



# Monthly Report

**April 2018**

# **Table of Contents**

- **Operations Performance Metrics Report**
- **Market Operation's Report**
- **Daily Loads**
- **Regulatory Filings**

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



## ***April 2018 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 May 8, 2018.

## **Table of Contents**

- ♦ **Highlights**
  - *Operations Performance*
- ♦ **Reliability Performance Metrics**
  - *Alert State Declarations*
  - *Major Emergency State Declarations*
  - *IROL Exceedance Times*
  - *Balancing Area Control Performance*
  - *Reserve Activations*
  - *Disturbance Recovery Times*
  - *Load Forecasting Performance*
  - *Wind Forecasting Performance*
  - *Wind Performance and Curtailments*
  - *Lake Erie Circulation and ISO Schedules*
- ♦ **Broader Regional Market Performance Metrics**
  - *PAR Interconnection Congestion Coordination Monthly Value*
  - *PAR Interconnection Congestion Coordination Daily Value*
  - *Regional Generation Congestion Coordination Monthly Value*
  - *Regional Generation Congestion Coordination Daily Value*
  - *Regional RT Scheduling - PJM Monthly Value*
  - *Regional RT Scheduling - PJM Daily Value*
- ♦ **Market Performance Metrics**
  - *Monthly Statewide Uplift Components and Rate*
  - *RTM Congestion Residuals Monthly Trend*
  - *RTM Congestion Residuals Daily Costs*
  - *RTM Congestion Residuals Event Summary*
  - *RTM Congestion Residuals Cost Categories*
  - *DAM Congestion Residuals Monthly Trend*
  - *DAM Congestion Residuals Daily Costs*
  - *DAM Congestion Residuals Cost Categories*
  - *NYCA Unit Uplift Components Monthly Trend*
  - *NYCA Unit Uplift Components Daily Costs*
  - *Local Reliability Costs Monthly Trend & Commitment Hours*
  - *TCC Monthly Clearing Price with DAM Congestion*
  - *ICAP Spot Market Clearing Price*
  - *UCAP Awards*

## April 2018 Operations Performance Highlights

- Peak load of 19,534 MW occurred on 04/16/2018 HB 11
- 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.

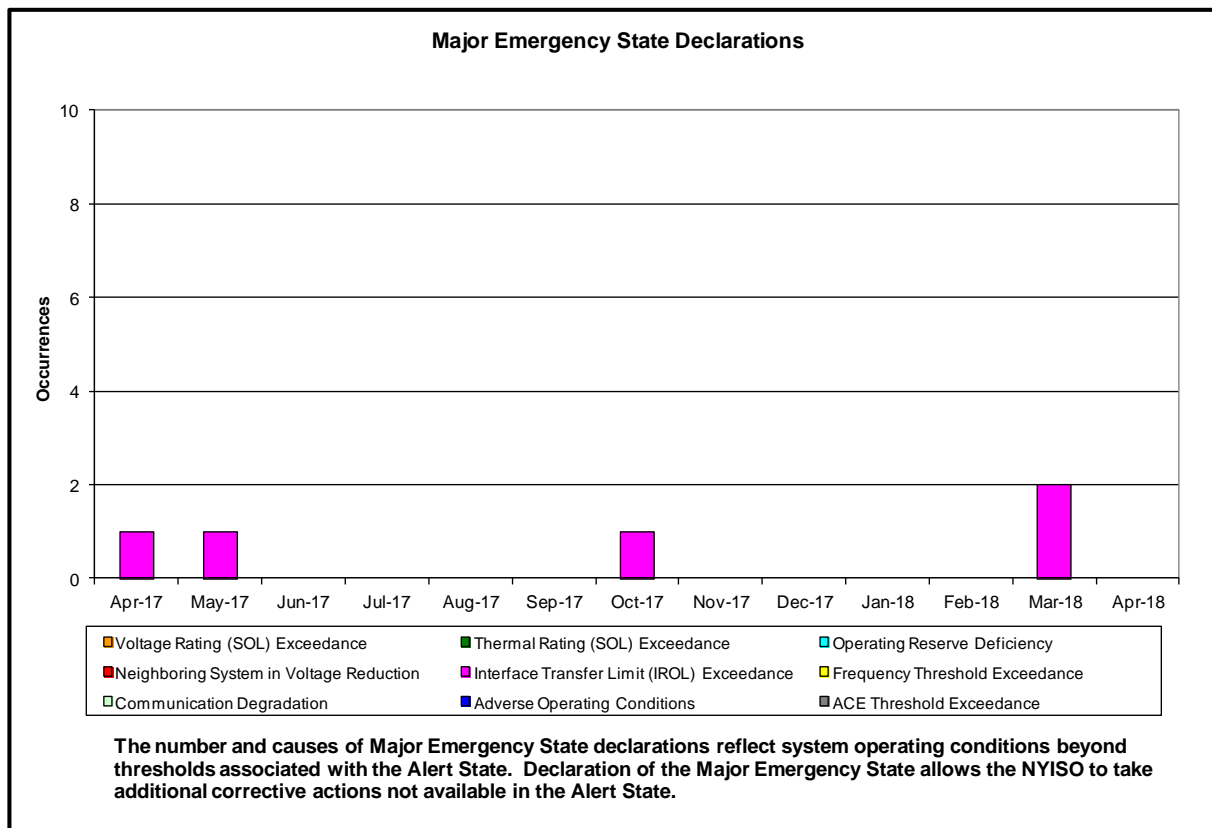
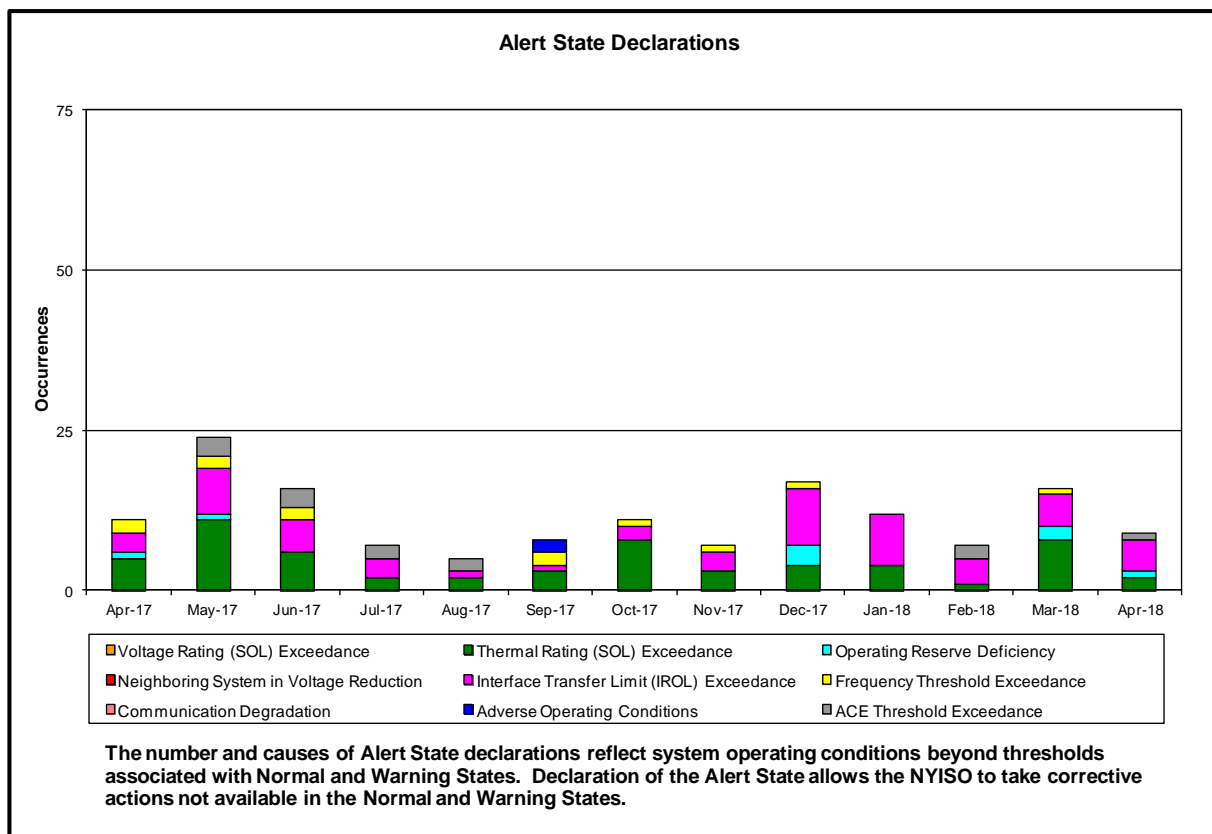
	Current Month Value (\$M)	Year-to-Date Value (\$M)
<b>NY Savings from PJM-NY Congestion Coordination</b>	\$0.36	\$8.36
<b>NY Savings from PJM-NY Coordinated Transaction Scheduling</b>	\$0.03	\$0.68
<b>NY Savings from NE-NY Coordinated Transaction Scheduling</b>	(\$0.07)	(\$0.55)
<b>Total NY Savings</b>	\$0.32	\$8.49
<b>Regional Savings from PJM-NY Coordinated Transaction Scheduling</b>	\$0.15	\$1.02
<b>Regional Savings from NE-NY Coordinated Transaction Scheduling</b>	\$0.05	\$0.21
<b>Total Regional Savings</b>	\$0.20	\$1.23

- Statewide uplift cost monthly average was (\$0.57)/MWh
- The following table identifies the Monthly ICAP spot market prices by locality and changes from the end of the prior Summer Capability period.

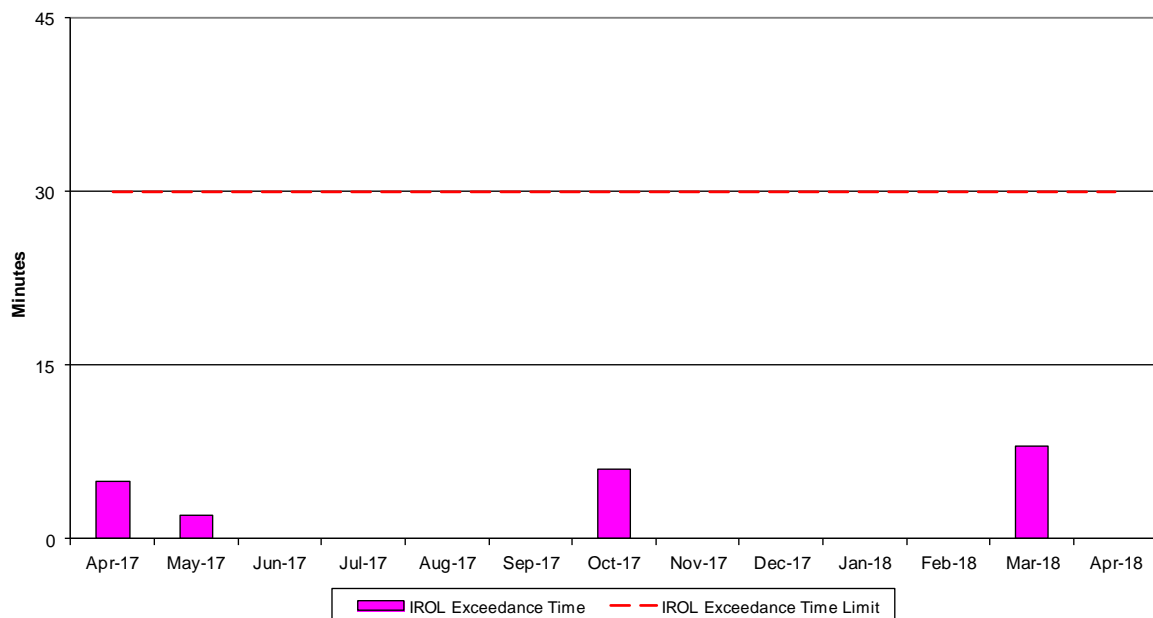
Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
May 2018 Spot Price	\$2.70	\$11.86	\$11.86	\$6.81
October 2017 Spot Price	\$1.84	\$9.47	\$9.55	\$6.60
Delta	\$0.86	\$2.39	\$2.31	\$0.21

- Price changes from October 2017 to May 2018 are driven by changes in supply as well as Capability Year inputs such as demand curve parameters, Locational Capacity Requirements, the Installed Reserve Margin and the load forecast.

## Reliability Performance Metrics

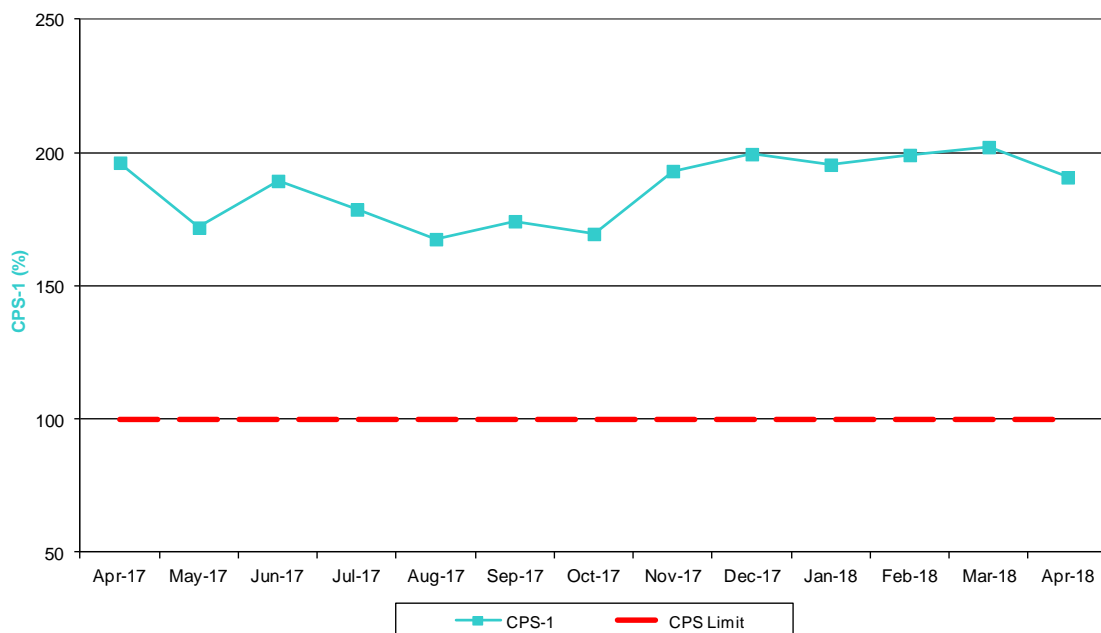


### NERC IROL Time Over Limit



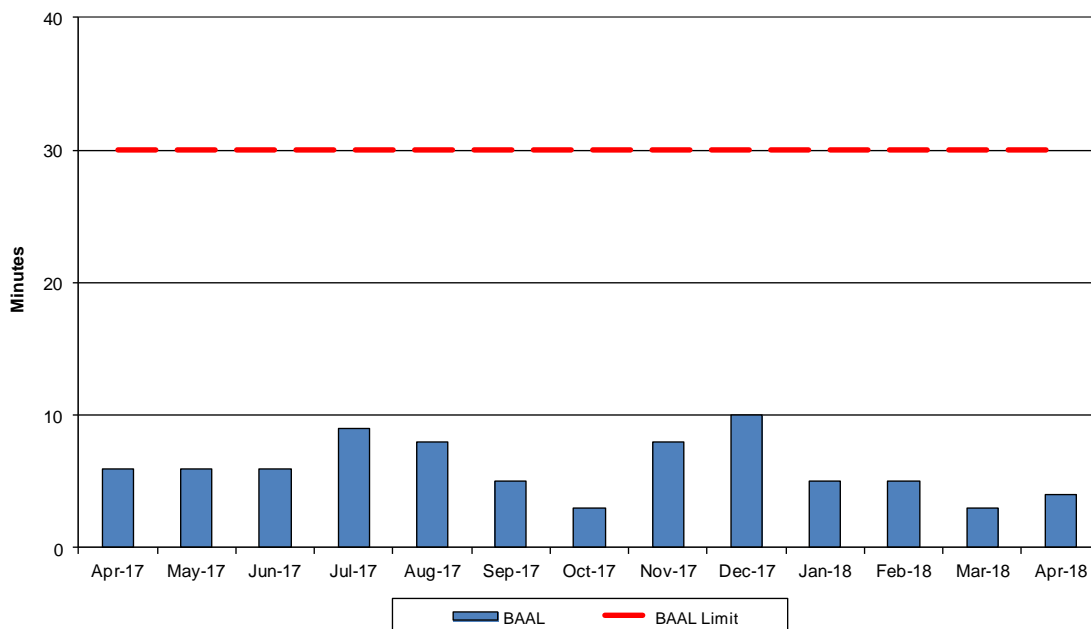
For IROL exceedances leading to Major Emergency State declarations, the maximum IROL exceedance time is identified. IROL exceedances of less than thirty minutes are considered NERC compliant.

### NERC Control Performance Standards



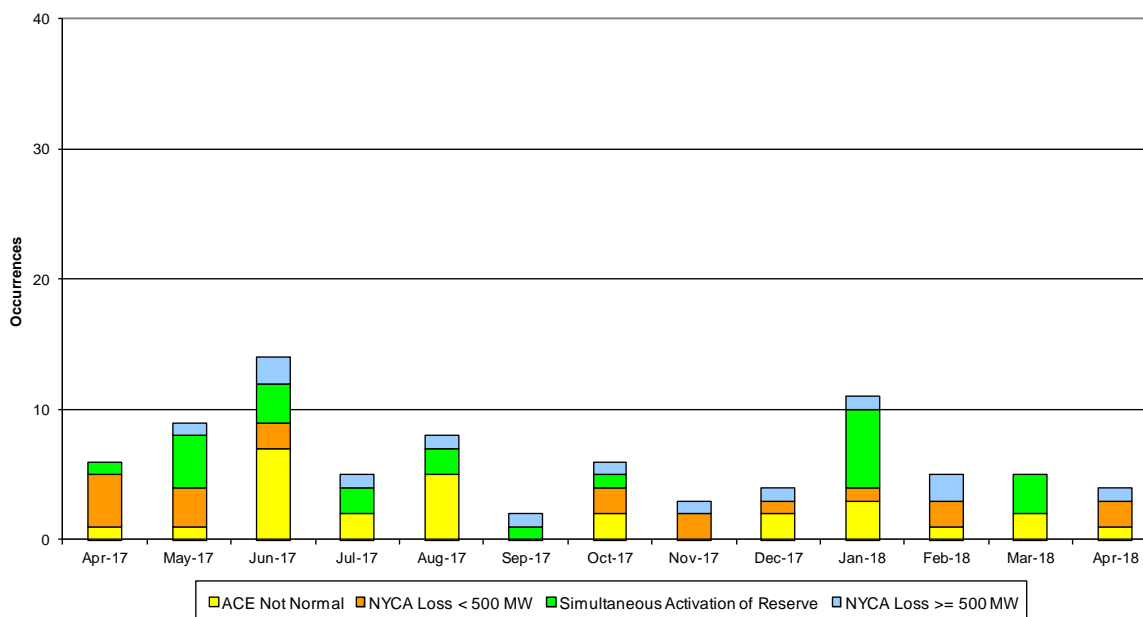
The value of NERC Control Performance Standards (CPS-1) is an indicator of the NYISO Area resource and demand balancing. Values exceeding the identified threshold are NERC compliant.

### 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.

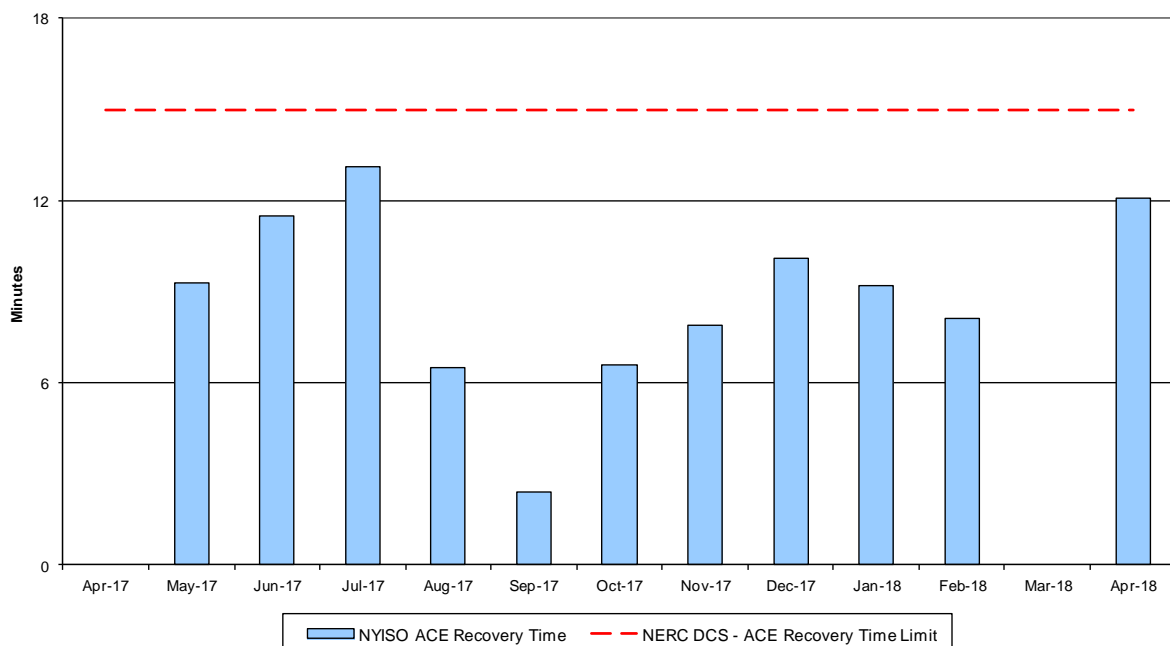
### Reserve Activations



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.

