GHIJK)	0.00	0.31	0.17	1.99	2.75	0.36	0.23	0.01	2.21	0.32	0.00	0.54
10 Min Non Synch East (F)	0.00	0.31	0.17	1.99	2.28	0.36	0.23	0.01	1.00	0.32	0.00	0.54
10 Min Non Synch West (ABCDE)	0.00	0.00	0.13	0.95	0.44	0.10	0.13	0.01	0.83	0.22	0.00	0.23
30 Min SENY (GHIJK)	0.00	0.00	0.12	0.06	0.85	0.10	0.13	0.01	2.05	0.09	0.00	0.01
30 Min East (F)	0.00	0.00	0.12	0.06	0.38	0.10	0.13	0.01	0.83	0.09	0.00	0.01
30 Min West (ABCDE)	0.00	0.00	0.12	0.06	0.38	0.10	0.13	0.01	0.83	0.09	0.00	0.01
Regulation	9.83	7.54	15.44	13.15	10.91	10.48	8.87	7.56	8.44	8.06	14.99	15.97
NYCA Regulation Movement	0.27	0.24	0.25	0.20	0.22	0.19	0.19	0.20	0.21	0.22	0.24	0.24
<b>2016</b>												
<b>Day Ahead Market</b>												
10 Min Spin SENY (GHIJK)	7.09	5.38	5.04	6.31	4.93	4.62	6.41	7.12	5.57	5.37	4.83	4.89
10 Min Spin East (F)	7.09	5.38	5.04	6.31	4.93	4.62	6.41	7.12	5.57	5.37	4.83	4.89
10 Min Spin West (ABCDE)	6.28	5.25	4.84	5.60	4.77	4.52	5.78	6.20	5.14	4.89	4.50	4.73
10 Min Non Synch SENY (GHIJK)	6.47	5.25	4.88	5.80	4.83	4.36	6.34	7.07	5.52	5.09	4.43	4.49
10 Min Non Synch East (F)	6.47	5.25	4.88	5.80	4.83	4.36	6.34	7.07	5.52	5.09	4.43	4.49
10 Min Non Synch West (ABCDE)	6.23	5.20	4.84	5.58	4.68	4.32	5.72	6.15	5.10	4.82	4.39	4.43
30 Min SENY (GHIJK)	6.23	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
30 Min East (F)	6.23	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
30 Min West (ABCDE)	6.23	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
Regulation	9.39	8.19	8.05	7.93	6.11	7.00	8.19	8.61	7.00	8.57	7.77	13.80
<b>RTC Market</b>												
10 Min Spin SENY (GHIJK)	1.53	0.59	0.71	1.81	0.43	0.49	2.79	7.26	0.61	0.99	1.05	1.92
10 Min Spin East (F)	1.53	0.59	0.71	1.81	0.43	0.46	2.77	6.88	0.61	0.99	1.05	1.92
10 Min Spin West (ABCDE)	0.42	0.26	0.08	0.95	0.23	0.24	1.72	4.80	0.30	0.29	0.82	1.14
10 Min Non Synch SENY (GHIJK)	0.45	0.00	0.17	0.14	0.05	0.05	1.89	6.06	0.21	0.09	0.00	0.00
10 Min Non Synch East (F)	0.45	0.00	0.17	0.14	0.05	0.02	1.87	5.67	0.21	0.09	0.00	0.00
10 Min Non Synch West (ABCDE)	0.04	0.00	0.00	0.14	0.04	0.02	1.18	3.80	0.16	0.08	0.00	0.00
30 Min SENY (GHIJK)	0.01	0.00	0.00	0.14	0.04	0.04	0.94	3.65	0.15	0.08	0.00	0.00
30 Min East (F)	0.01	0.00	0.00	0.14	0.04	0.02	0.93	3.27	0.15	0.08	0.00	0.00