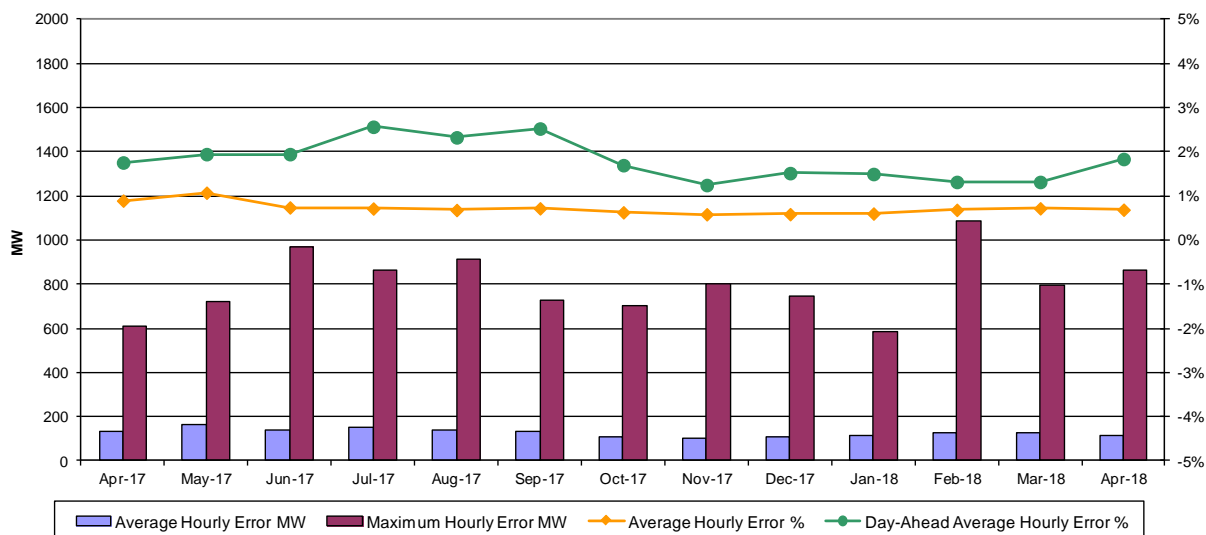


### DCS Event Time to ACE Recovery



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

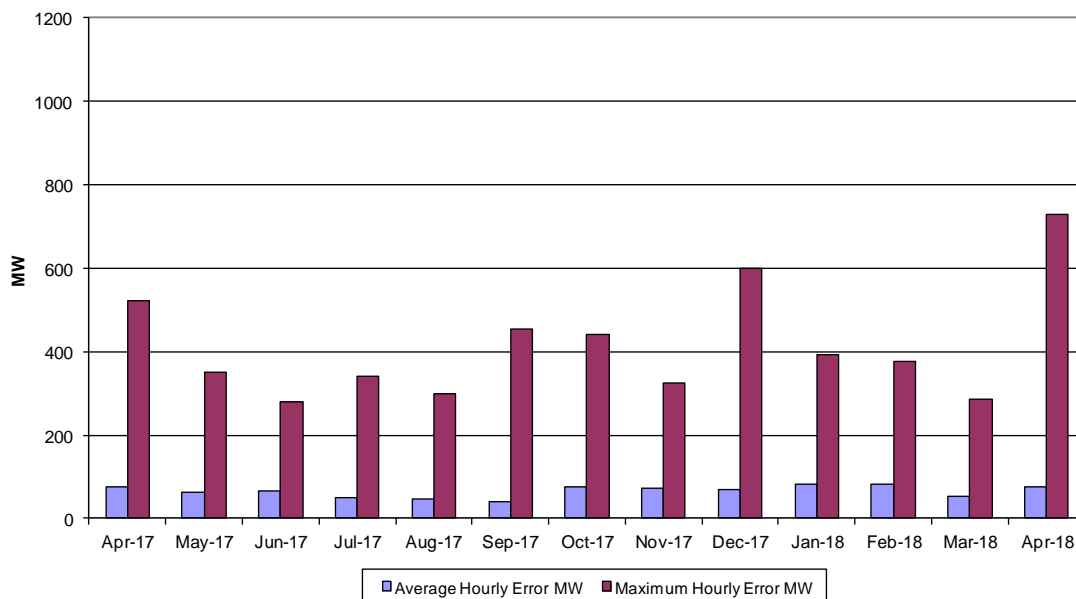


**Hourly Error MW** - Absolute value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.

**Average Hourly Error %** - Average value of the ratio of hourly average error magnitude to hourly average actual load demand.

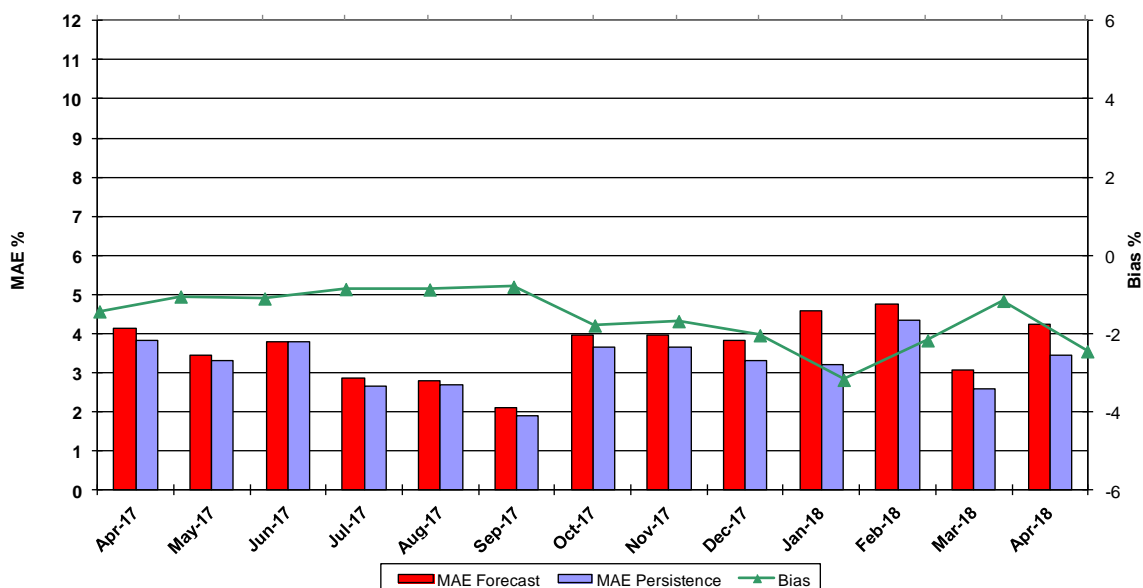
**Day-Ahead Average Hourly Error %** - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.

### Wind Forecast Performance Hour Ahead MW Error

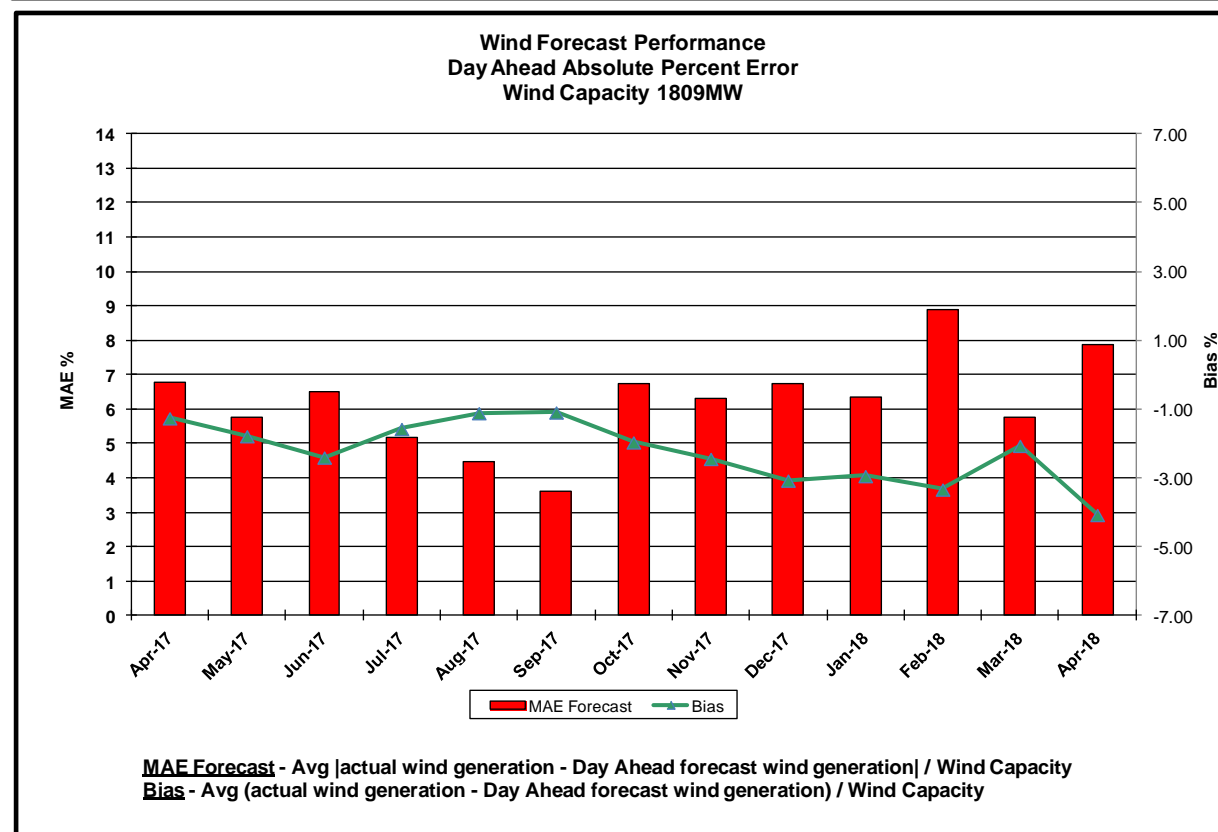
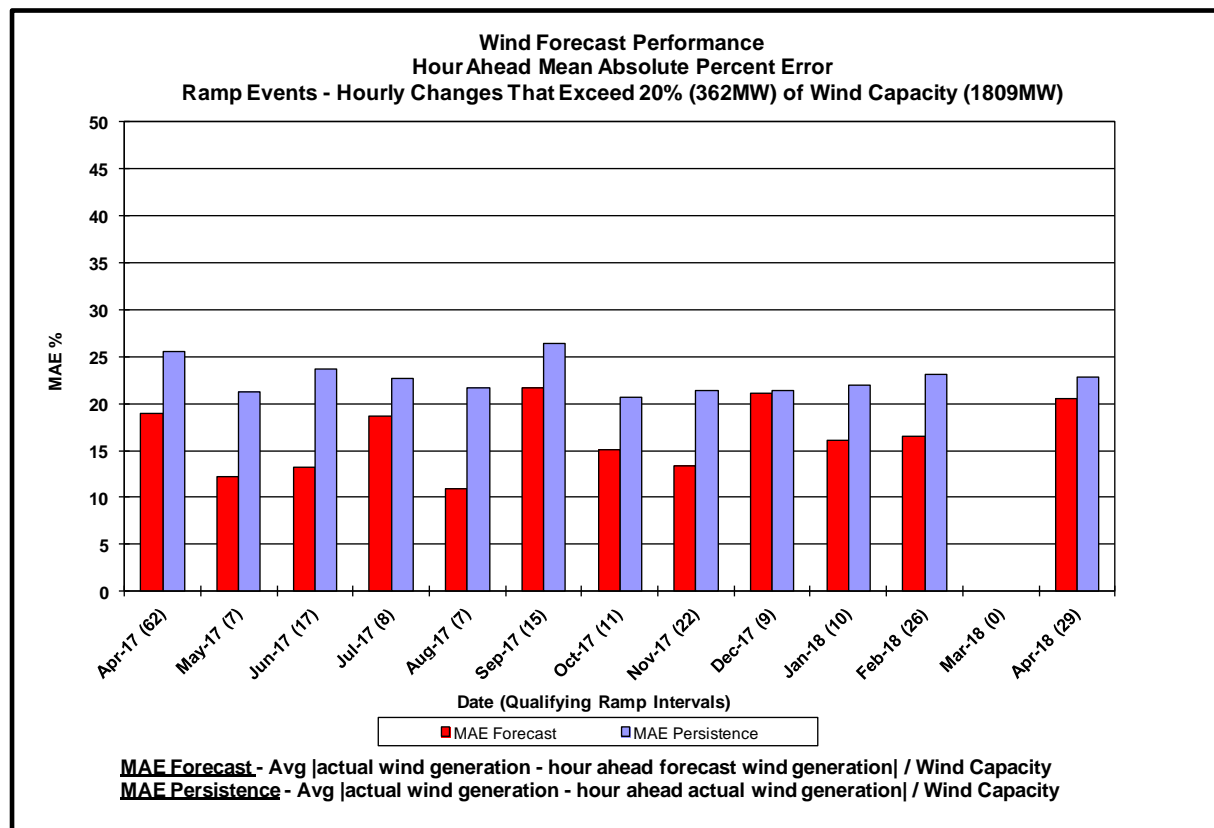


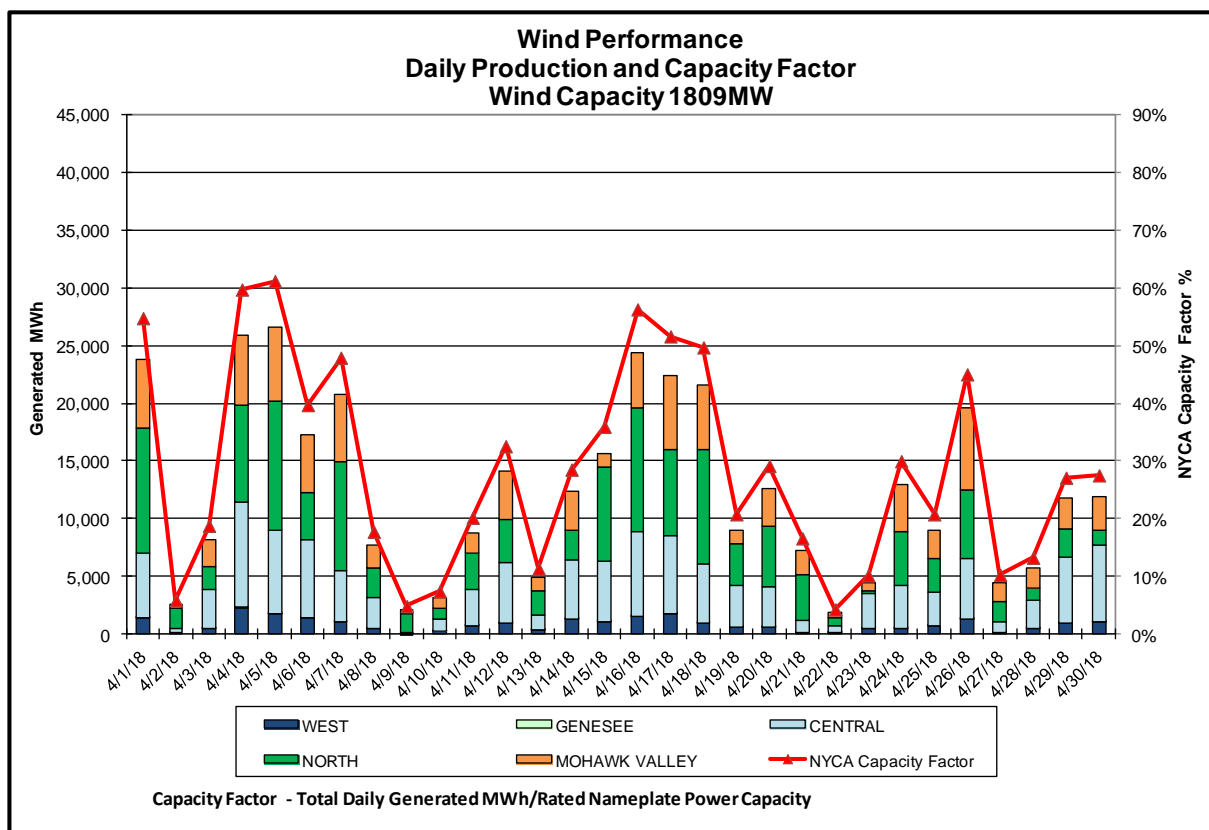
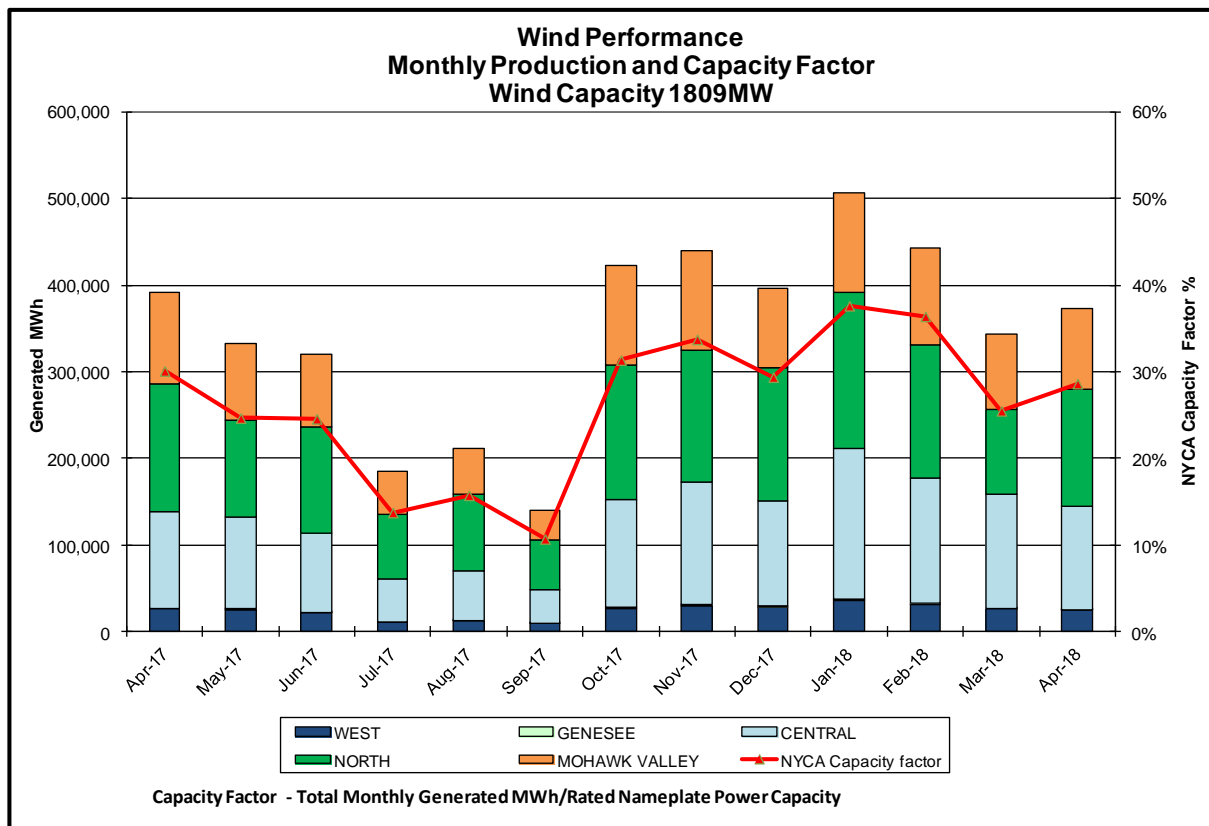
**Hourly Error MW** - Absolute value of the difference between the hourly average actual wind generation and the average hour ahead forecast wind generation.

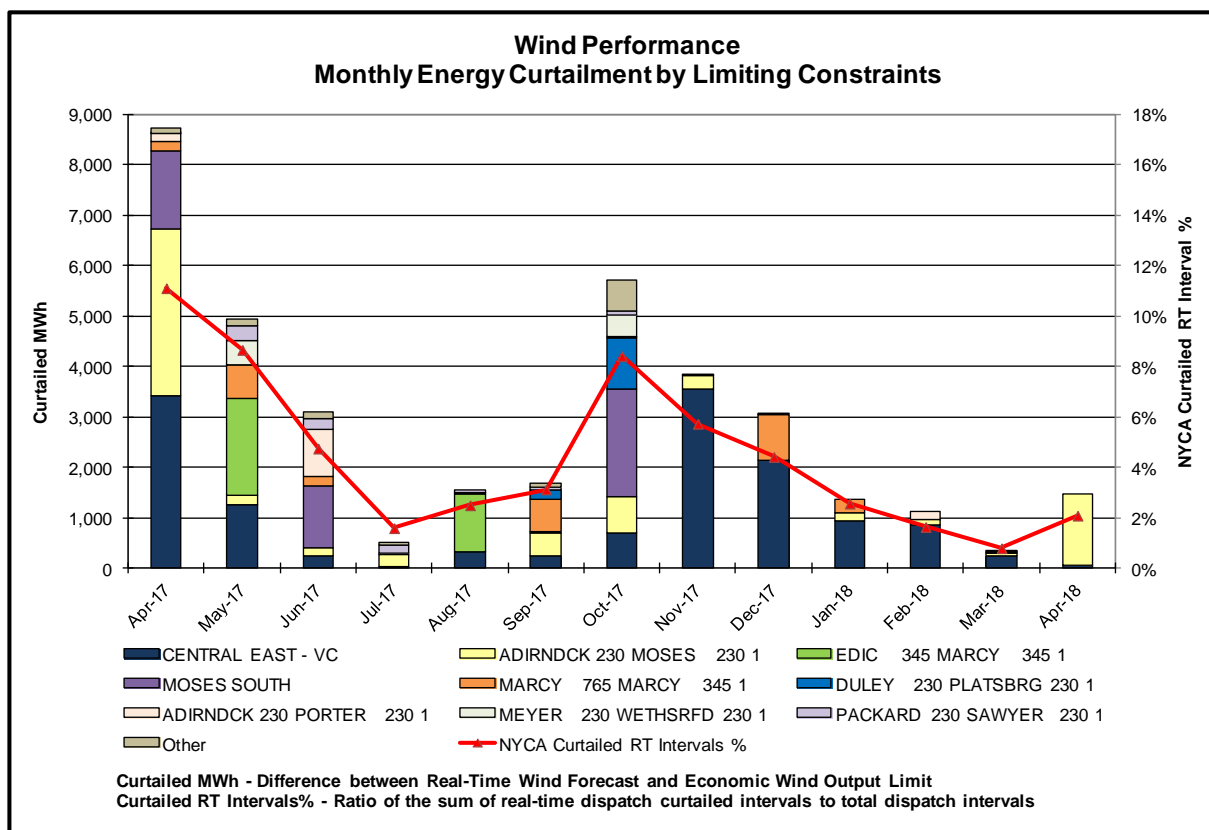
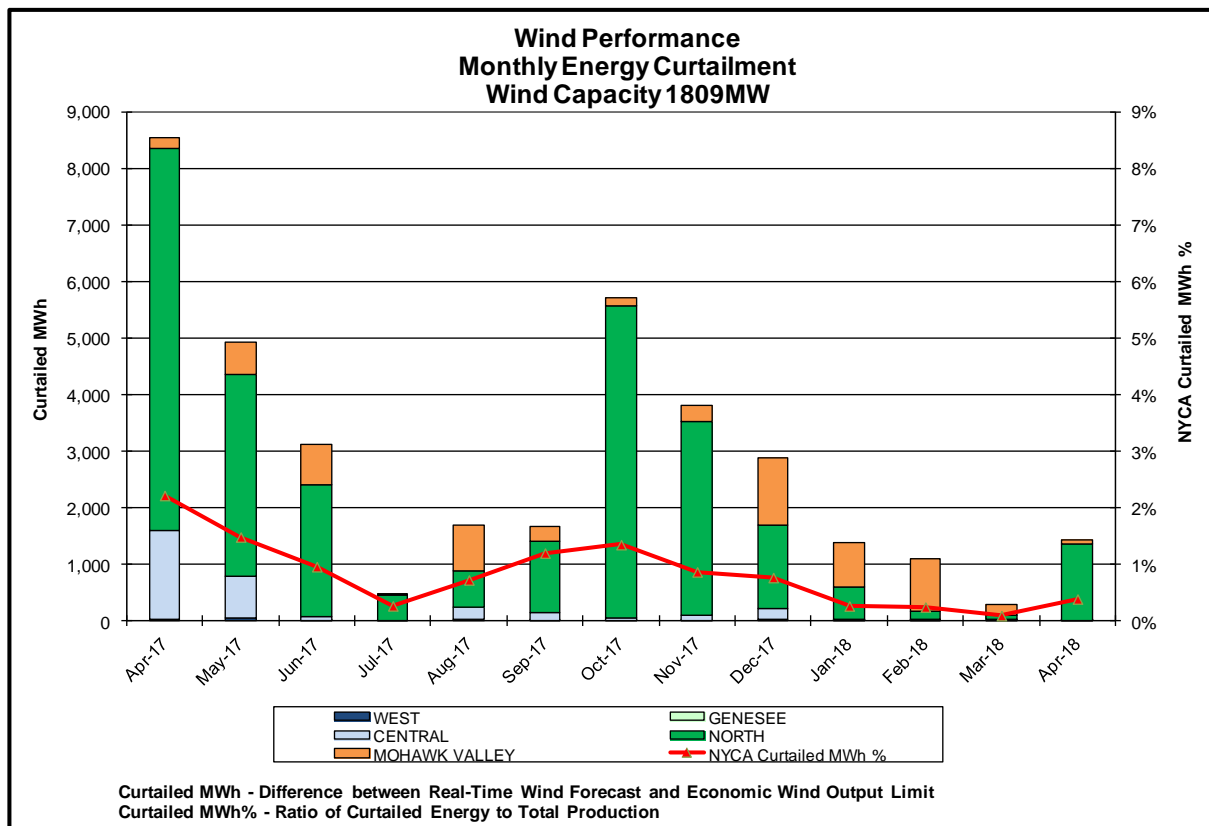
### Wind Forecast Performance Hour Ahead Percent Error Wind Capacity 1809MW



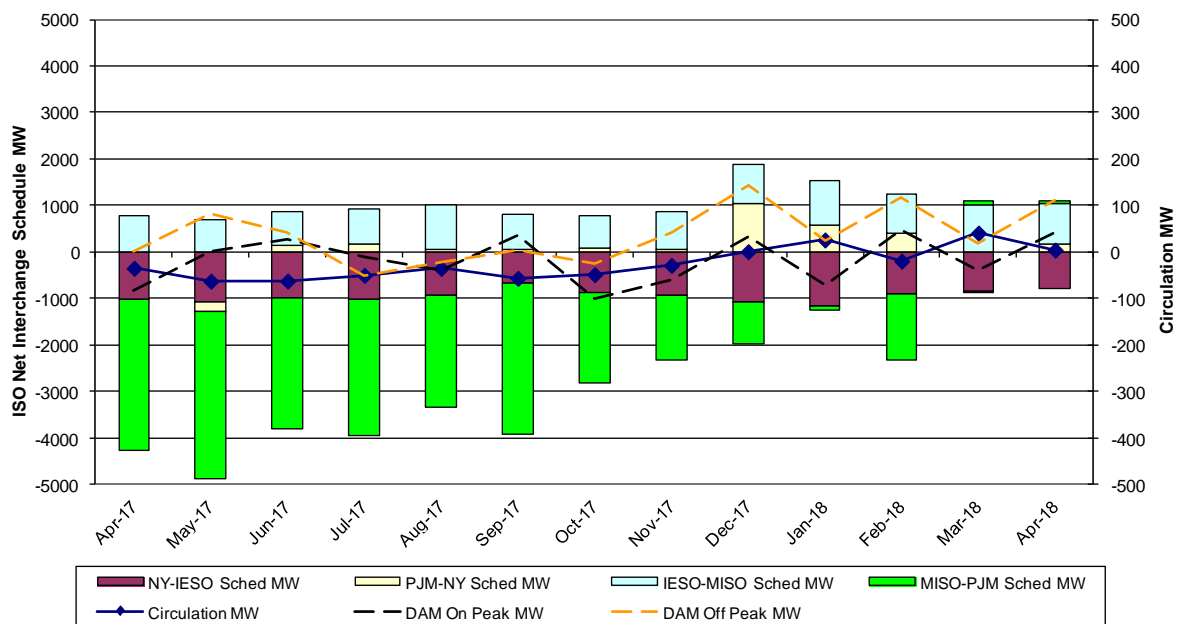
**MAE Forecast** - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity  
**MAE Persistence** - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity  
**Bias** - Avg (actual wind generation - hour ahead forecast wind generation) / Wind Capacity





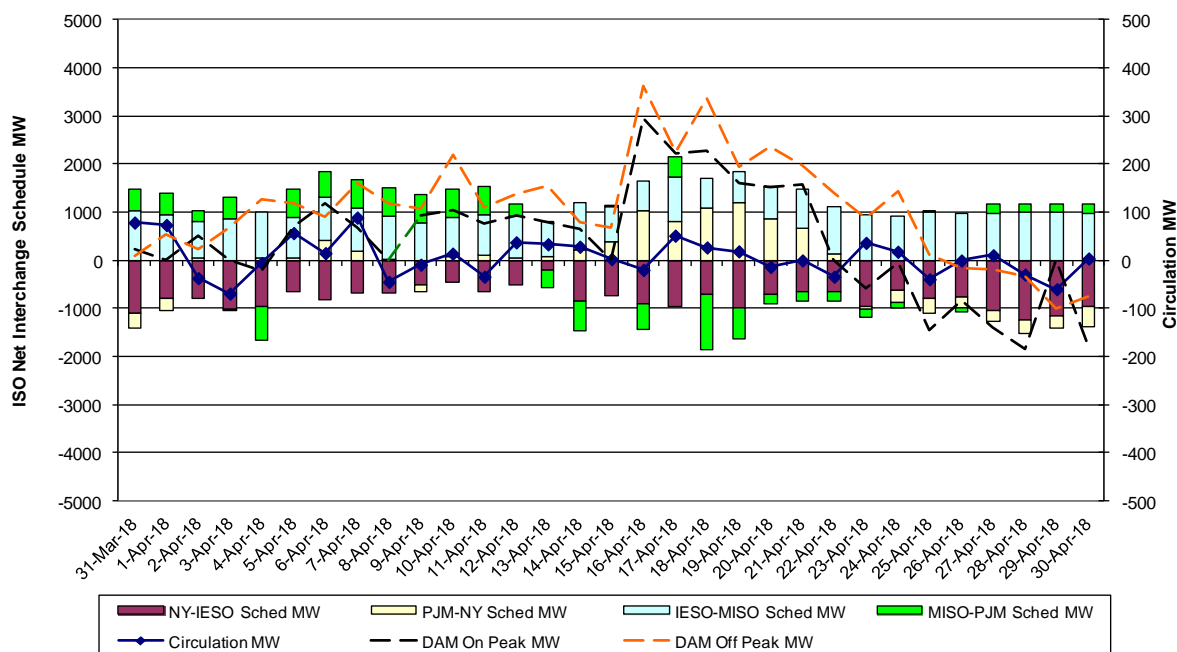


**Lake Erie Circulation and ISO Net Interchange Schedules  
Monthly Averages**



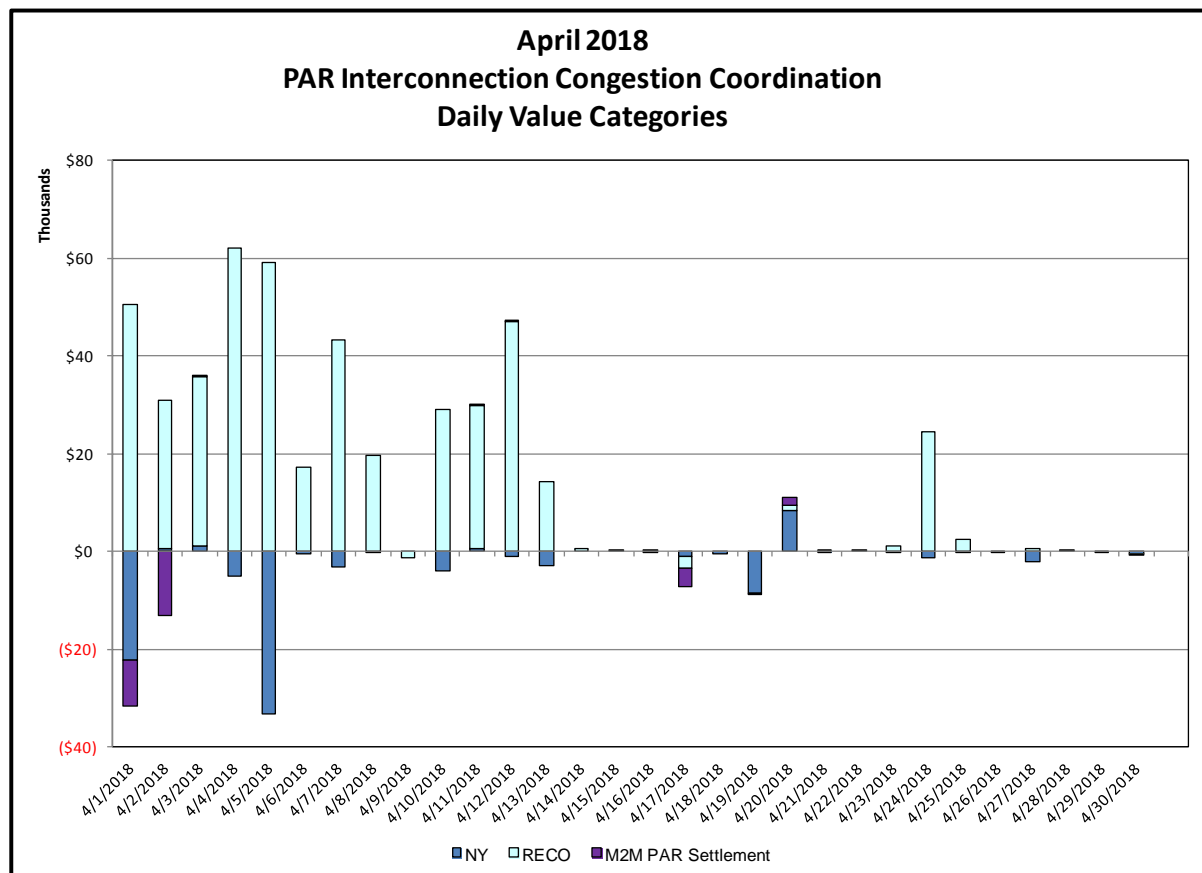
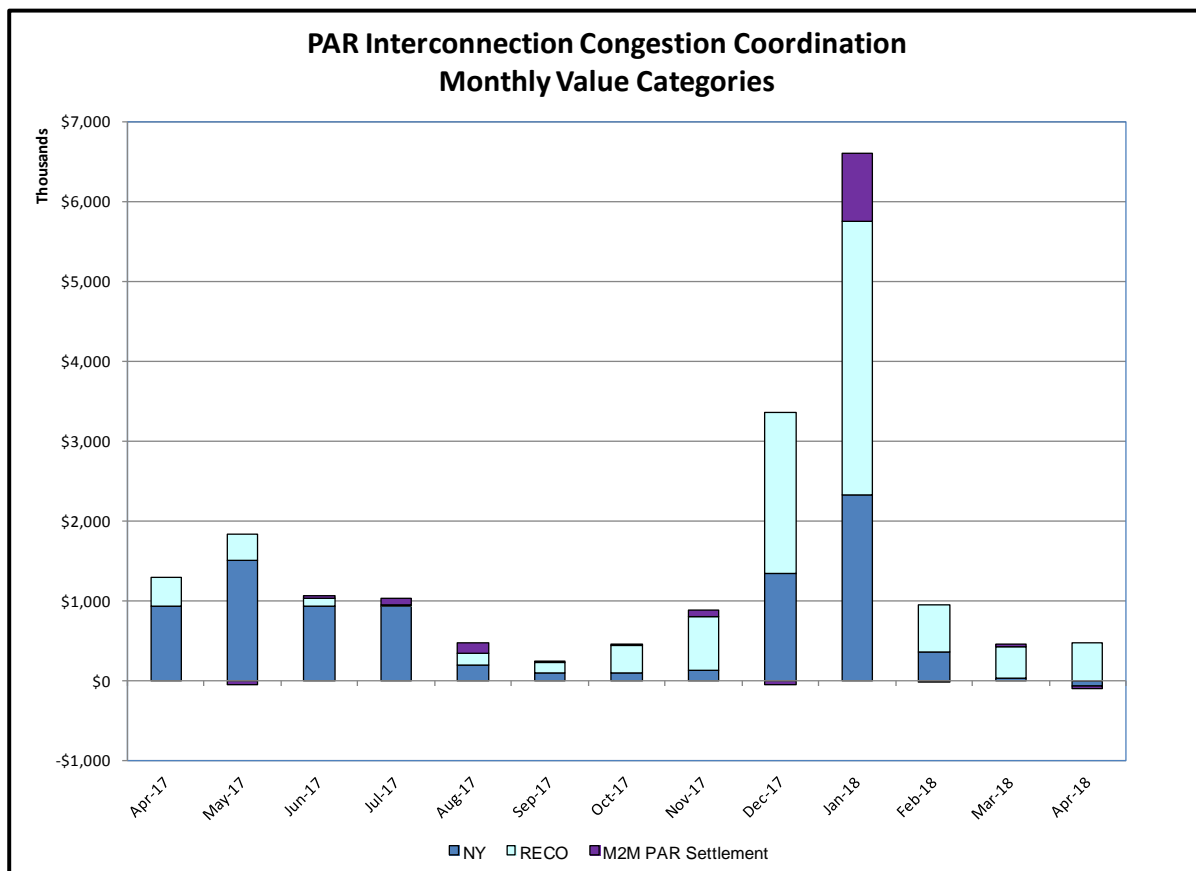
Interchange schedules with positive values aggravate clockwise Lake Erie Circulation.

**Lake Erie Circulation and ISO Net Interchange Schedules  
Daily Averages**



Interchange schedules with positive values aggravate clockwise Lake Erie Circulation.

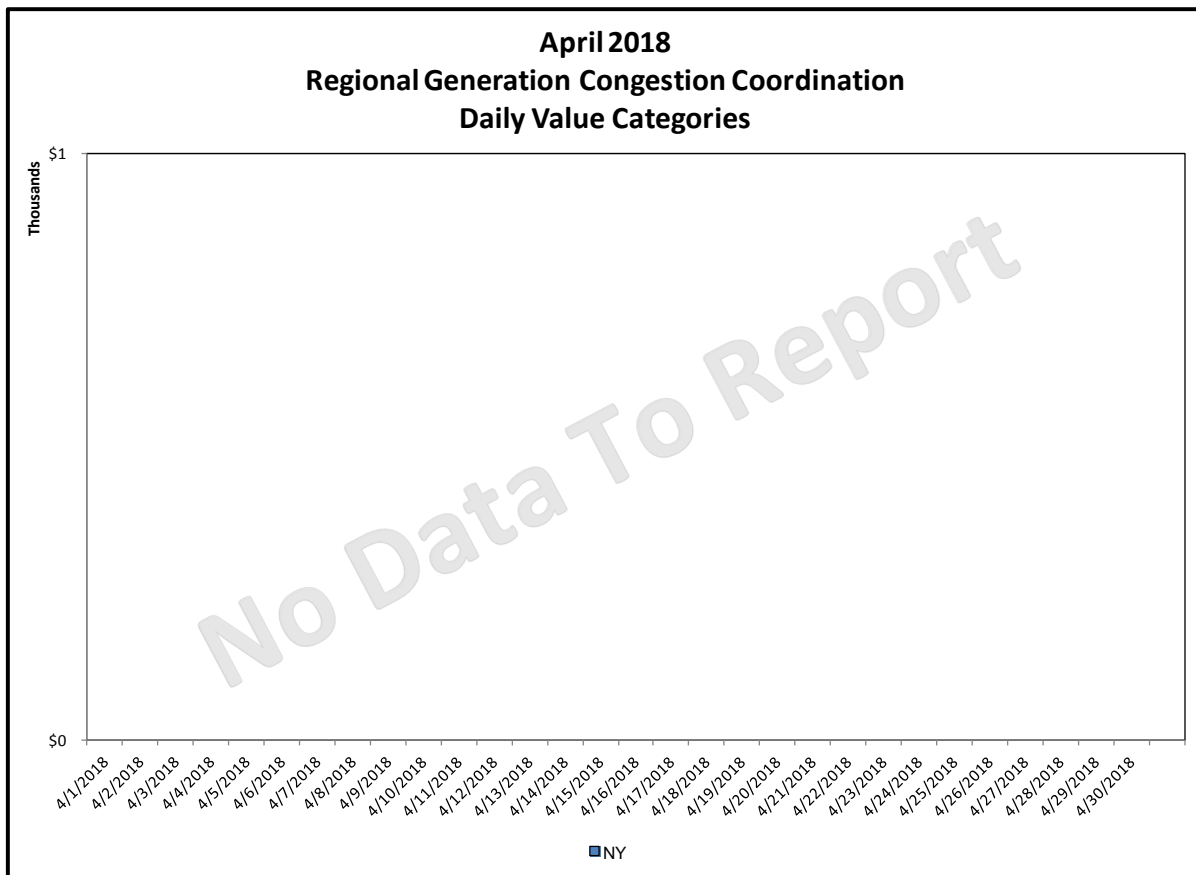
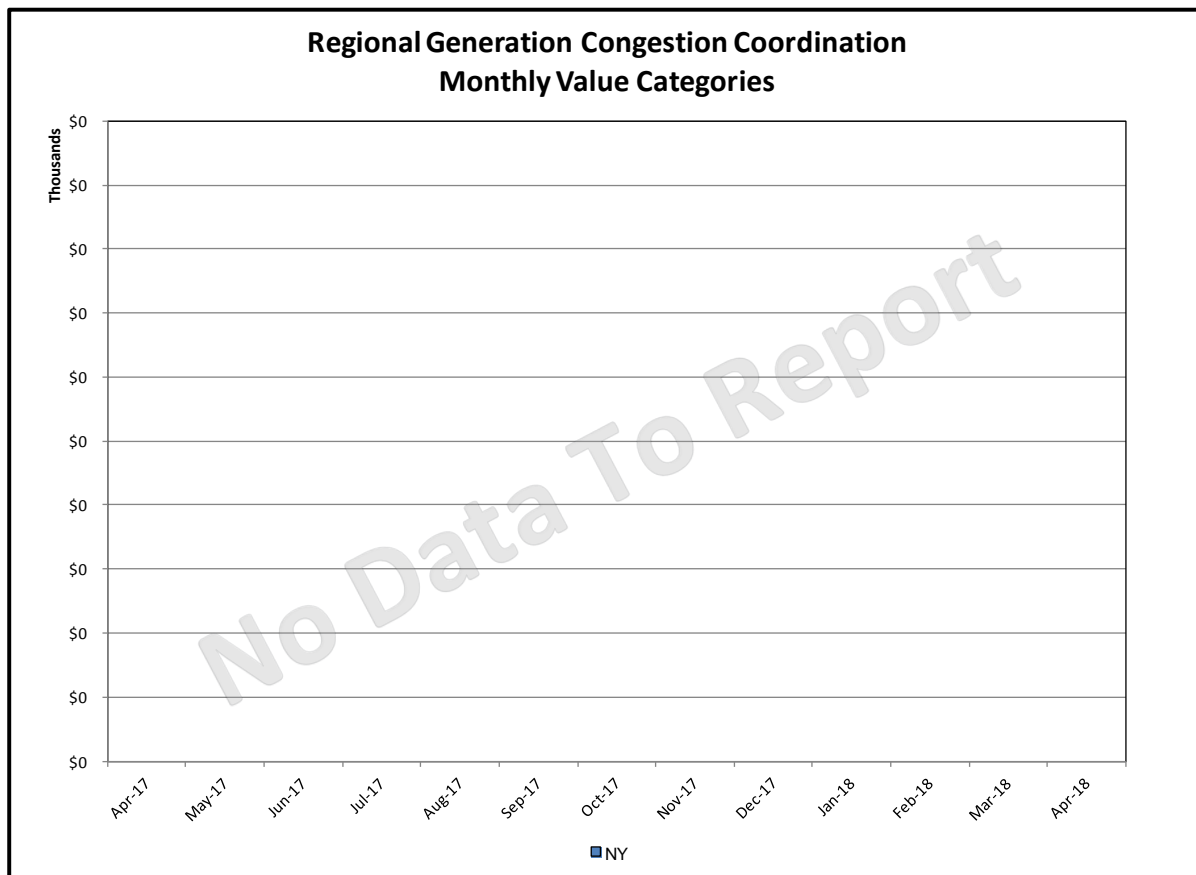
## Broader Regional Market Performance Metrics



### PAR Interconnection Congestion Coordination

<u>Category</u>	<u>Description</u>
NY	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
RECO	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.
M2M PAR Settlement	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.