30 Min West (ABCDE)	0.01	0.00	0.00	0.14	0.04	0.02	0.93	3.27	0.15	0.08	0.00	0.00
Regulation	8.04	6.86	7.15	7.07	5.43	6.09	7.51	10.25	5.52	6.86	7.00	16.70
NYCA Regulation Movement	0.23	0.21	0.20	0.25	0.25	0.23	0.23	0.24	0.24	0.26	0.24	0.26
<b>Real Time Market</b>												
10 Min Spin SENY (GHIJK)	7.51	1.12	1.73	4.34	1.19	1.43	4.73	8.04	1.59	1.96	2.69	3.18
10 Min Spin East (F)	7.51	1.12	1.73	4.34	1.19	1.40	4.72	7.68	1.59	1.96	2.69	3.18
10 Min Spin West (ABCDE)	4.17	0.58	0.48	2.23	0.79	1.00	2.51	4.72	0.90	1.16	2.29	2.33
10 Min Non Synch SENY (GHIJK)	4.26	0.00	0.22	1.20	0.06	0.15	3.49	6.70	0.59	0.18	0.00	0.00
10 Min Non Synch East (F)	4.26	0.00	0.22	1.20	0.06	0.11	3.48	6.34	0.59	0.18	0.00	0.00
10 Min Non Synch West (ABCDE)	1.89	0.00	0.00	0.26	0.03	0.04	1.65	3.56	0.21	0.11	0.00	0.00
30 Min SENY (GHIJK)	0.06	0.00	0.00	0.25	0.03	0.07	0.98	3.48	0.21	0.11	0.00	0.00
30 Min East (F)	0.06	0.00	0.00	0.25	0.03	0.04	0.97	3.12	0.21	0.11	0.00	0.00
30 Min West (ABCDE)	0.06	0.00	0.00	0.25	0.03	0.04	0.97	3.12	0.21	0.11	0.00	0.00