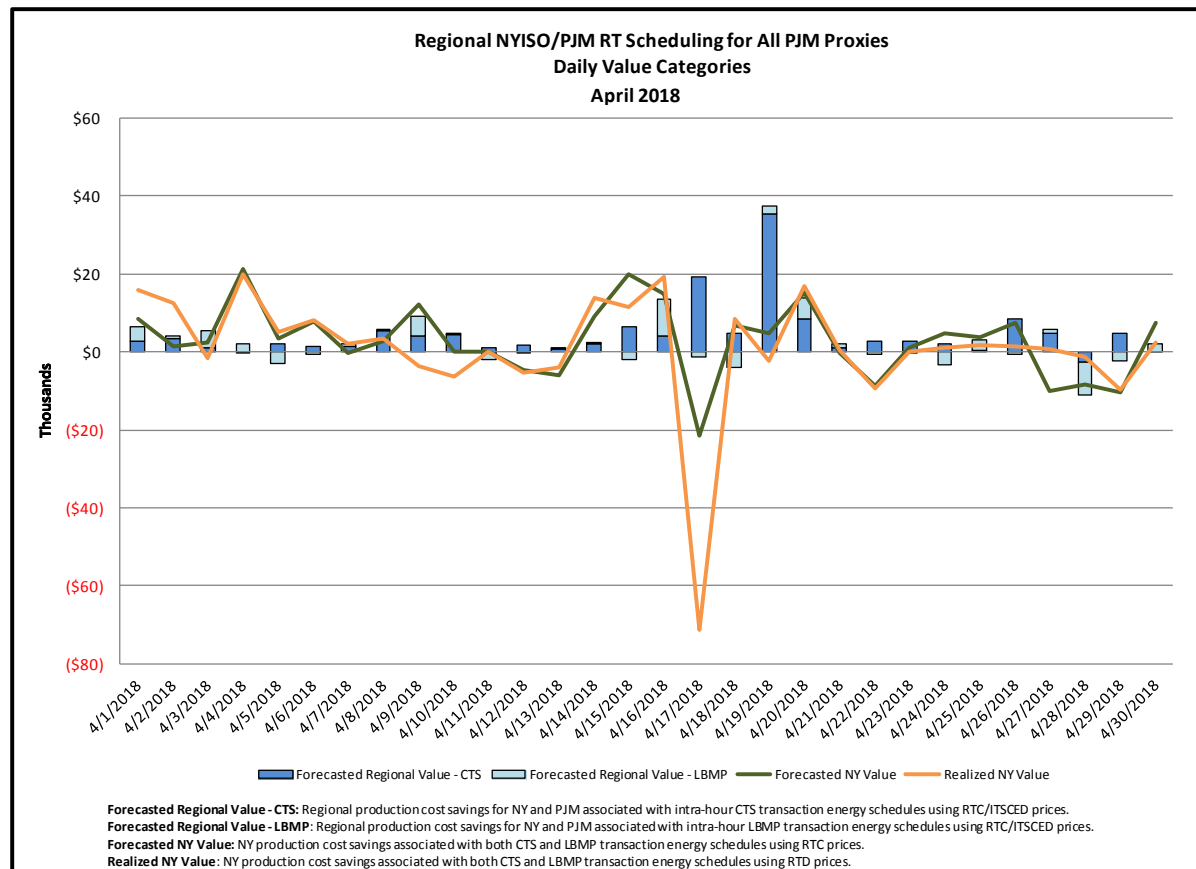
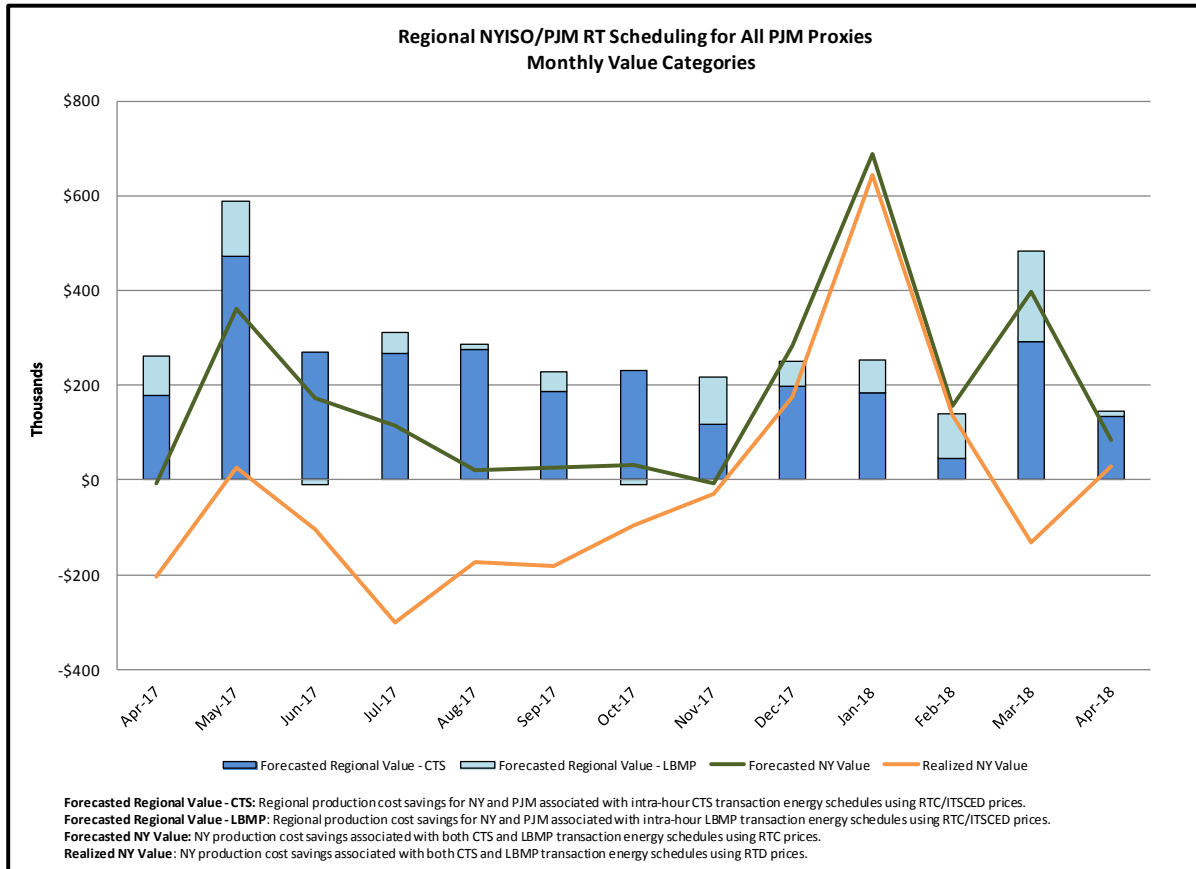
### Regional Generation Congestion Coordination

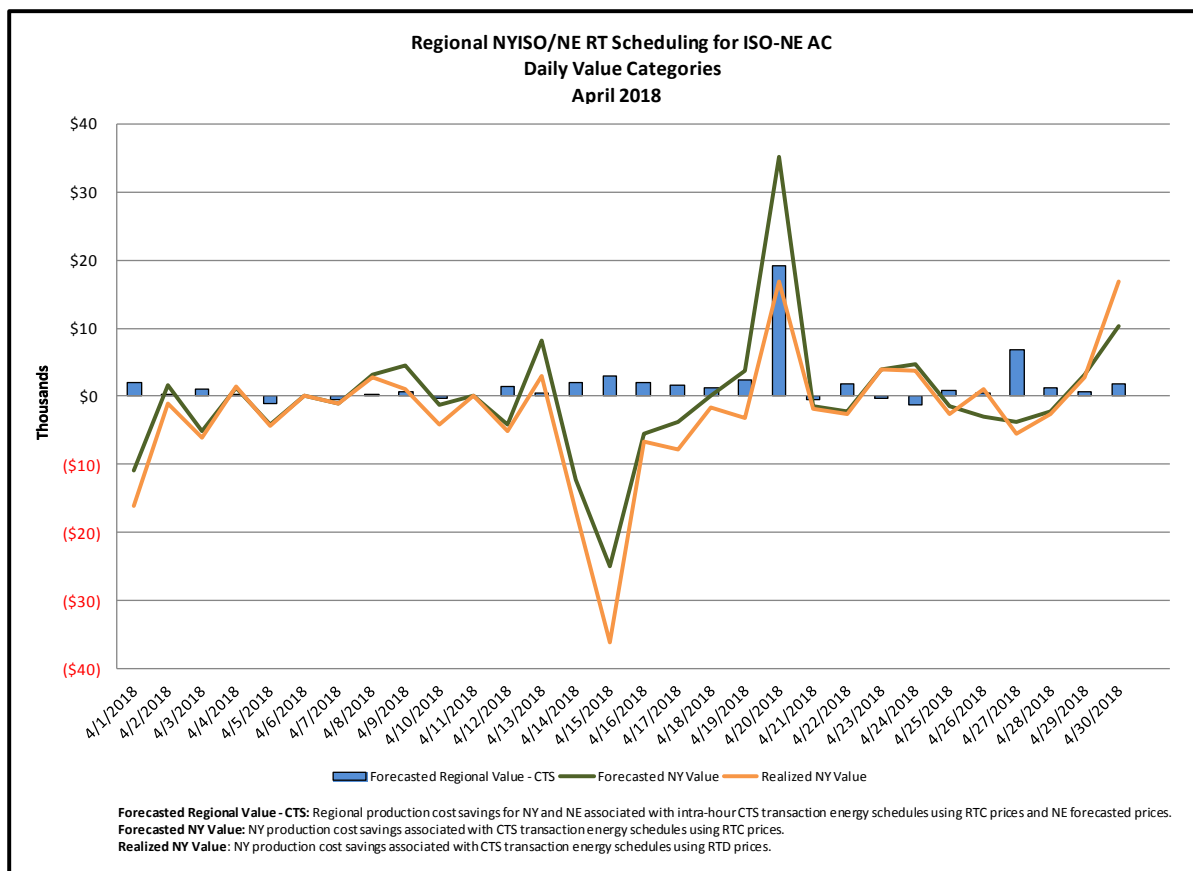
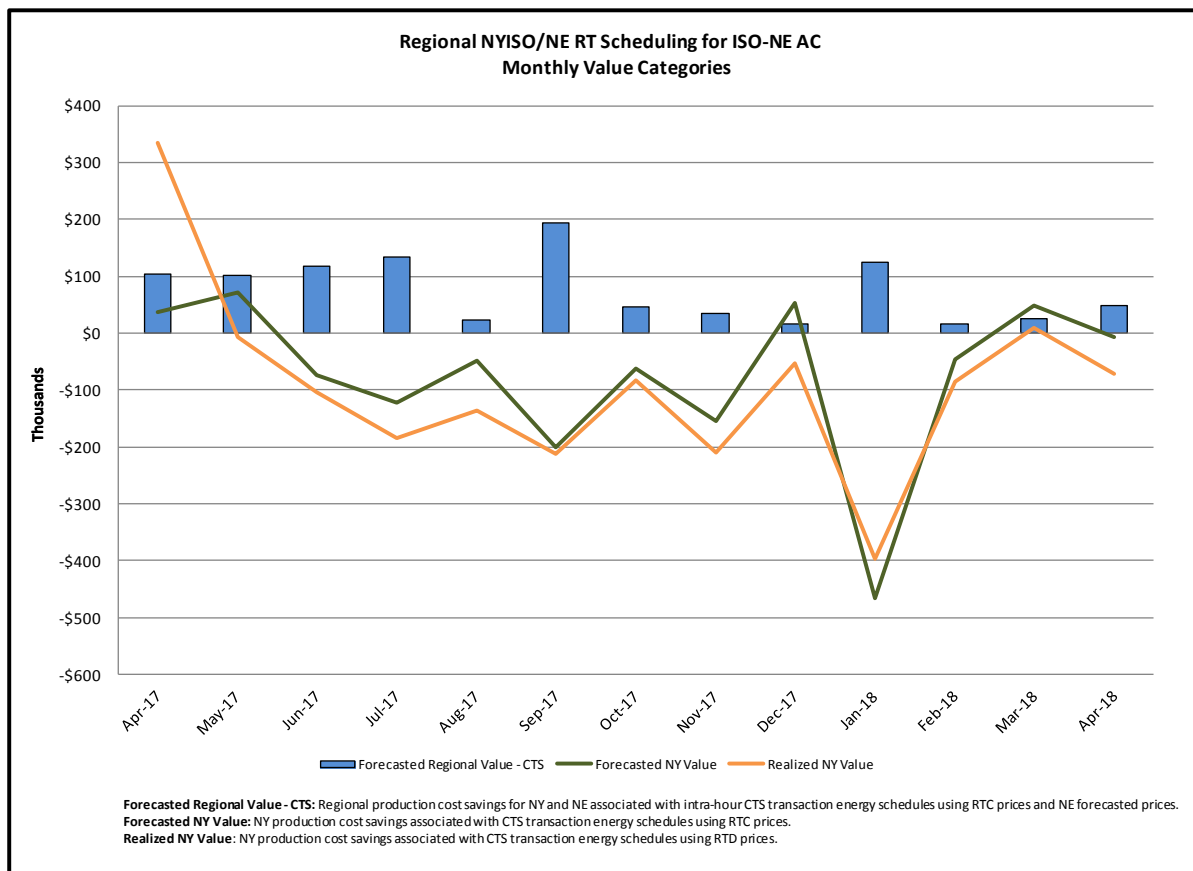
#### Category

NY

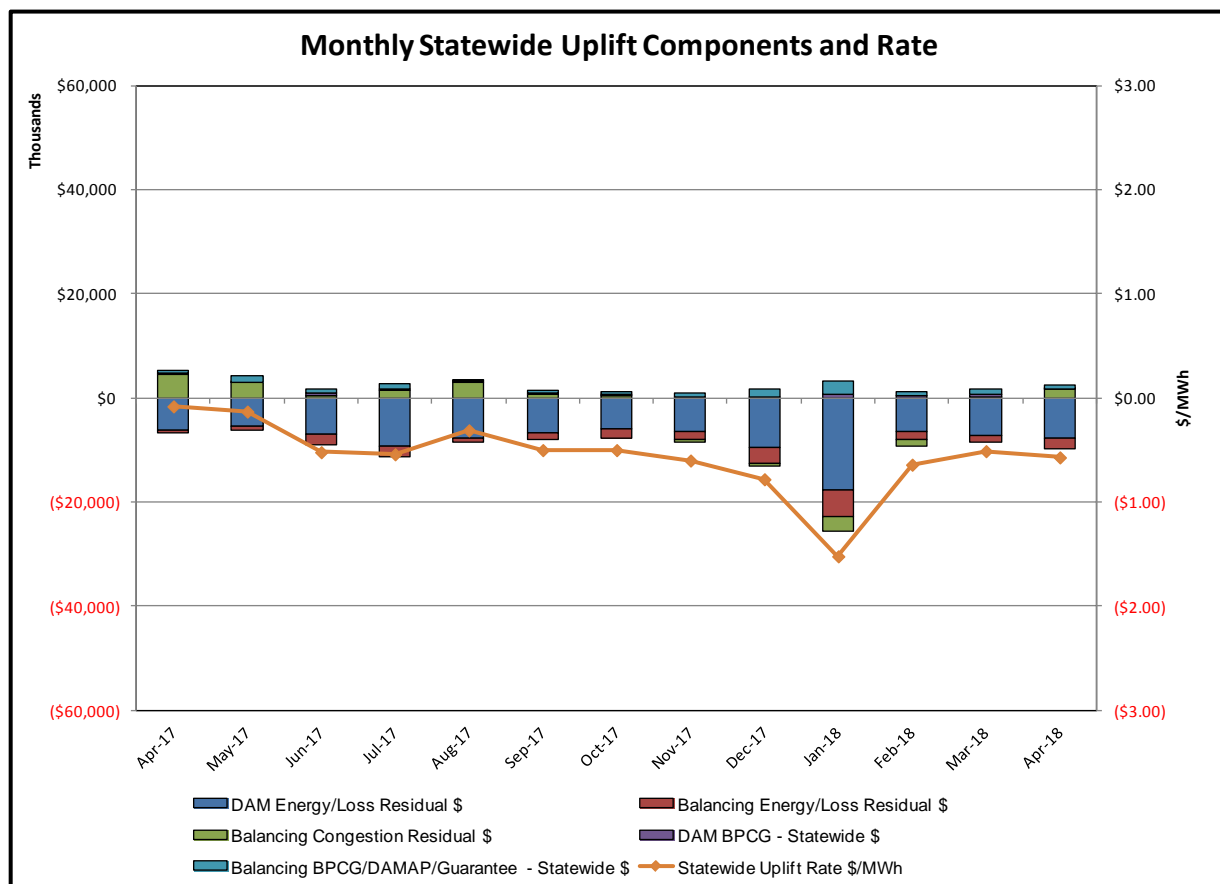
#### Description

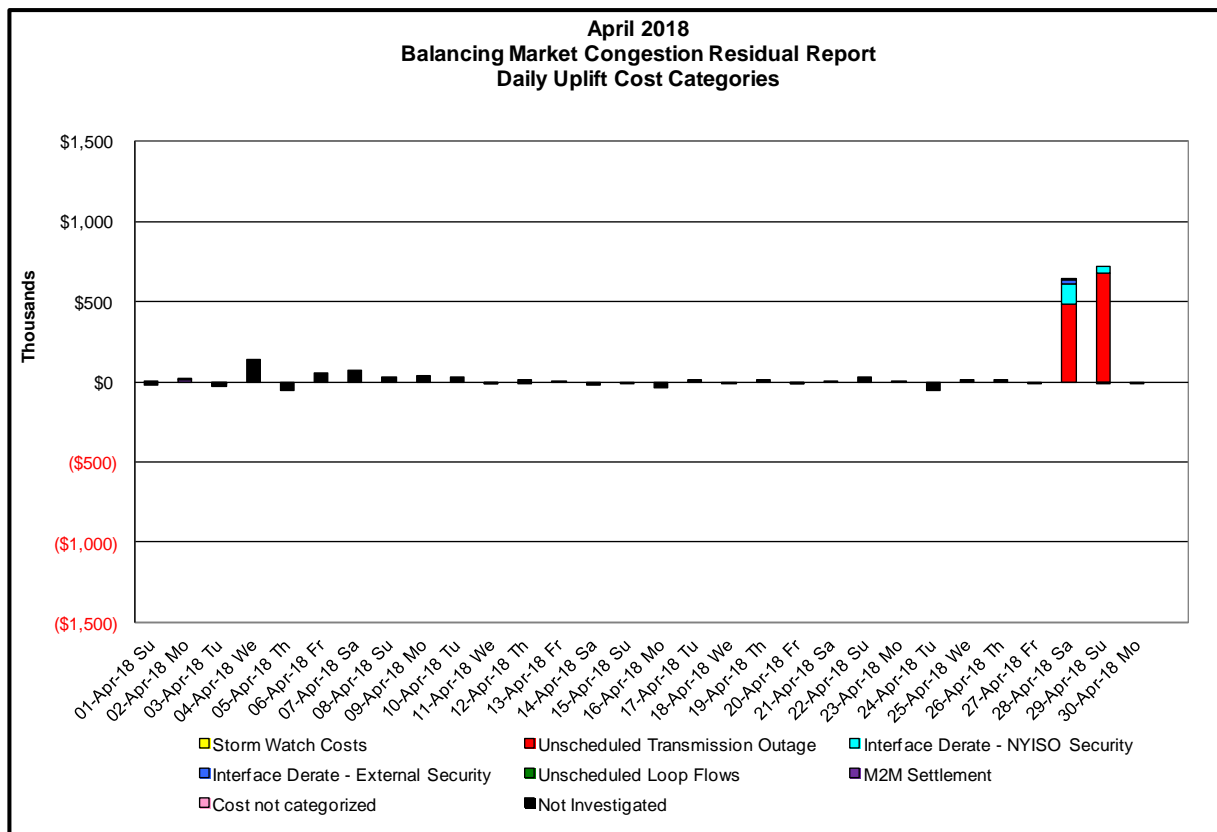
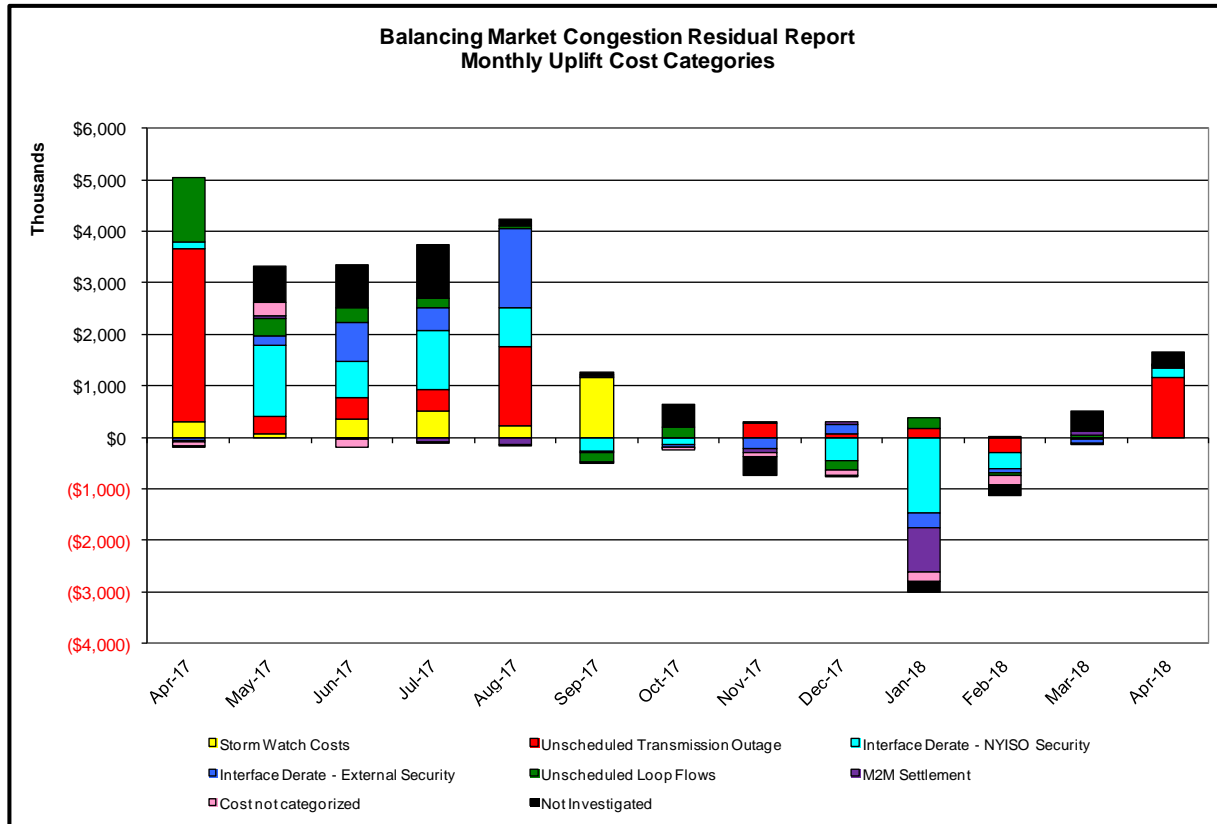
NYISO savings that result from PJM payments to NYISO when PJM's transmission use (PJM's market flow) is greater than PJM's entitlement of the NY transmission system and NYISO is incurring Western or Central NY congestion. Additionally, NYISO savings may result from the more efficient regional utilization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