Regulation	10.66	7.21	7.73	8.30	6.06	6.92	8.37	10.31	6.42	7.70	8.21	14.88
NYCA Regulation Movement	0.23	0.22	0.20	0.25	0.25	0.23	0.23	0.24	0.24	0.26	0.23	0.24

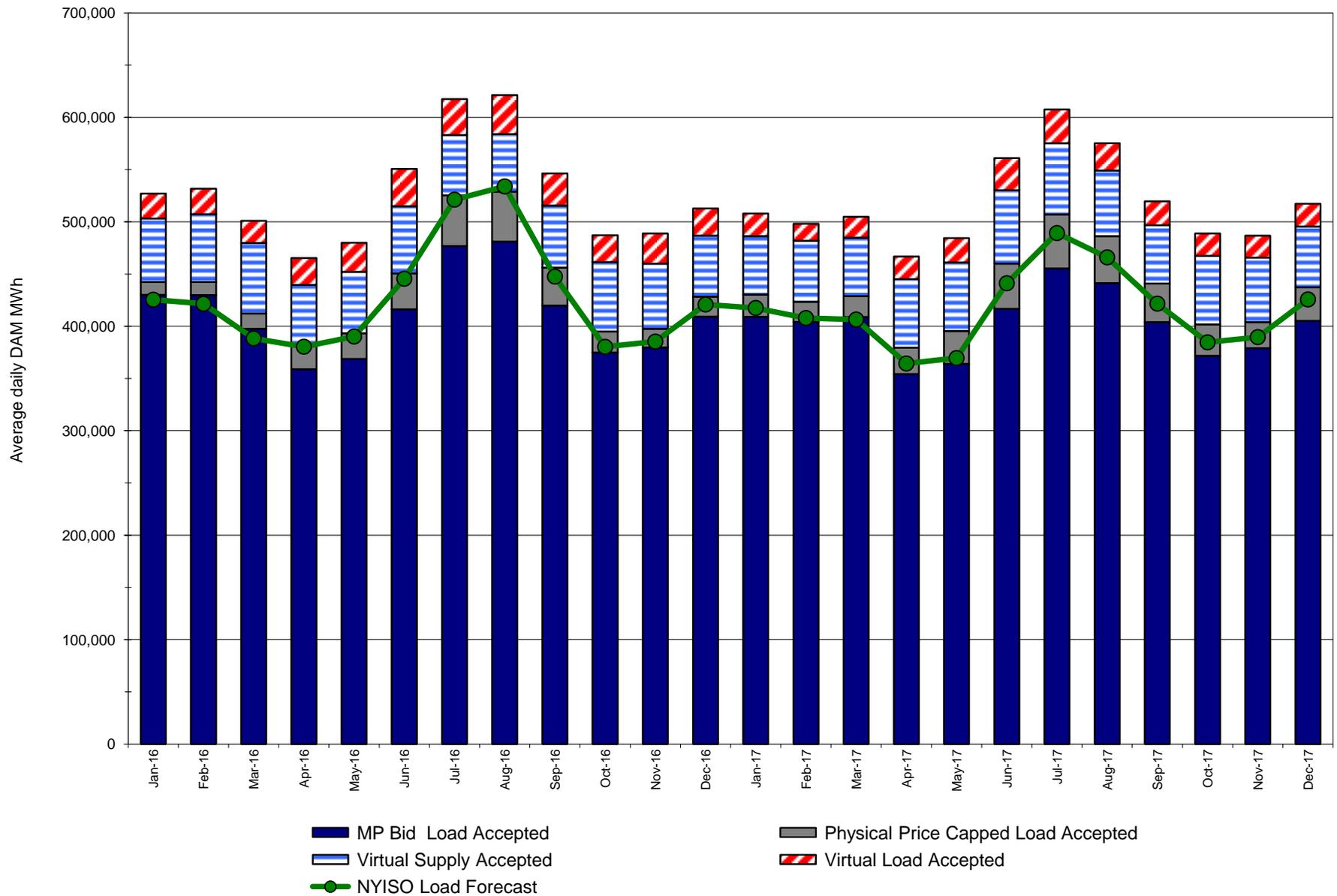
## NYISO In City Energy Mitigation - AMP (NYC Zone) 2016 - 2017 Percentage of committed unit-hours mitigated



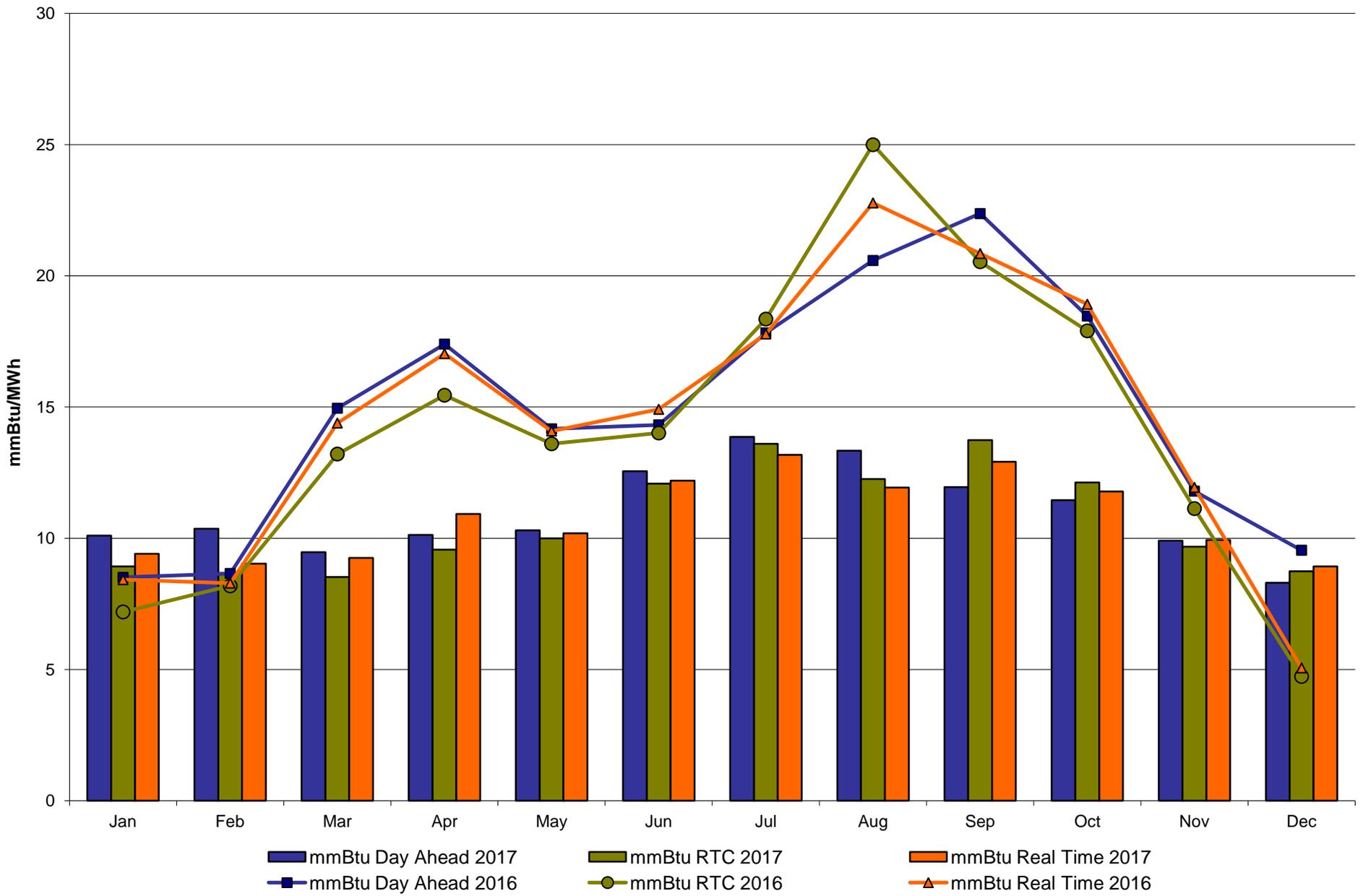
**NYISO In City Energy Mitigation (NYC Zone) 2016 - 2017**  
**Monthly megawatt hours mitigated**



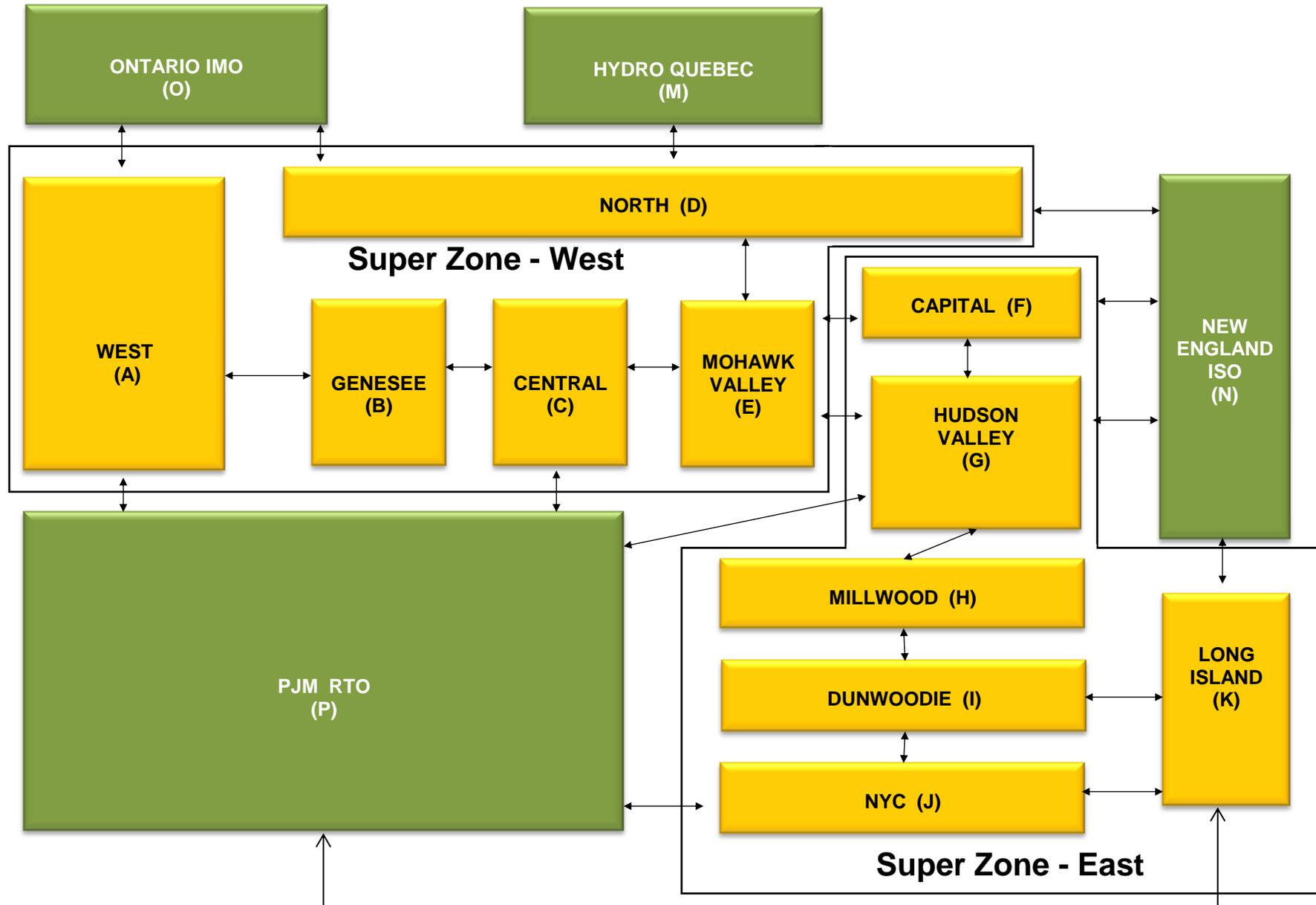
### NYISO Average Daily DAM Load Bid Summary



## Monthly Implied Heat Rate 2016-2017



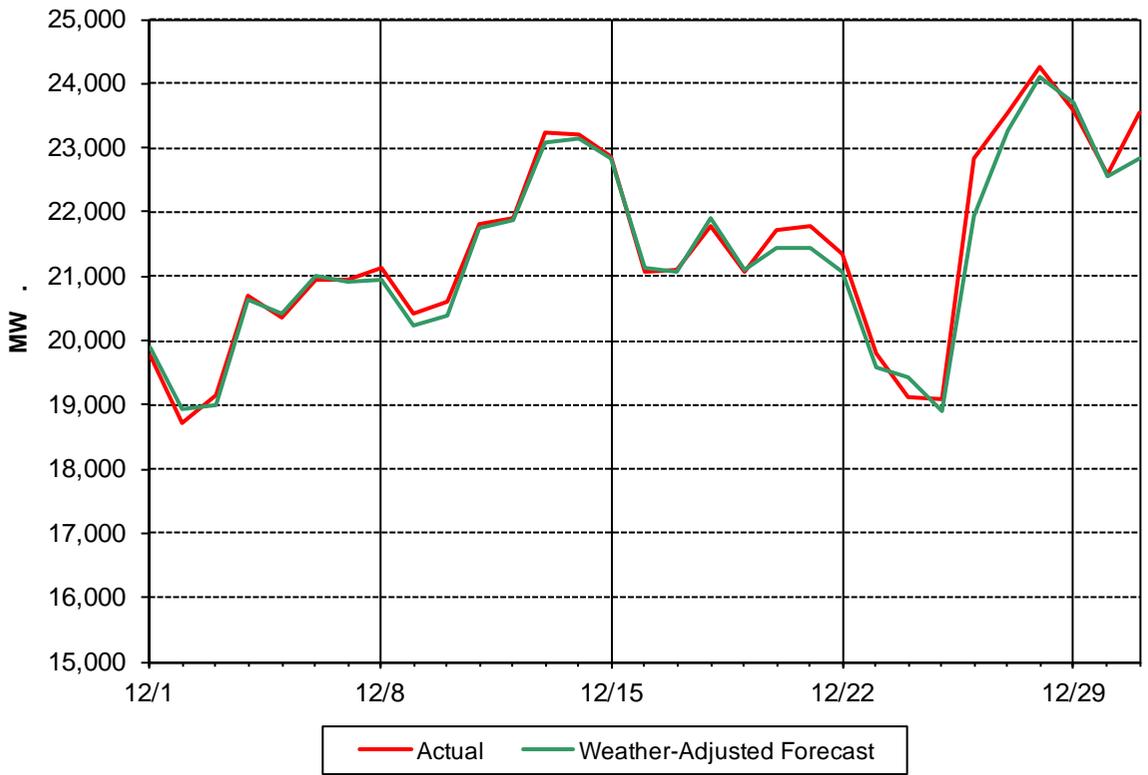
# NYISO LBMP ZONES



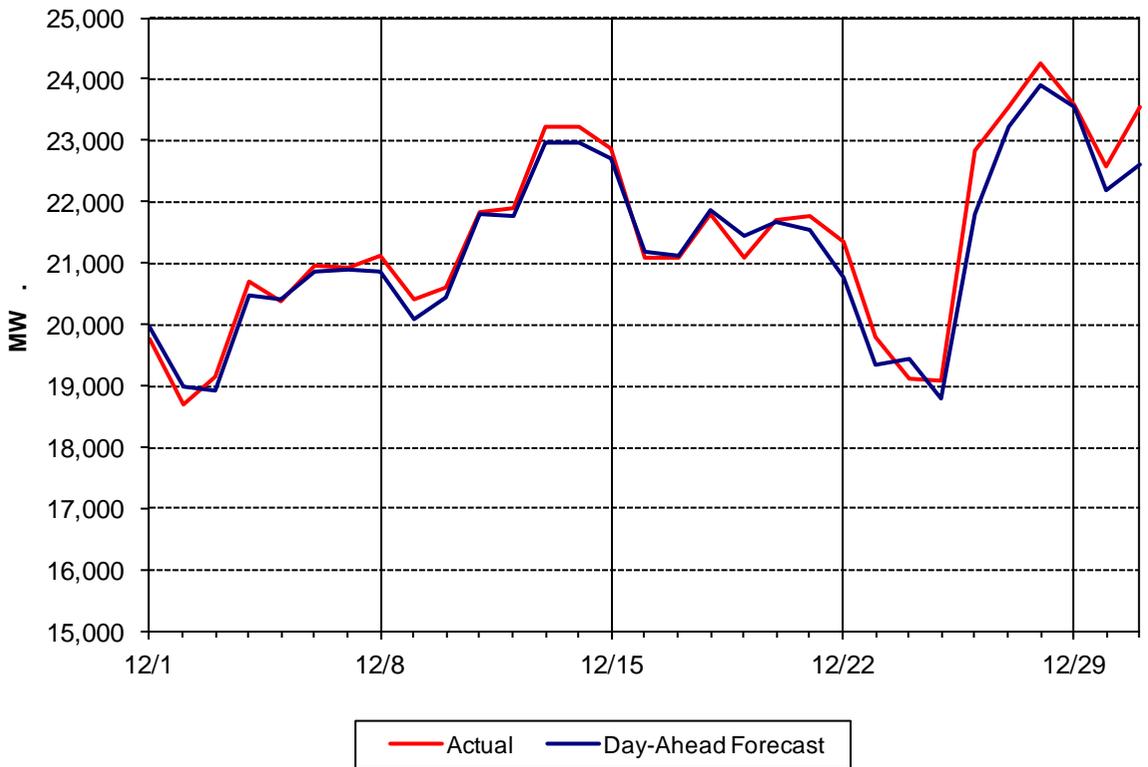
**Billing Codes for Chart C**

<b>Chart - C Category Name</b>	<b>Billing Code</b>	<b>Billing Category Name</b>
Bid Production Cost Guarantee Balancing	81203	Balancing NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee Balancing	81204	Balancing NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee Balancing	81205	Balancing NYISO Bid Production Cost Guarantee Expenditure due to Curtailed Imports
Bid Production Cost Guarantee Balancing	81208	Balancing NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee Balancing	81209	Balancing NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee Balancing	81213	Balancing NYISO Bid Production Cost Guarantee Expenditure due to Curtailed Imports
Bid Production Cost Guarantee DAM	81201	DAM NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee DAM	84001	EDRP/SCR Demand Response - Local
Bid Production Cost Guarantee DAM	84101	EDRP/SCR Demand Response - NYISO Wide
Bid Production Cost Guarantee DAM	81401	DAM Price Responsive Load Program
Bid Production Cost Guarantee DAM	81202	DAM NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee DAM	81206	DAM NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee DAM	81207	DAM NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee DAM Virtual	81501	DAM Virtual Bid Production Cost Guarantee
DAM Contract Balancing	81315	DAM Contract Balancing
DAM Contract Balancing	81317	DAM Contract Balancing
Local Reliability Balancing	81002	Balancing Local Reliability Bid Production Cost Guarantee
Local Reliability Balancing	83901	Margin Restoration (MOB) Revenue
Local Reliability DAM	81001	DAM Local Reliability Bid Production Cost Guarantee
NYISO Cost of Operations	80901	NYISO Cost Of Operations
NYISO Cost of Operations	80902	NYISO Cost Of Operations
NYISO Cost of Operations	83501	NYISO Cost Of Operations
NYISO Cost of Operations	83502	NYISO Cost Of Operations
Residuals Balancing	81302	Balancing Market Energy Residual
Residuals Balancing	81304	Balancing Market Loss Residual
Residuals Balancing	81305	Balancing Market Congestion Balancing
Residuals Balancing	81306	Emergency Energy Purchases
Residuals Balancing	81307	Emergency Energy Sales
Residuals Balancing	81309	Balancing Market Energy Residual
Residuals Balancing	81311	Balancing Market Loss Residual
Residuals Balancing	81312	Balancing Market Congestion Balancing
Residuals Balancing	81313	Emergency Energy Purchases
Residuals Balancing	81314	Emergency Energy Sales
Residuals DAM	81301	Day Ahead Market Energy Residual
Residuals DAM	81303	Day Ahead Market Loss Residual
Residuals DAM	81308	Day Ahead Market Energy Residual
Residuals DAM	81310	Day Ahead Market Loss Residual