## Market Performance Metrics





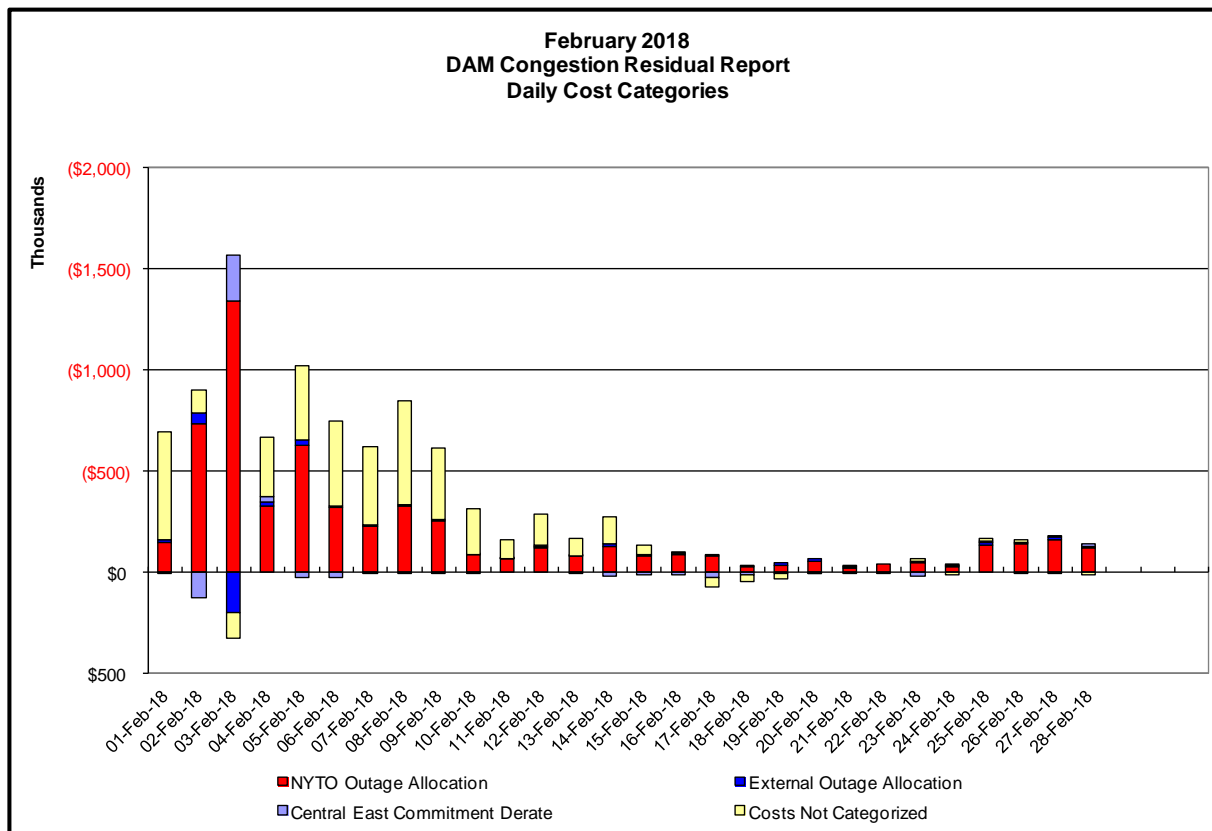
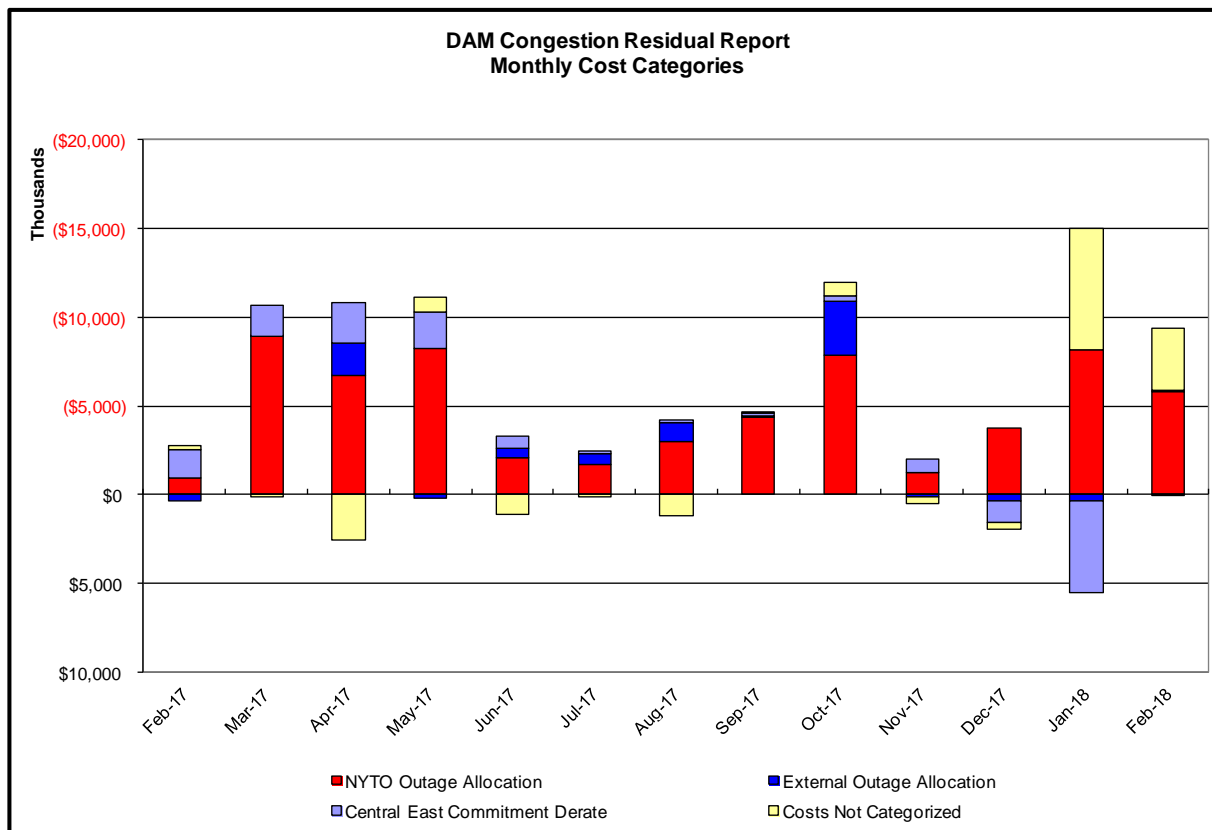
Day's investigated in April: 28,29			
Event	Date (yyyymmdd)	Hours	Description
	4/28/2018	8-12,15-23	Forced Outaged Sprainbrook-East Garden City 345kV (#Y49)
	4/28/2018	0	NYCA DNI Ramp Limit
	4/28/2018	1	Derate Dunwoodie-Shore Rd 345kV (#Y50) for I/o SCB:SPBK(RNS2):Y49&M29&Y49_ST
	4/28/2018	1	Derate Dunwoodie-Shore Rd 345kV (#Y50) for I/o SPRNBRK_-EGRDNCTR_345_Y49
	4/28/2018	8-12,15-17,22	Derate East 179th St - Hellgate East138kV (#15053)
	4/28/2018	8-12,15-17	Derate East 179th St - Hellgate West 138kV (#15055)
	4/28/2018	22,23	NE_NNC1385 Scheduling Limit
	4/29/2018	6-23	Forced Outaged Sprainbrook-East Garden City 345kV (#Y49)
	4/29/2018	22	NYCA DNI Ramp Limit

### **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**

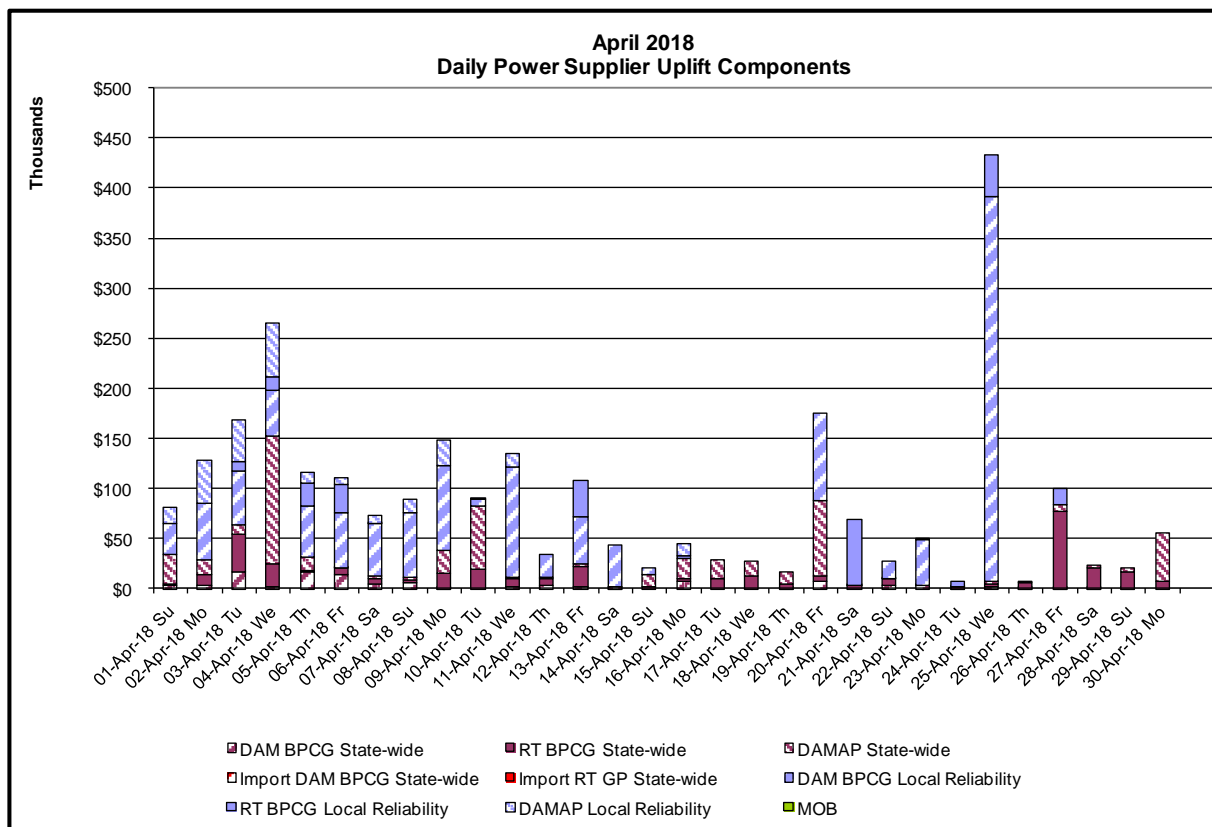
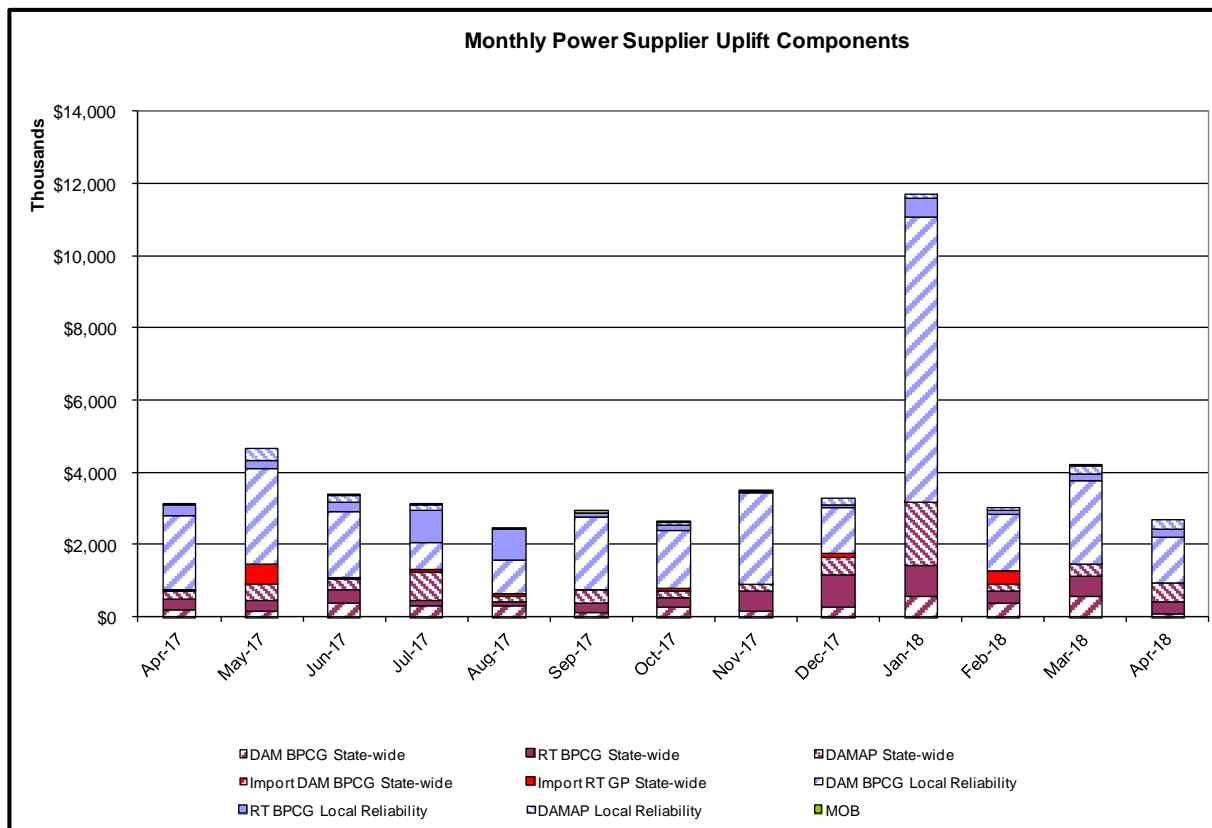
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

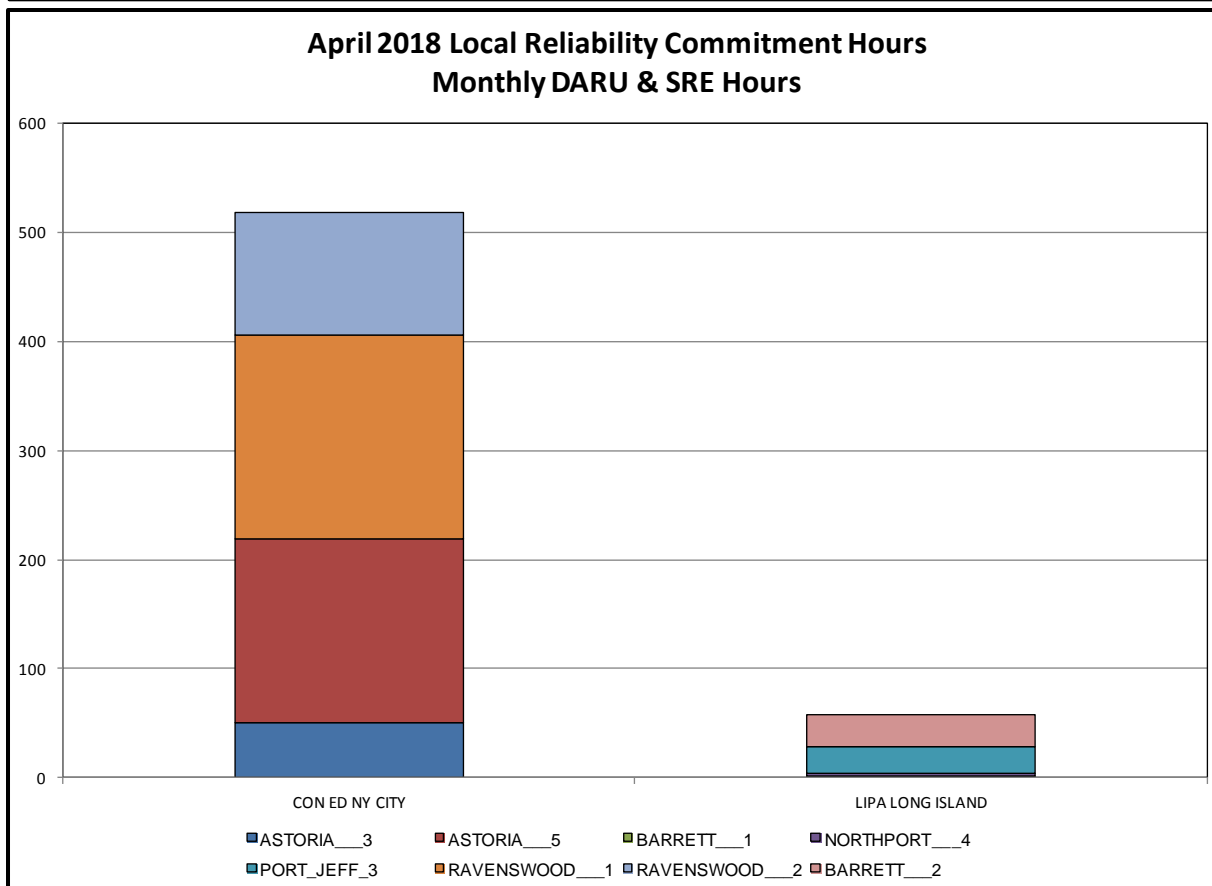
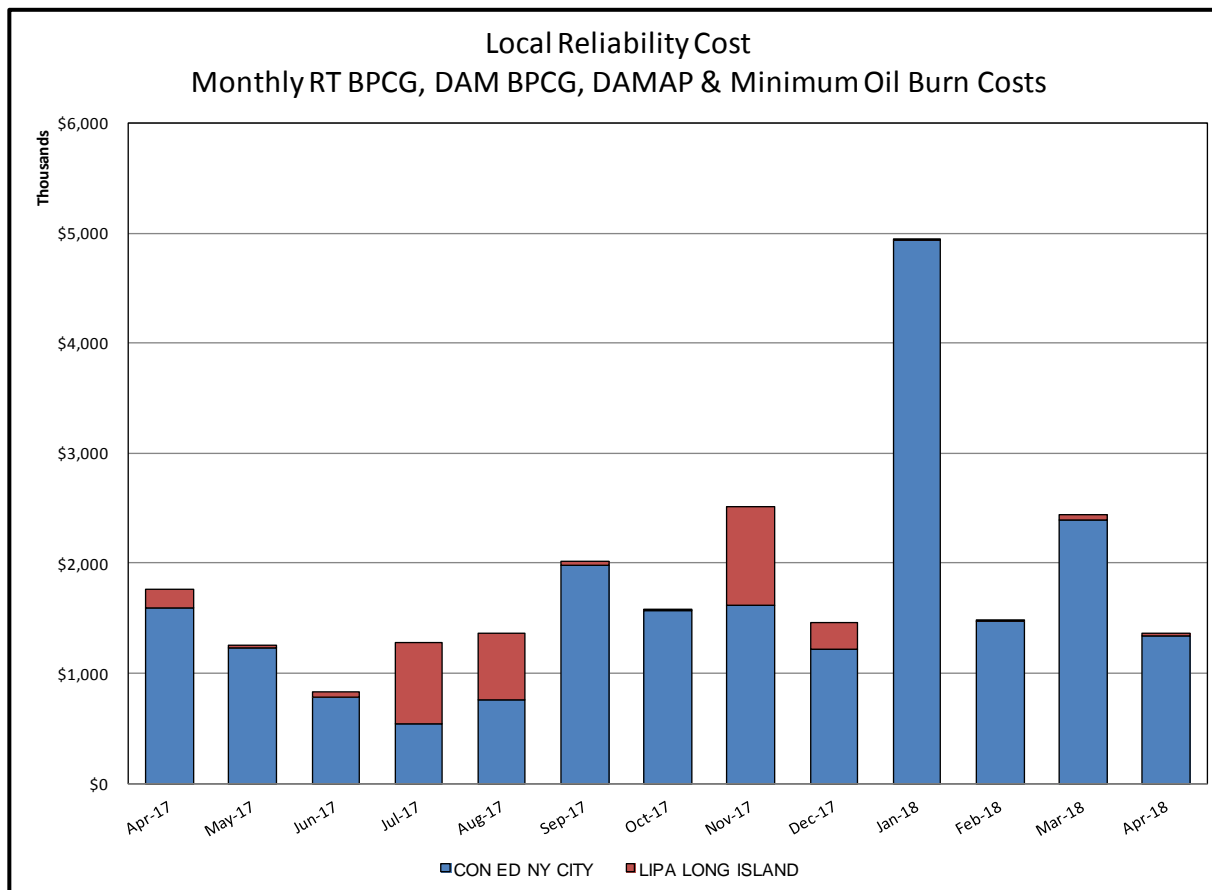


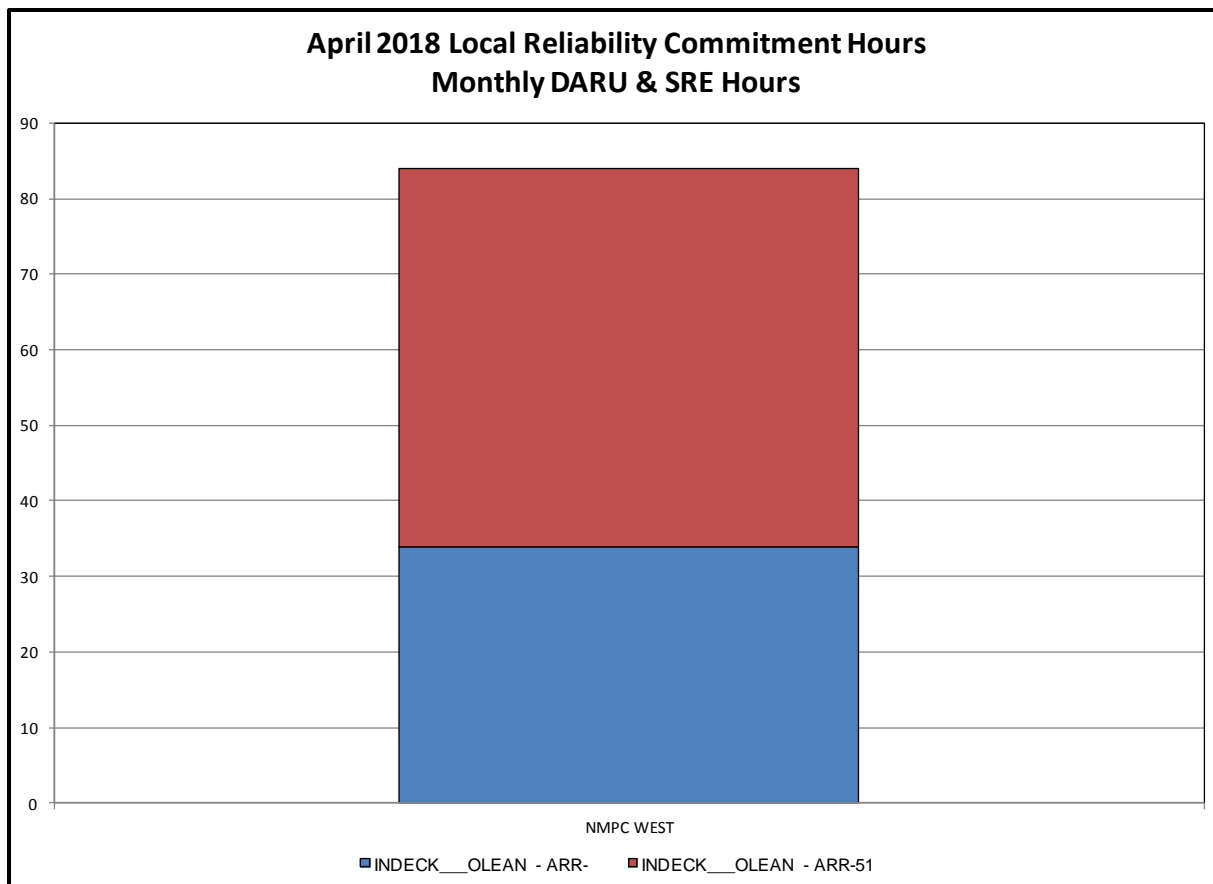
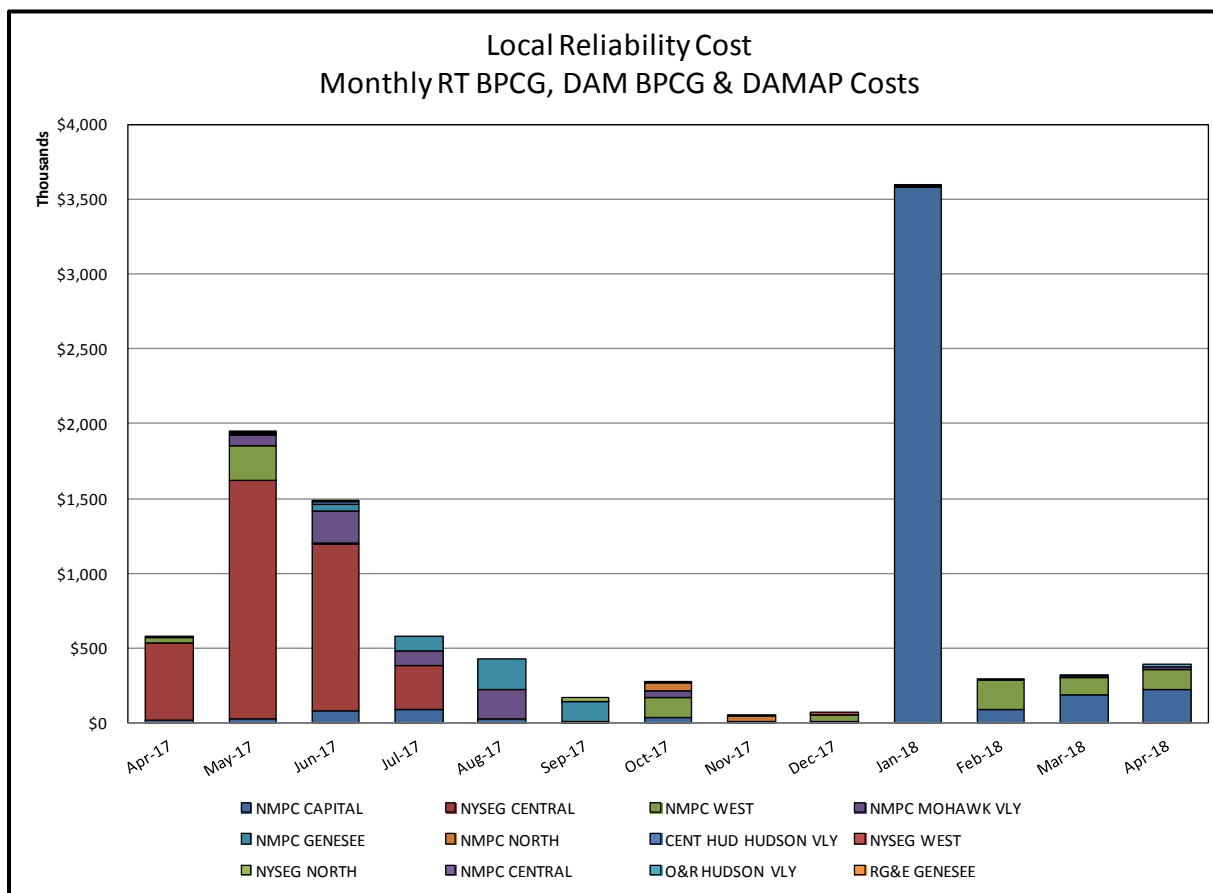


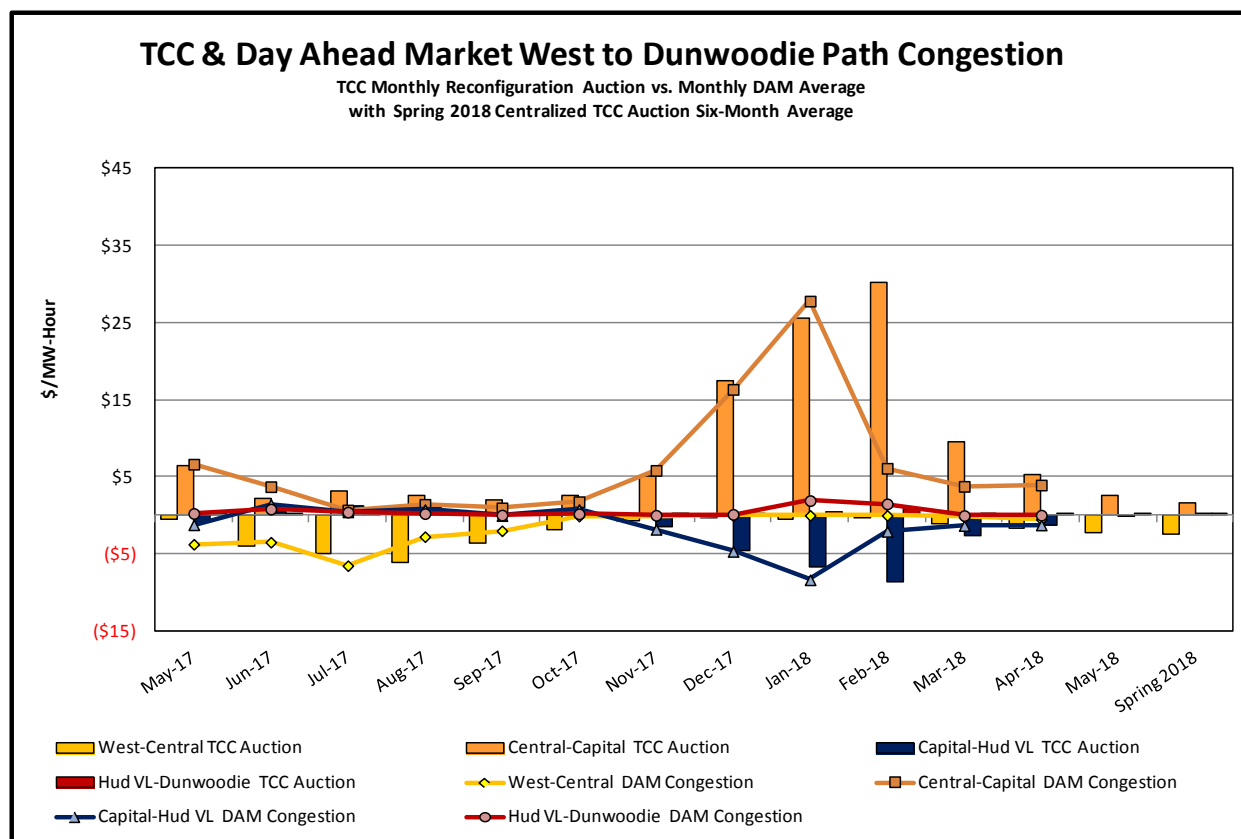
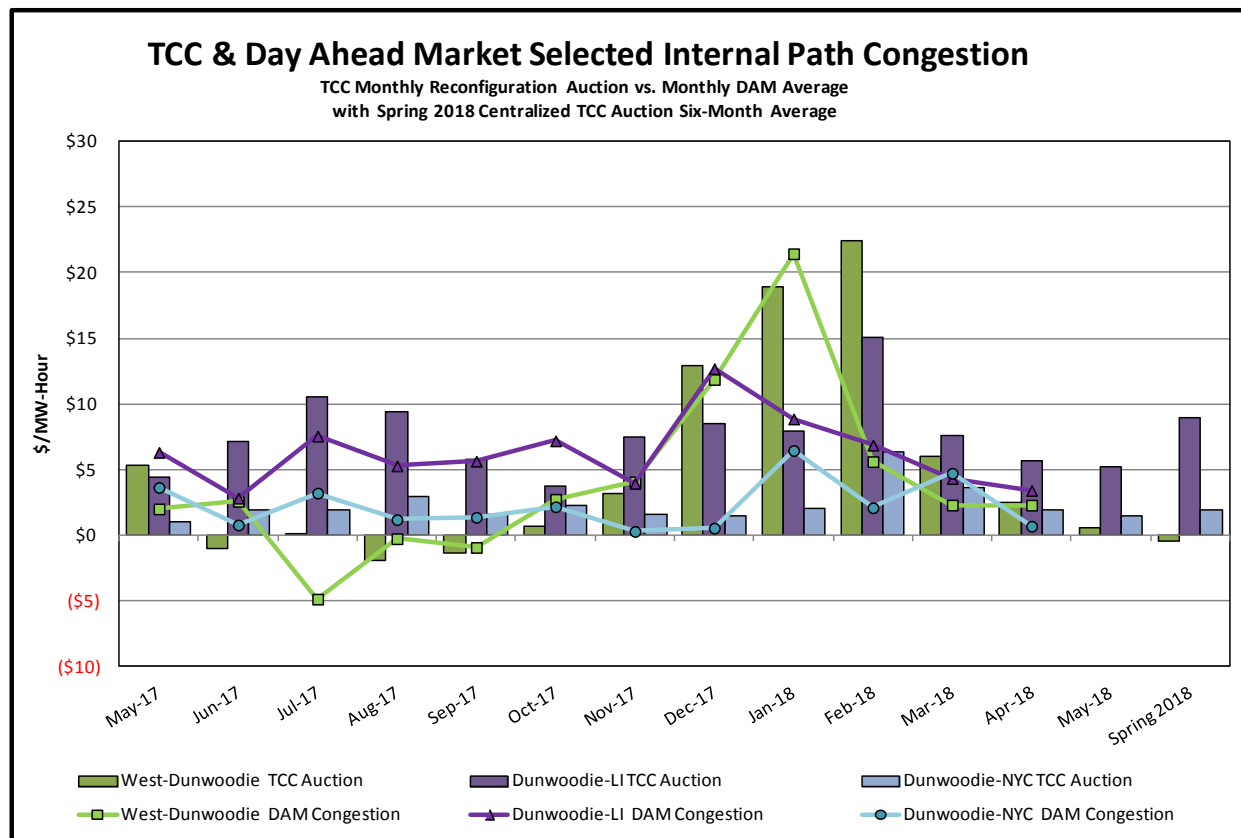
### Day-Ahead Market Congestion Residual Categories

<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.	



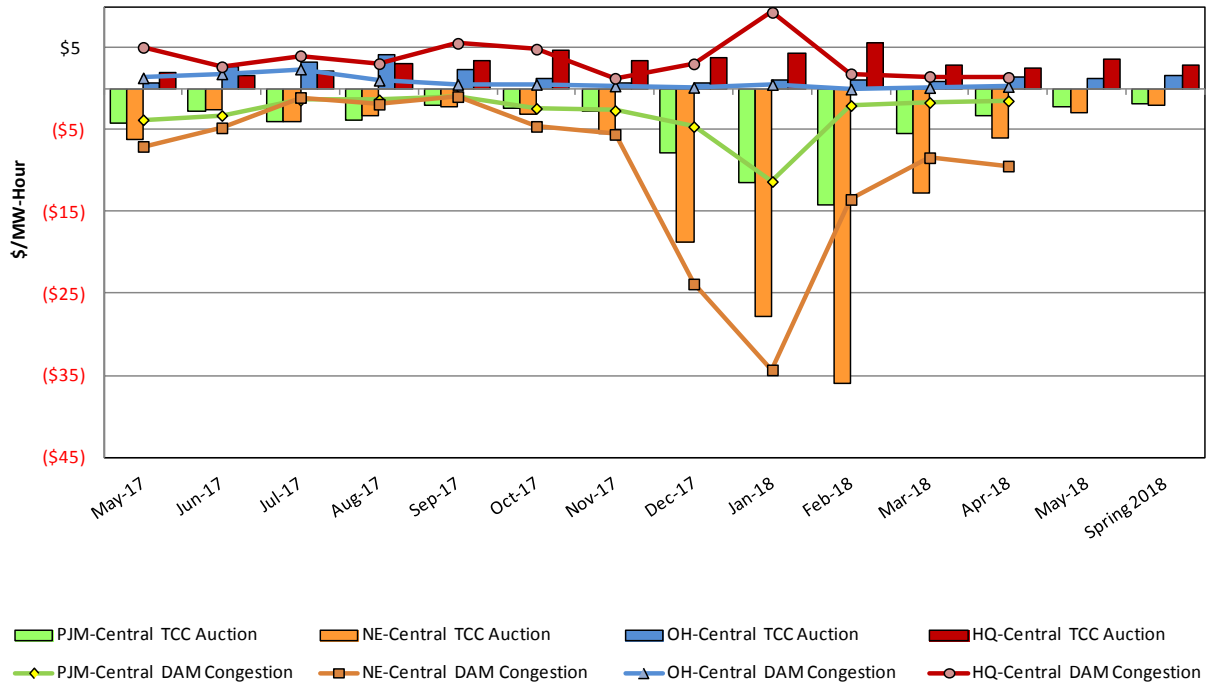


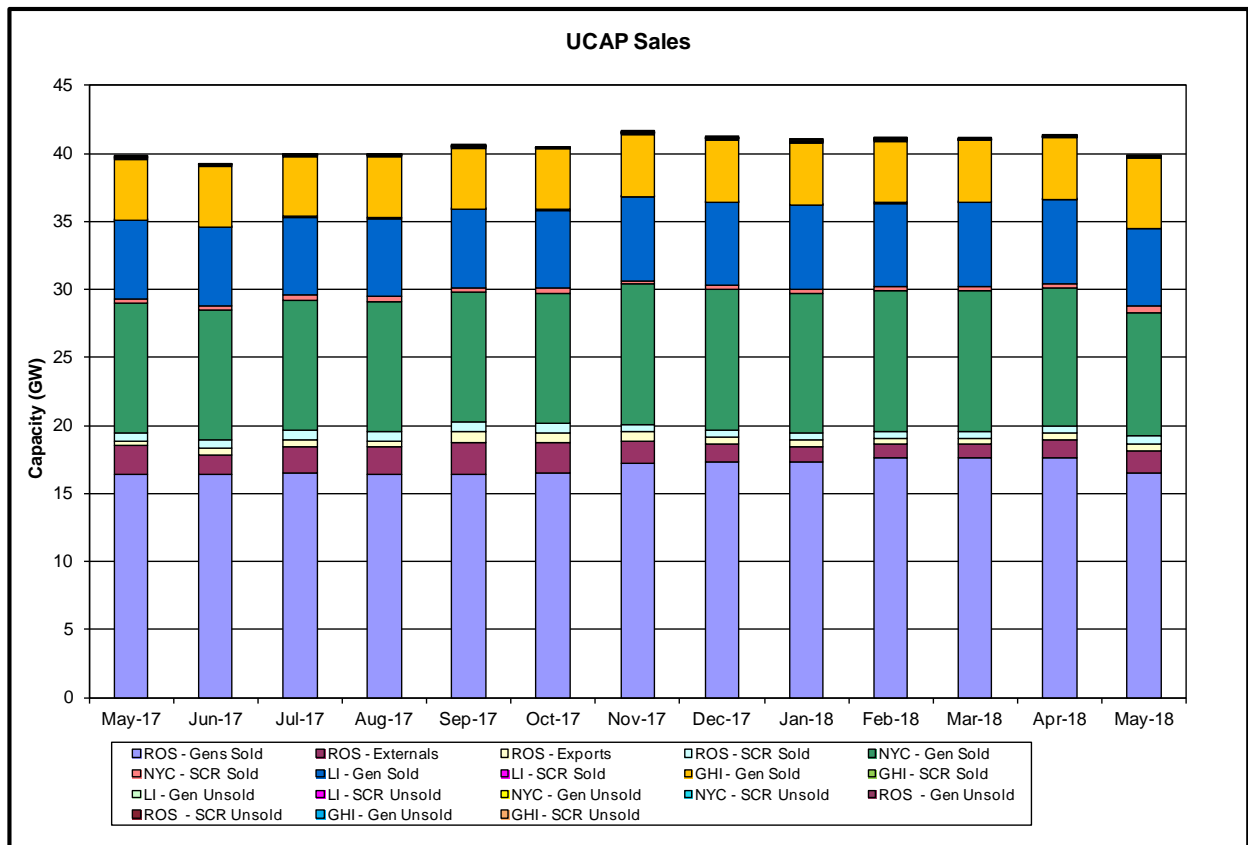
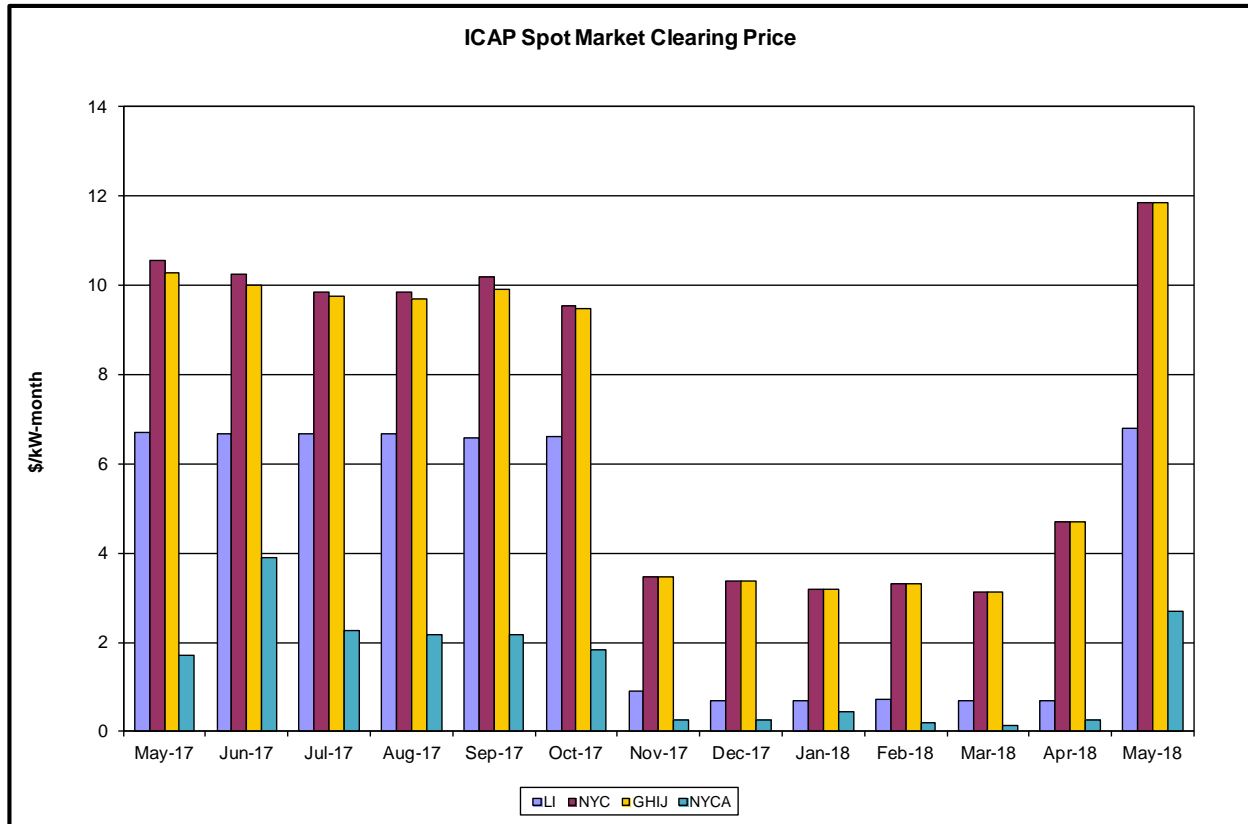




## TCC & Day Ahead Market Selected External Path Congestion

TCC Monthly Reconfiguration Auction vs. Monthly DAM Average  
with Spring 2018 Centralized TCC Auction Six-Month Average





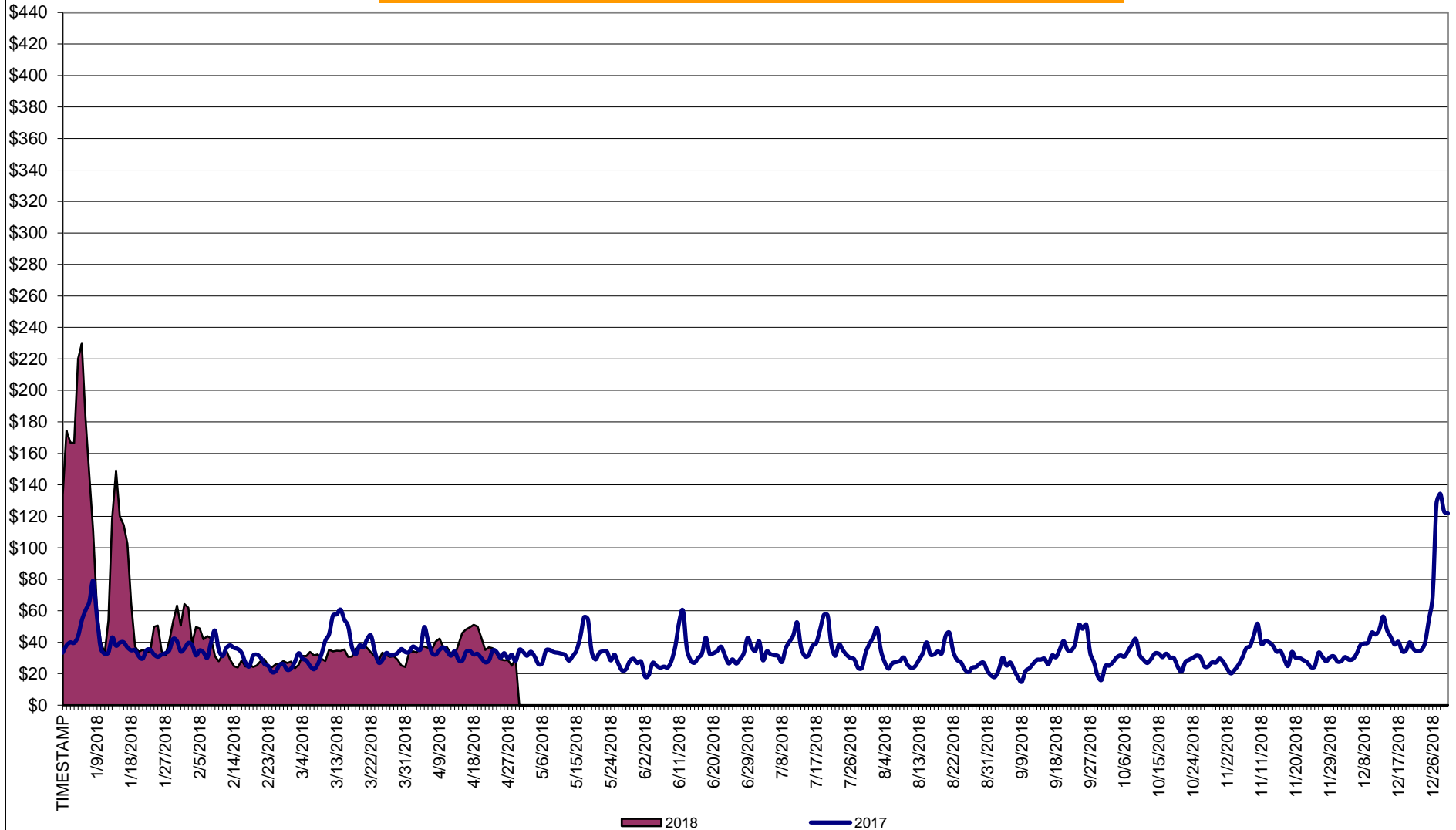
# Market Performance Highlights

## April 2018

- LBMP for April is \$35.00/MWh; higher than \$29.91/MWh in March 2018 and \$31.06/MWh in April 2017.
  - Day Ahead and Real Time Load Weighted LBMPs are higher compared to March.
- April 2018 average year-to-date monthly cost of \$54.82/MWh is a 48% increase from \$37.05/MWh in April 2017.
- Average daily sendout is 390 GWh/day in April; lower than 413 GWh/day in March 2018 and higher than 377 GWh/day in April 2017.
- Natural gas prices were lower and distillate prices were higher compared to the previous month.
  - Natural Gas (Transco Z6 NY) was \$2.79/MMBtu, down from \$2.85/MMBtu in March.
  - Natural gas prices are down 0.9% year-over-year.
  - Jet Kerosene Gulf Coast was \$14.94/MMBtu, up from \$13.76/MMBtu in March.
  - Ultra Low Sulfur No.2 Diesel NY Harbor was \$14.85/MMBtu, up from \$13.78/MMBtu in March.
  - Distillate prices are up 32.6% year-over-year.
- Uplift per MWh is lower compared to the previous month.
  - Uplift (not including NYISO cost of operations) is (\$0.45)/MWh; lower than (\$0.31)/MWh in March.
    - Local Reliability Share is \$0.12/MWh, lower than \$0.19/MWh in March.
    - Statewide Share is (\$0.57)/MWh, lower than (\$0.51)/MWh in March.
  - TSA \$ per NYC MWh is \$0.00/MWh.
  - Total uplift costs (Schedule 1 components including NYISO Cost of Operations) are lower than March.