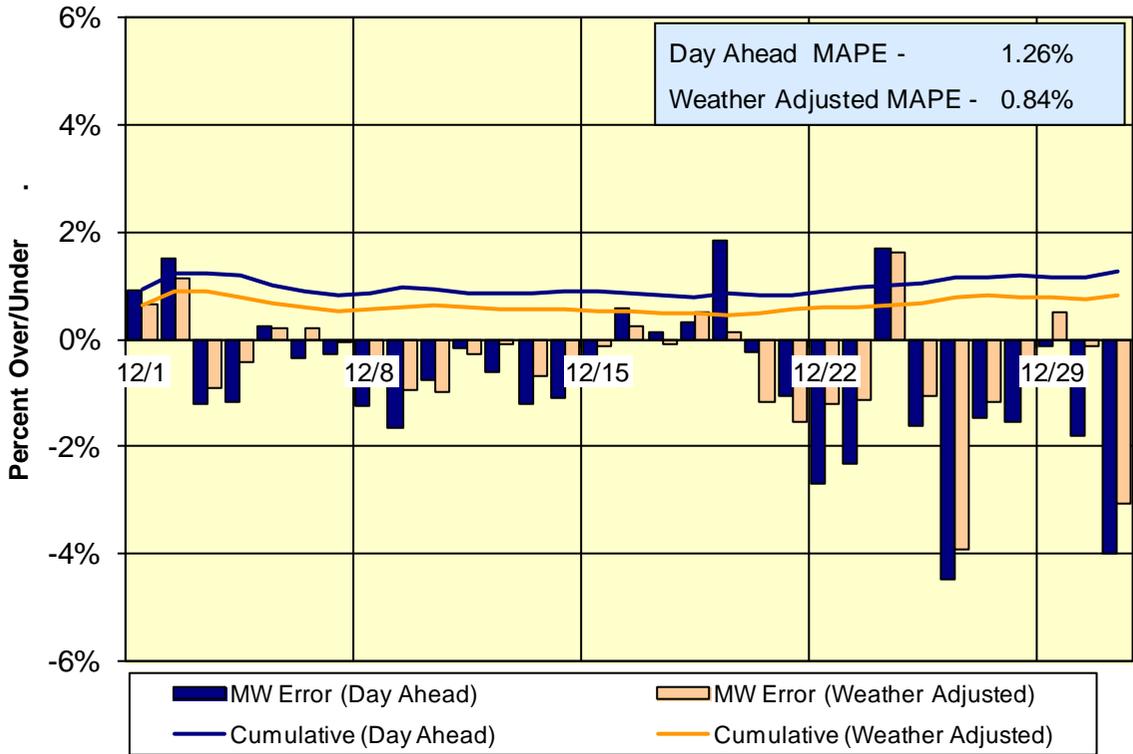
**NYISO Daily Peak Load - December 2017  
Actual vs. Weather-Adjusted Forecast**



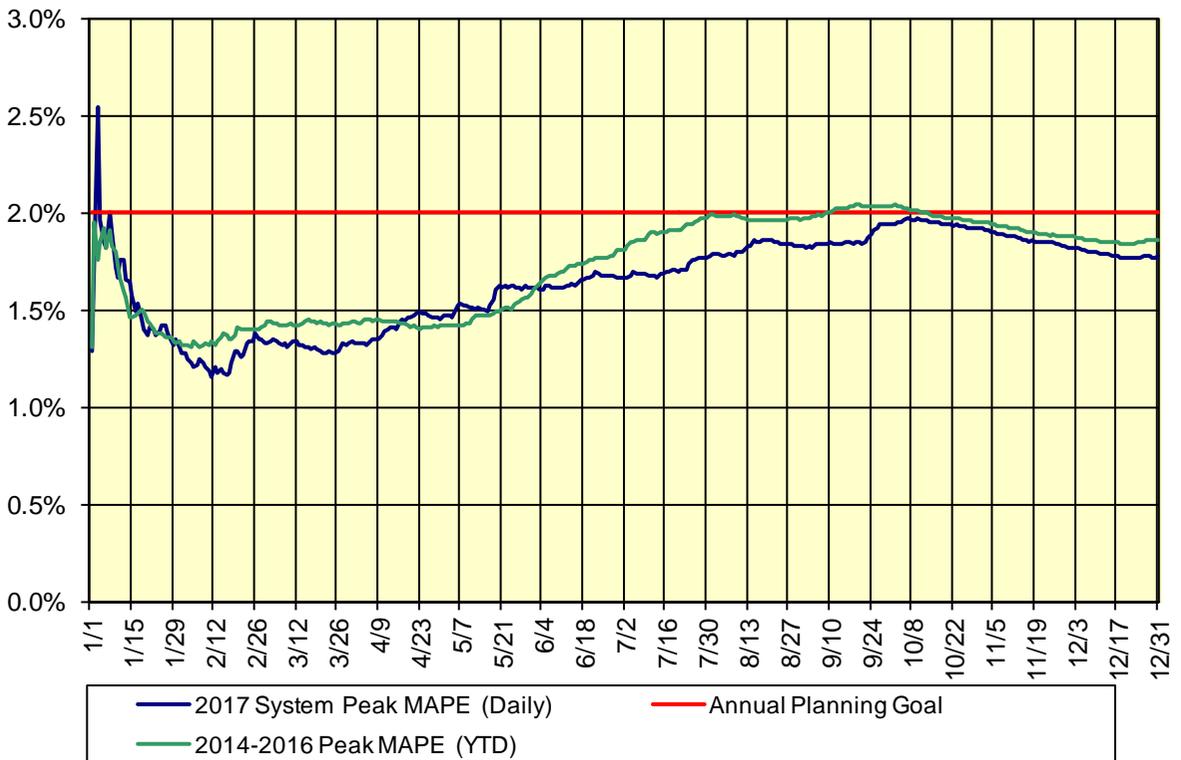
**NYISO Daily Peak Load - December 2017  
Actual vs. Forecast**



### Day Ahead Peak Forecast - December 2017 Percent Error - Actual & Weather Adjusted



### Day-Ahead Forecast Accuracy - Cumulative Performance 2017 Year-to-Date



## Summary Description of Regulatory Filings, Investigations, Rulemakings and Related Orders in NYISO Matters – December 2017

<b>Filing Date</b>	<b>Filing Summary</b>	<b>Docket</b>	<b>Order Date</b>	<b>Order Summary</b>
10/16/2017	NYISO 205 filing re: comprehensive interconnection queue process revisions	ER18-80-000	12/07/2017	Order accepted filing as filed with a to be determined 2018 effective date
10/27/2017	NYISO 205 filing re: incorporate an accepted revision that corrects an erroneous data entry for Contract No. 218 in Table 1A of Attachment L of the OATT	ER18-173-000	12/13/2017	Order accepted filing as filed effective 12/27/2017, as requested
12/01/2017	NYISO filing re: answer to the NJBPU and PSE&G requests for rehearing of the 10/06/17 order accepting tariff revisions and denying request for rehearing and clarification	ER17-905-000 ER17-905-001		
12/08/2017	NYISO compliance filing re: offer cap revisions per Order No. 831	ER17-1561-001		
12/15/2017	NYISO confidential filing to the NYPSC re: three-month Reliability Commitment Data Report for the period ending 11/30/2017	PSC Matter No. 10-02007		
12/15/2017	NYISO confidential filing to the NYPSC re: disclosure of five-year capital plan for 2018-2022	PSC Case No. 12-E-0168		
12/15/2017	NYISO filing re: annual installed capacity report on the NYISO's capacity market, possible withholding, new generation projects, and net revenue analysis	ER01-3001-000 ER04-647-000		
12/19/2017	NYISO confidential filing to the NYPSC re: the 2017 transmission planning assessment	PSC Matter No. 10-02007		
12/28/2017	NYISO, <i>et. al.</i> filing re: request for extension of time to answer the NJBPU complaint v. PJM, NYISO, Consolidated Edison, Linden VFT, Hudson Transmission Partners and NYPA	EL18-54-000		