**Daily NYISO Average Cost/MWh (Energy & Ancillary Services)\***  
**2017 Annual Average \$36.56/MWh**  
**April 2017 YTD Average \$37.36/MWh**  
**April 2018 YTD Average \$54.82/MWh**



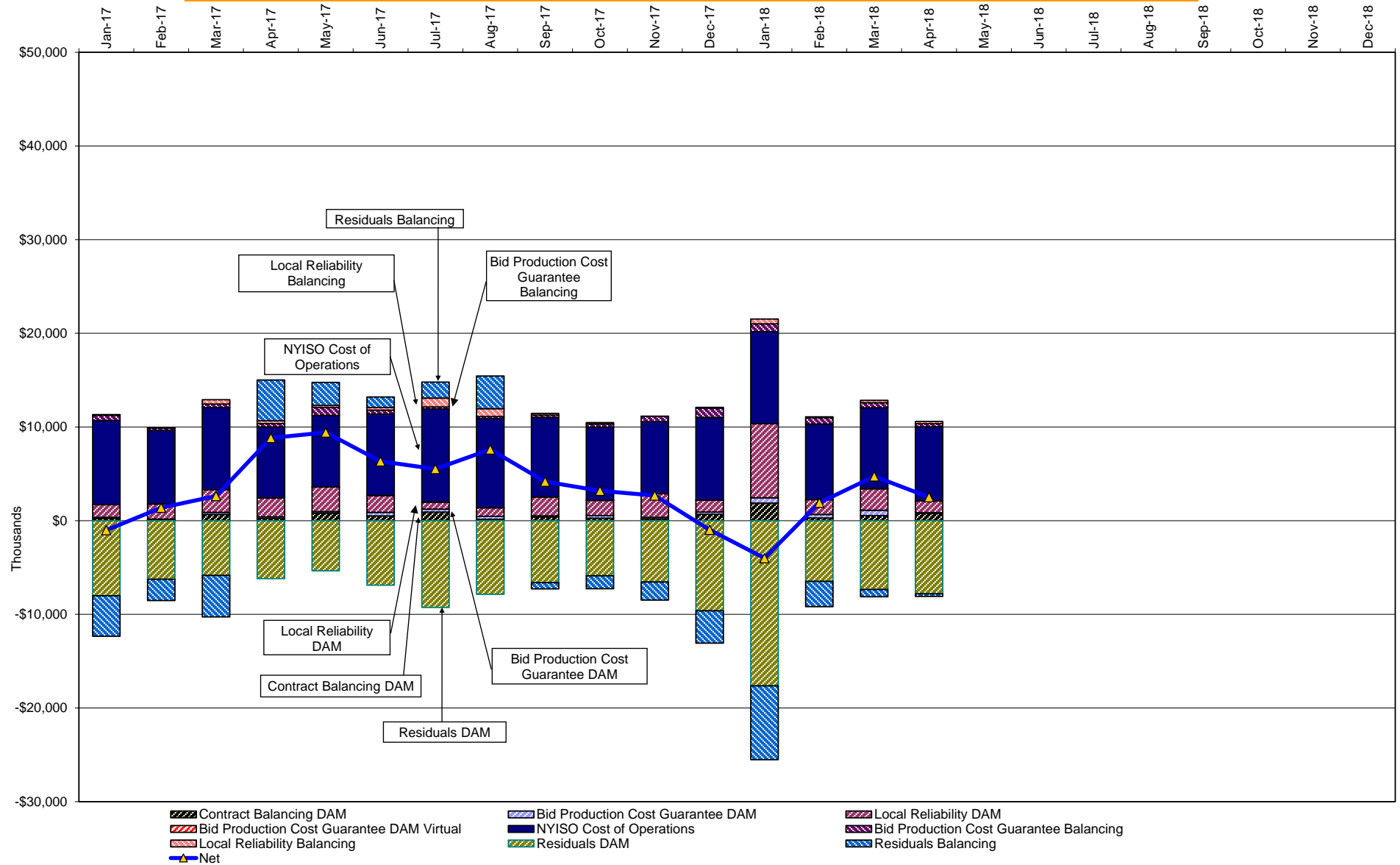
\* Excludes ICAP payments.

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

<b>2018</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	99.55	33.83	29.91	35.00								
NTAC	0.71	0.58	0.88	1.09								
Reserve	0.92	0.65	0.64	0.81								
Regulation	0.15	0.15	0.16	0.12								
NYISO Cost of Operations	0.65	0.65	0.66	0.65								
FERC Fee Recovery	0.08	0.10	0.09	0.10								
Uplift	(0.92)	(0.50)	(0.31)	(0.45)								
Uplift: Local Reliability Share	0.59	0.14	0.19	0.12								
Uplift: Statewide Share	(1.52)	(0.64)	(0.51)	(0.57)								
Voltage Support and Black Start	0.40	0.41	0.42	0.41								
<b>Avg Monthly Cost</b>	101.54	35.87	32.45	37.74								
 Avg YTD Cost	101.54	72.85	60.06	54.82								
 TSA \$ per NYC MWh	0.00	0.00	0.04	0.00								
 <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>	41.96	33.44	37.38	34.26	34.52	33.80	37.94	32.60	31.54	30.31	32.79	54.67
 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

\* Excludes ICAP payments.  
Market Mitigation and Analysis  
Prepared: 5/8/2018 11:54 AM

## NYISO Dollar Flows - Uplift - OATT Schedule 1 components - Data through April 30, 2018



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>2018</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><u>Day Ahead Market MWh</u></b>	15,153,751	12,643,854	13,521,386	12,158,686								
DAM LSE Internal LBMP Energy Sales	59%	57%	58%	60%								
DAM External TC LBMP Energy Sales	4%	3%	2%	2%								
DAM Bilateral - Internal Bilaterals	29%	31%	32%	30%								
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	5%								
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%	2%	2%	2%								
DAM Bilateral - Wheel Through Bilaterals	1%	2%	2%	2%								
<b><u>Balancing Energy Market MWh</u></b>	-149,619	-299,377	-386,811	-72,862								
Balancing Energy LSE Internal LBMP Energy Sales	-147%	-101%	-128%	-208%								
Balancing Energy External TC LBMP Energy Sales	74%	24%	37%	189%								
Balancing Energy Bilateral - Internal Bilaterals	9%	5%	0%	-11%								
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	0%	0%	0%								
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	22%	9%	6%	34%								
Balancing Energy Bilateral - Wheel Through Bilaterals	-58%	-36%	-15%	-103%								
<b><u>Transactions Summary</u></b>												
LBMP	63%	59%	59%	62%								
Internal Bilaterals	30%	32%	33%	30%								
Import Bilaterals	5%	5%	6%	5%								
Export Bilaterals	2%	2%	2%	2%								
Wheels Through	1%	1%	1%	1%								
<b><u>Market Share of Total Load</u></b>												
Day Ahead Market	101.0%	102.4%	102.9%	100.6%								
Balancing Energy +	-1.0%	-2.4%	-2.9%	-0.6%								
Total MWh	15,004,132	12,344,477	13,134,575	12,085,824								
Average Daily Energy Sendout/Month GWh	463	426	413	390								

<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><u>Day Ahead Market MWh</u></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><u>Balancing Energy Market MWh</u></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><u>Transactions Summary</u></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><u>Market Share of Total Load</u></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

+ 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 2018 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 *	\$83.53	\$30.37	\$27.37	\$32.40								
Standard Deviation	\$58.94	\$12.38	\$6.34	\$9.06								
Load Weighted Price **	\$88.42	\$31.44	\$27.95	\$33.14								
<b><u>RTC LBMP</u></b>												
Price *	\$81.65	\$27.73	\$25.99	\$30.80								
Standard Deviation	\$60.83	\$11.96	\$8.99	\$14.30								
Load Weighted Price **	\$85.85	\$28.54	\$26.46	\$31.47								
<b><u>REAL TIME LBMP</u></b>												
Price *	\$87.94	\$28.50	\$26.49	\$34.53								
Standard Deviation	\$87.41	\$17.36	\$12.25	\$26.57								
Load Weighted Price **	\$93.59	\$29.49	\$27.09	\$35.72								
Average Daily Energy Sendout/Month GWh	463	426	413	390								

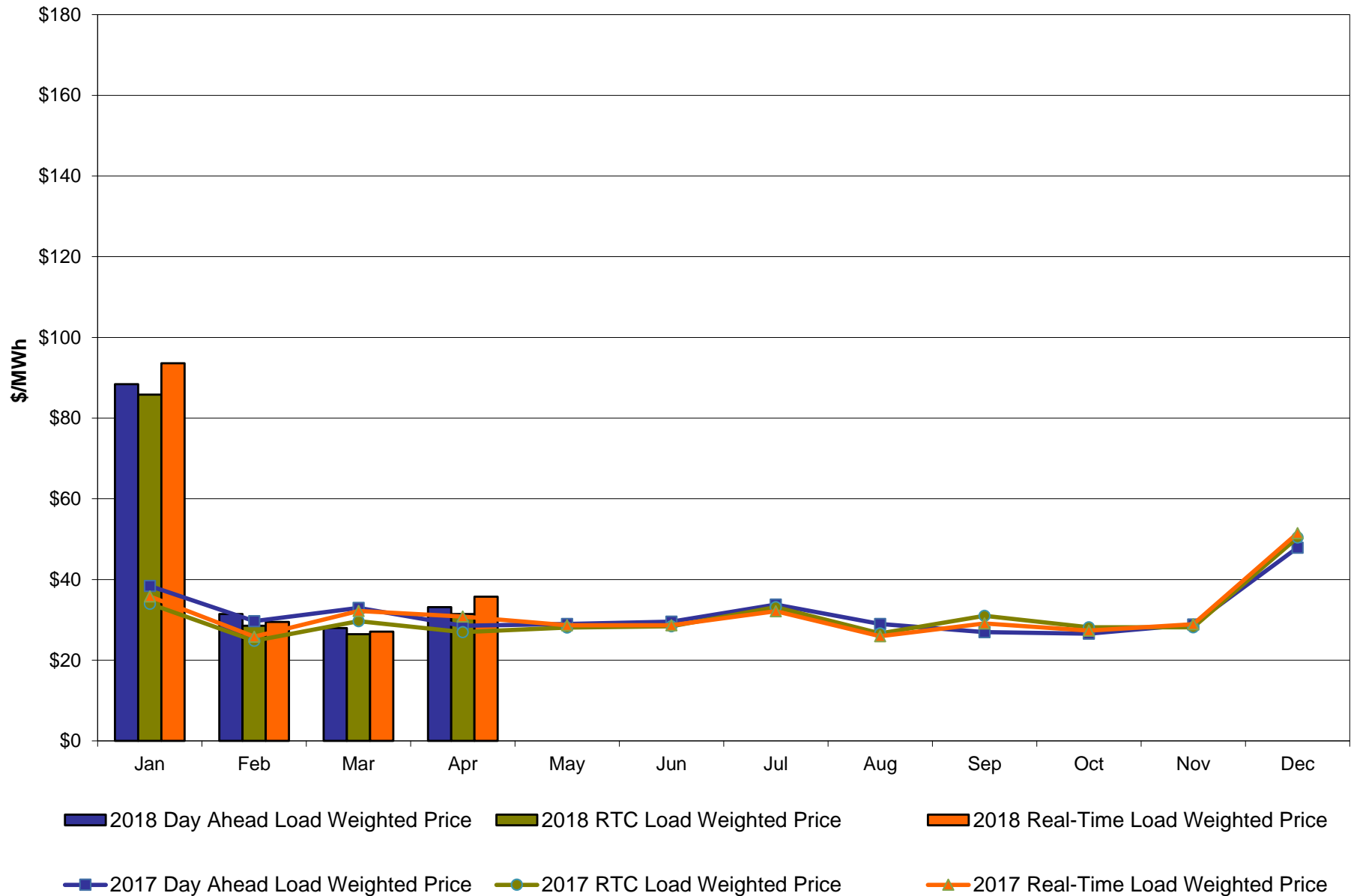
### NYISO Markets 2017 Energy Statistics

	<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

\* Average zonal load weighted prices.

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

# **NYISO Monthly Average Internal LBMPs 2017- 2018**

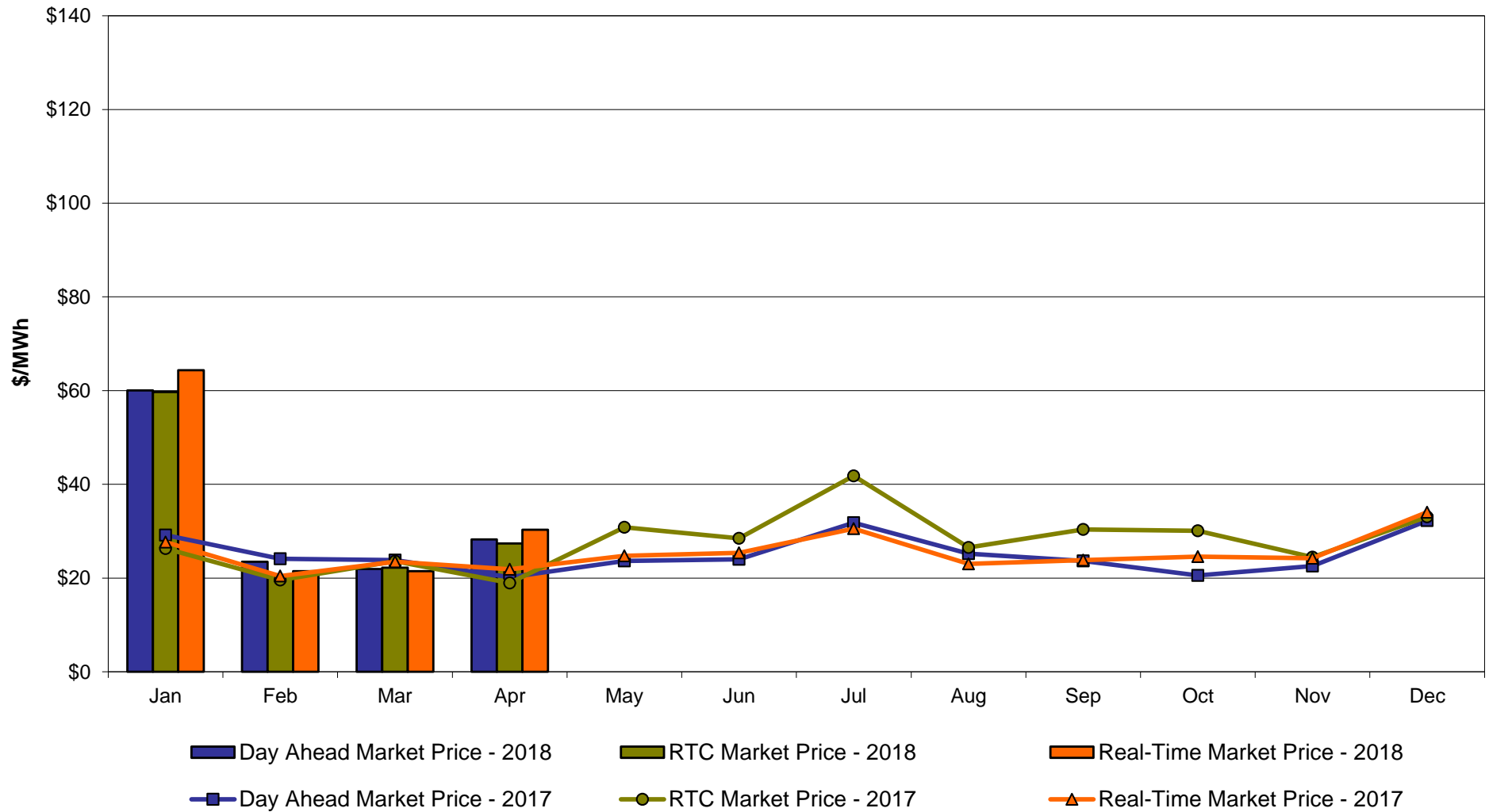


**April 2018 Zonal LBMP Statistics for NYISO (\$/MWh)**

	<b><u>WEST</u></b> <b><u>Zone A</u></b>	<b><u>GENESEE</u></b> <b><u>Zone B</u></b>	<b><u>NORTH</u></b> <b><u>Zone D</u></b>	<b><u>CENTRAL</u></b> <b><u>Zone C</u></b>	<b><u>MOHAWK</u></b> <b><u>VALLEY</u></b> <b><u>Zone E</u></b>	<b><u>CAPITAL</u></b> <b><u>Zone F</u></b>	<b><u>HUDSON</u></b> <b><u>VALLEY</u></b> <b><u>Zone G</u></b>	<b><u>MILLWOOD</u></b> <b><u>Zone H</u></b>	<b><u>DUNWOODIE</u></b> <b><u>Zone I</u></b>	<b><u>NEW YORK</u></b> <b><u>CITY</u></b> <b><u>Zone J</u></b>	<b><u>LONG</u></b> <b><u>ISLAND</u></b> <b><u>Zone K</u></b>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	28.22	27.22	24.59	28.14	28.05	33.35	33.30	33.64	33.63	34.77	37.97
Standard Deviation	10.12	9.18	9.96	9.49	9.61	8.93	9.17	9.34	9.28	9.22	10.55
<b><u>RTC LBMP</u></b>											
Unweighted Price *	27.36	26.21	25.05	27.15	27.21	29.24	29.94	30.12	30.23	31.69	41.21
Standard Deviation	17.57	13.40	13.85	13.83	13.90	13.64	14.08	14.19	14.14	13.84	41.17
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	30.34	30.12	28.46	31.04	31.17	33.20	34.10	34.30	34.45	35.84	43.90
Standard Deviation	25.36	25.11	24.51	25.76	25.89	26.21	27.18	27.38	27.33	27.24	45.29
	<b><u>ONTARIO</u></b> <b><u>IESO</u></b>  <b><u>Zone O</u></b>	<b><u>HYDRO</u></b> <b><u>QUEBEC</u></b> <b><u>(Wheel)</u></b> <b><u>Zone M</u></b>	<b><u>HYDRO</u></b> <b><u>QUEBEC</u></b> <b><u>(Import/Export)</u></b> <b><u>Zone M</u></b>	<b><u>PJM</u></b>  <b><u>Zone P</u></b>	<b><u>NEW</u></b> <b><u>ENGLAND</u></b>  <b><u>Zone N</u></b>	<b><u>CROSS</u></b> <b><u>SOUND</u></b> <b><u>CABLE</u></b> <b><u>Controllable</u></b> <b><u>Line</u></b>	<b><u>NORTHPORT-</u></b> <b><u>NORWALK</u></b> <b><u>Controllable</u></b> <b><u>Line</u></b>	<b><u>NEPTUNE</u></b>  <b><u>Controllable</u></b> <b><u>Line</u></b>	<b><u>LINDEN VFT</u></b>  <b><u>Controllable</u></b> <b><u>Line</u></b>	<b><u>HUDSON</u></b>  <b><u>Controllable</u></b> <b><u>Line</u></b>	<b><u>Dennison</u></b>  <b><u>Controllable</u></b> <b><u>Line</u></b>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	26.70	25.54	25.51	30.52	38.83	37.73	40.86	36.42	34.55	34.07	24.16
Standard Deviation	8.61	9.75	9.76	8.95	12.84	10.34	13.87	9.76	9.02	9.31	9.72
<b><u>RTC LBMP</u></b>											
Unweighted Price *	25.14	25.21	25.21	28.23	43.04	41.48	40.78	37.50	31.28	30.31	24.56
Standard Deviation	12.73	13.74	13.74	13.37	27.27	41.67	40.87	31.91	13.14	14.18	13.45
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	29.38	28.98	28.90	32.07	40.18	44.28	44.81	40.87	34.56	34.60	26.78
Standard Deviation	24.64	24.52	24.53	25.64	29.25	46.25	47.11	41.96	31.57	27.32	23.73

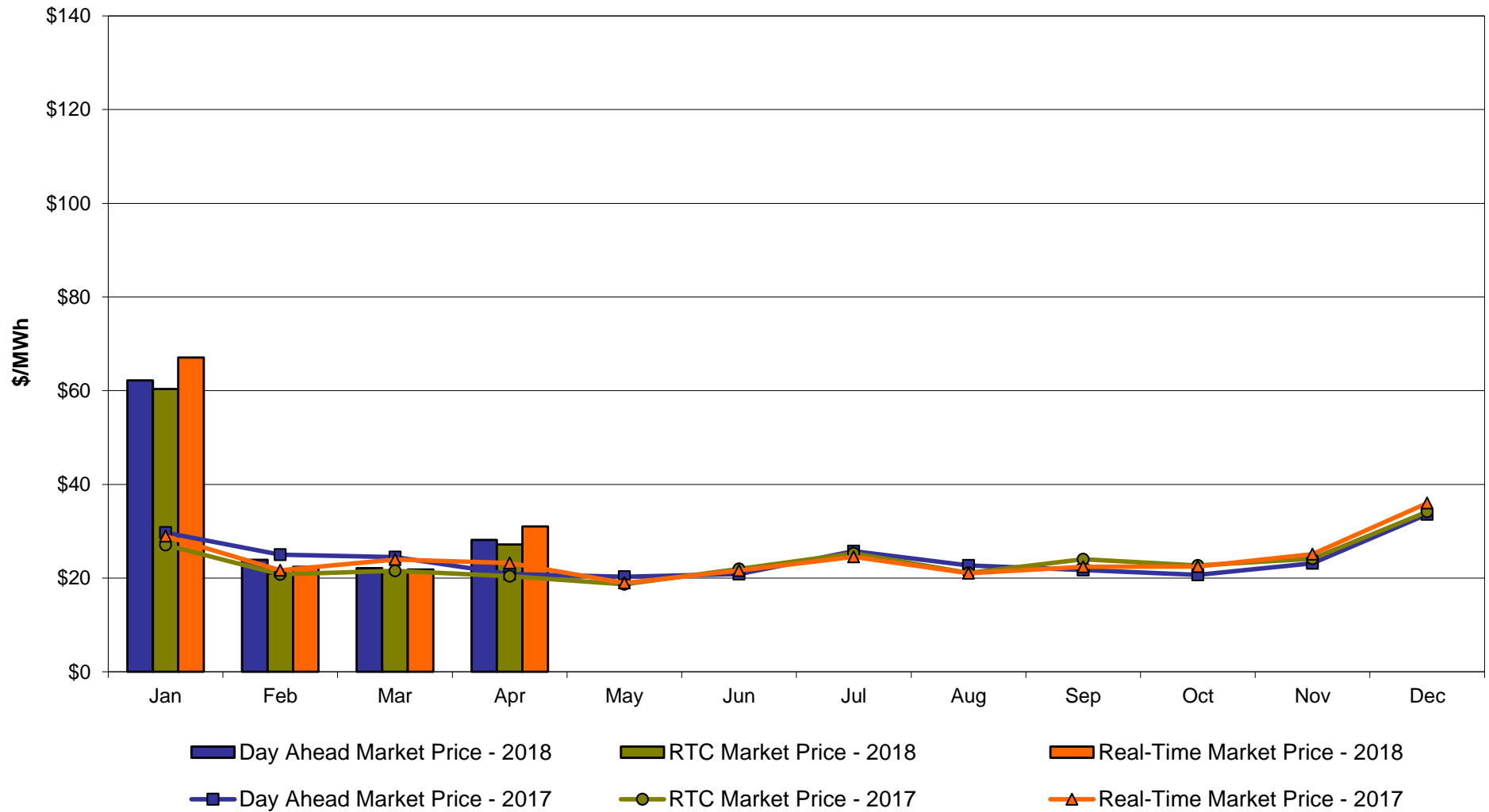
\* Straight LBMP averages

# **West Zone A** **Monthly Average LBMP Prices 2017 - 2018**

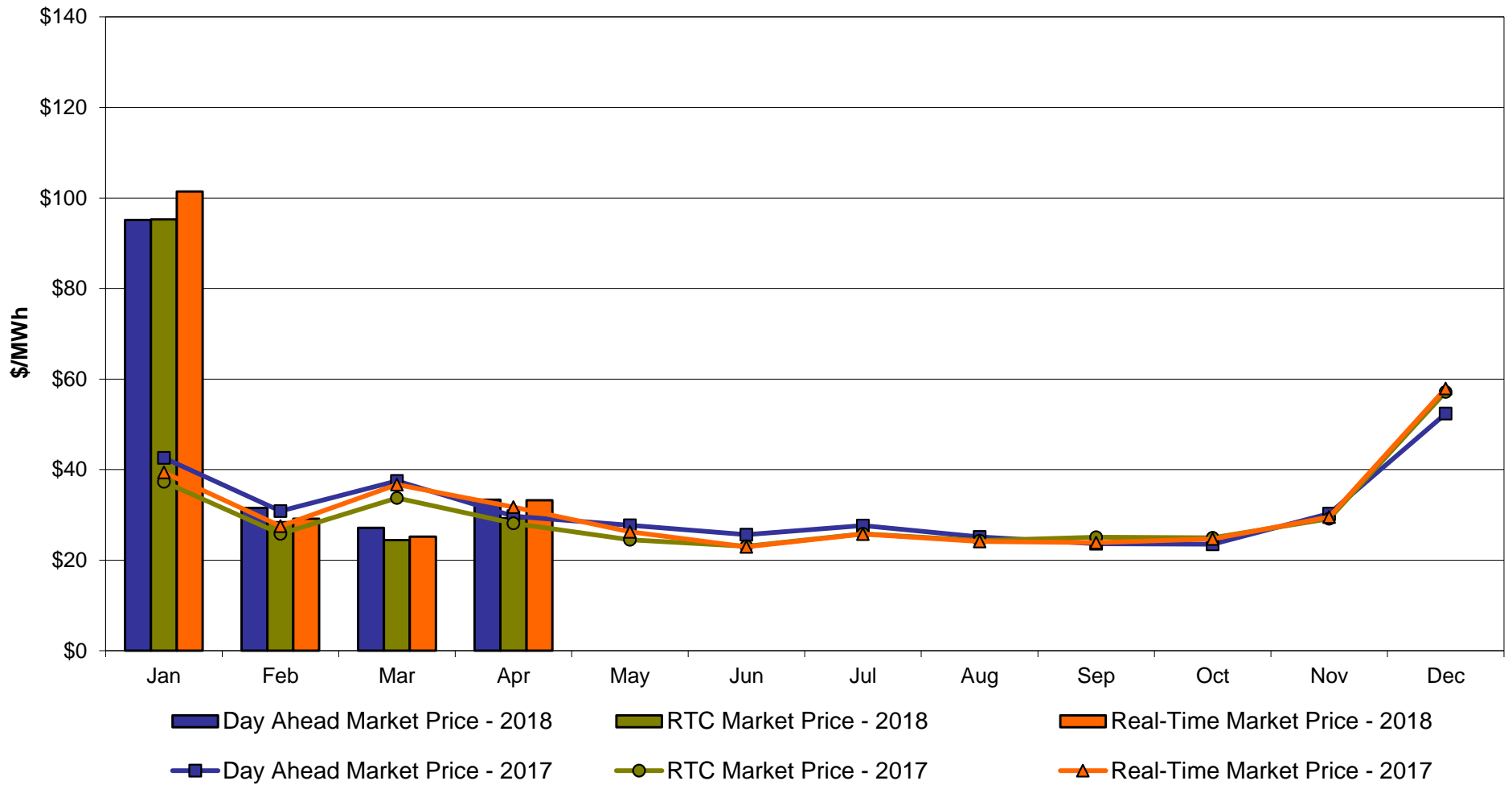




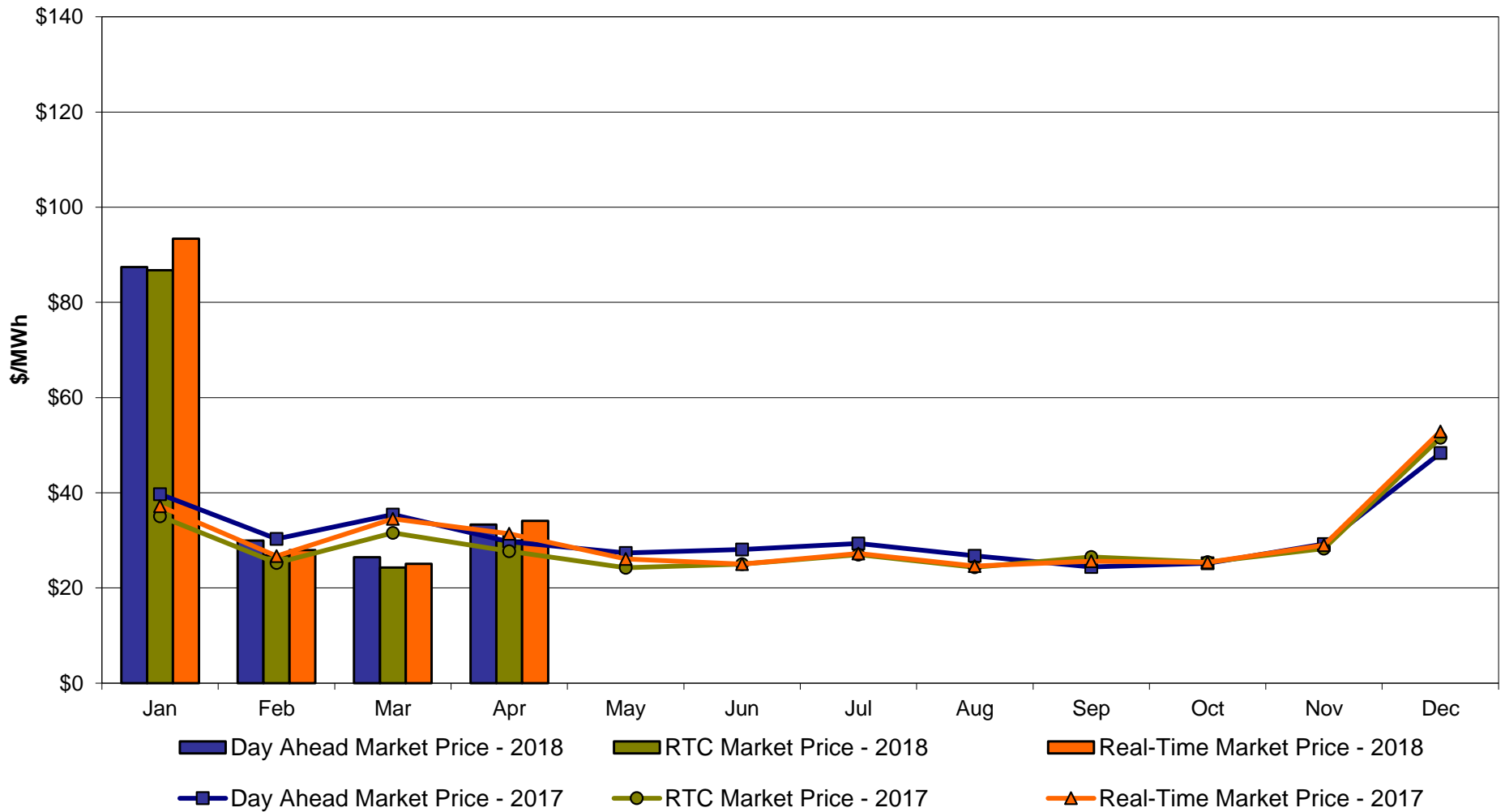
# Central Zone C Monthly Average LBMP Prices 2017 - 2018



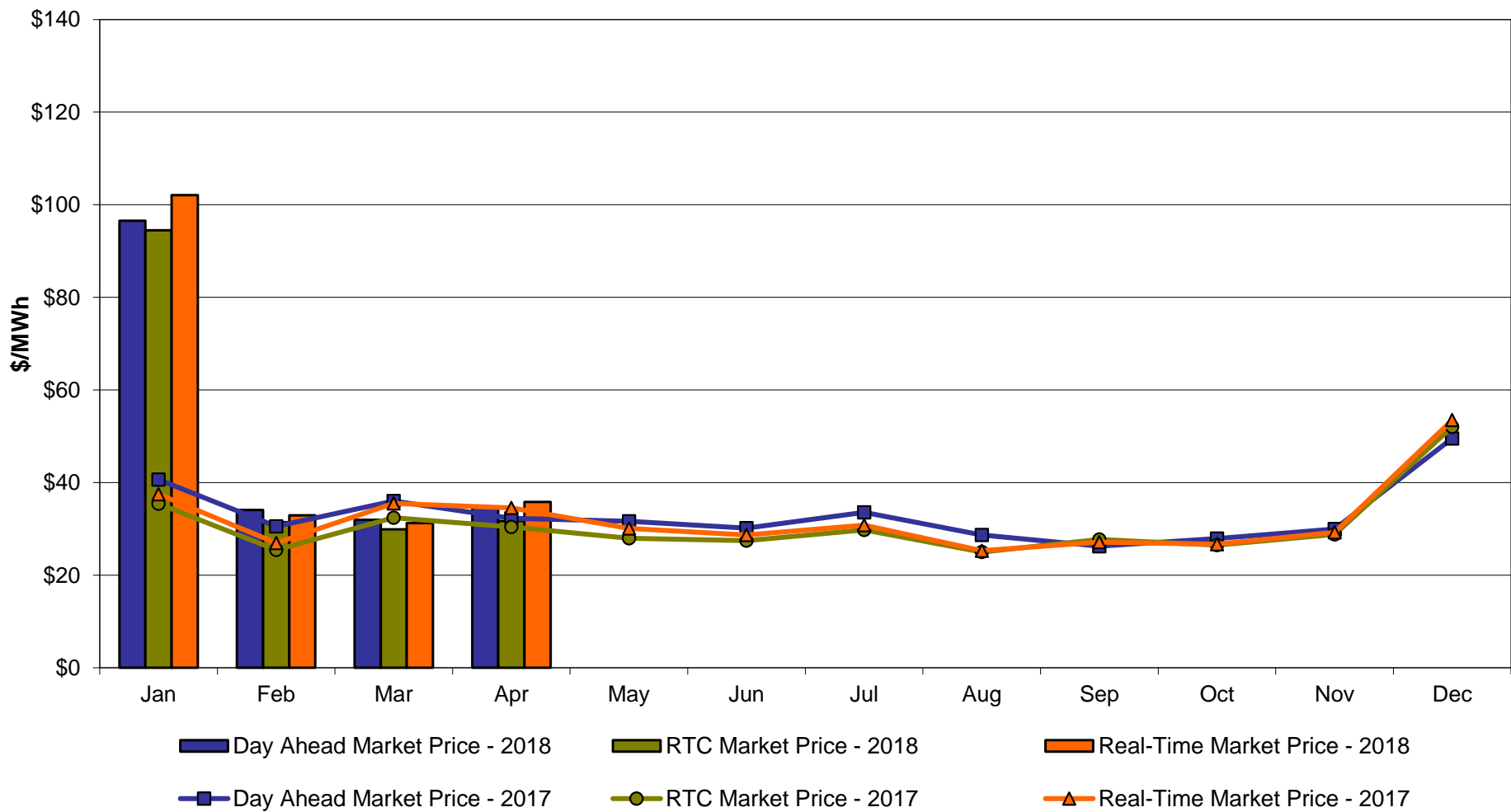
# **Capital Zone F** **Monthly Average LBMP Prices 2017 - 2018**



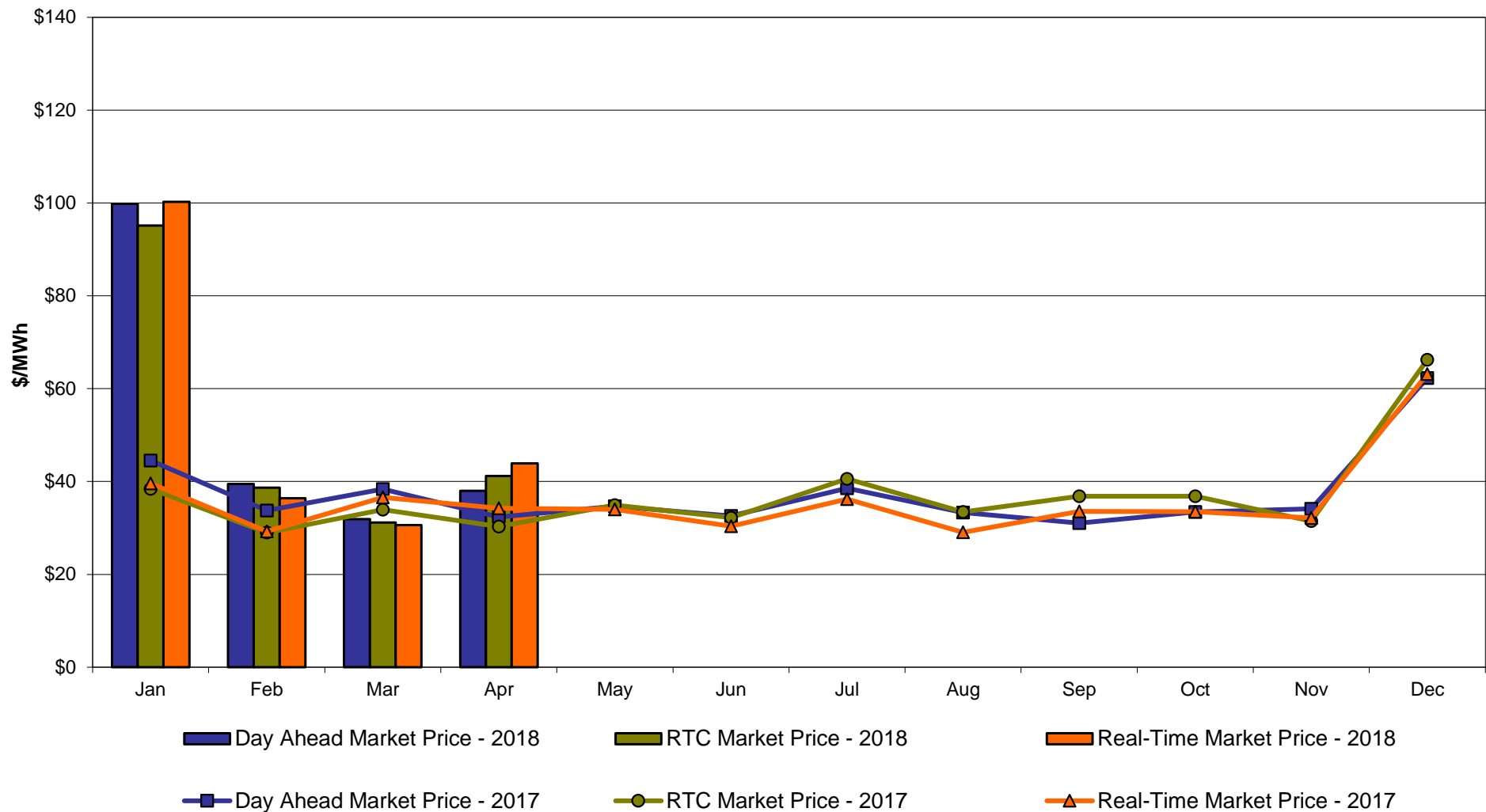
## Hudson Valley Zone G Monthly Average LBMP Prices 2017 - 2018



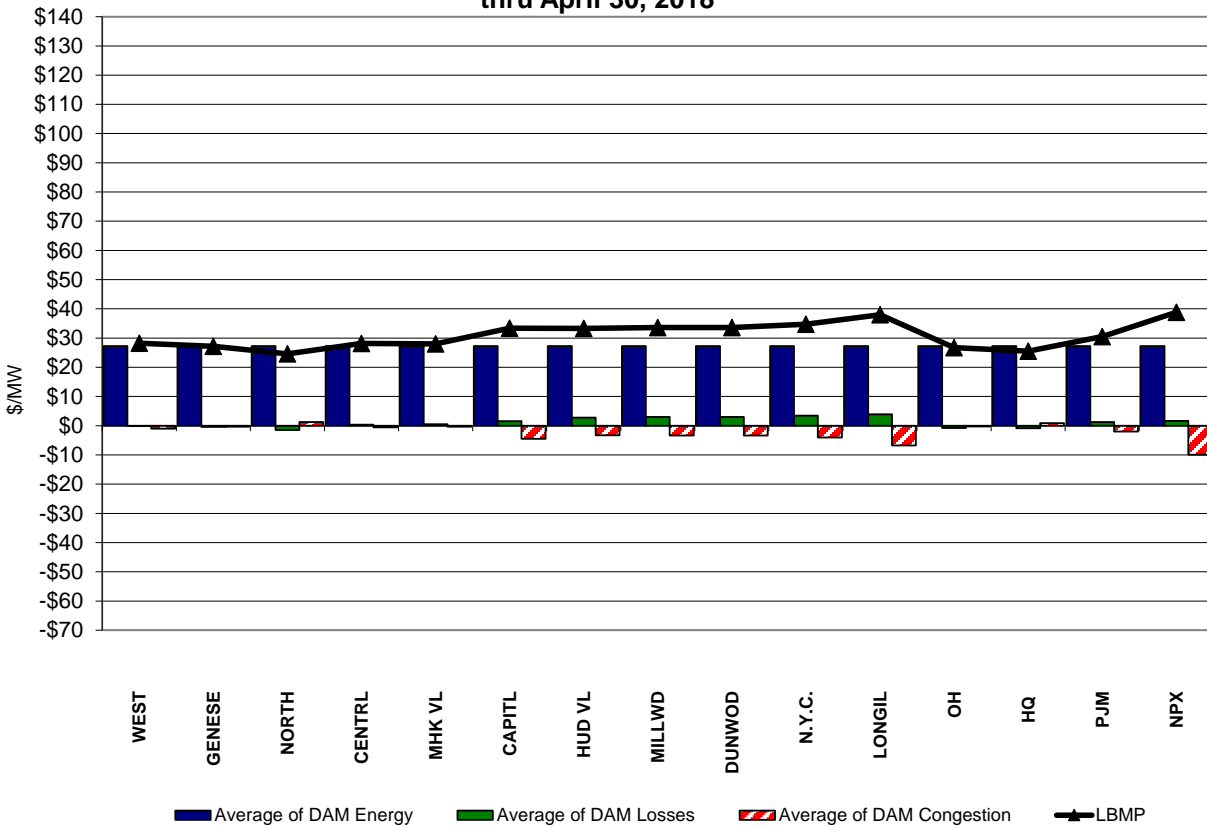
# **NYC Zone J** **Monthly Average LBMP Prices 2017 - 2018**



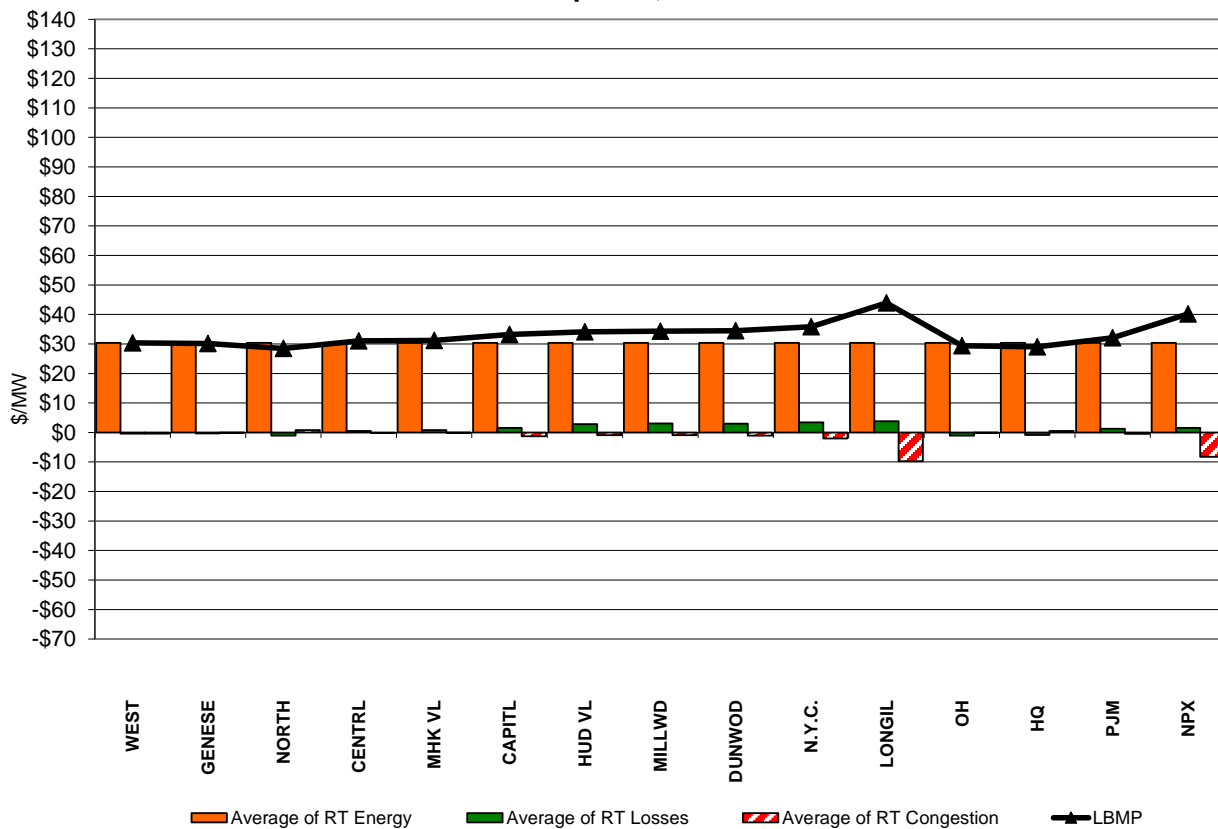
# Long Island Zone K Monthly Average LBMP Prices 2017 - 2018



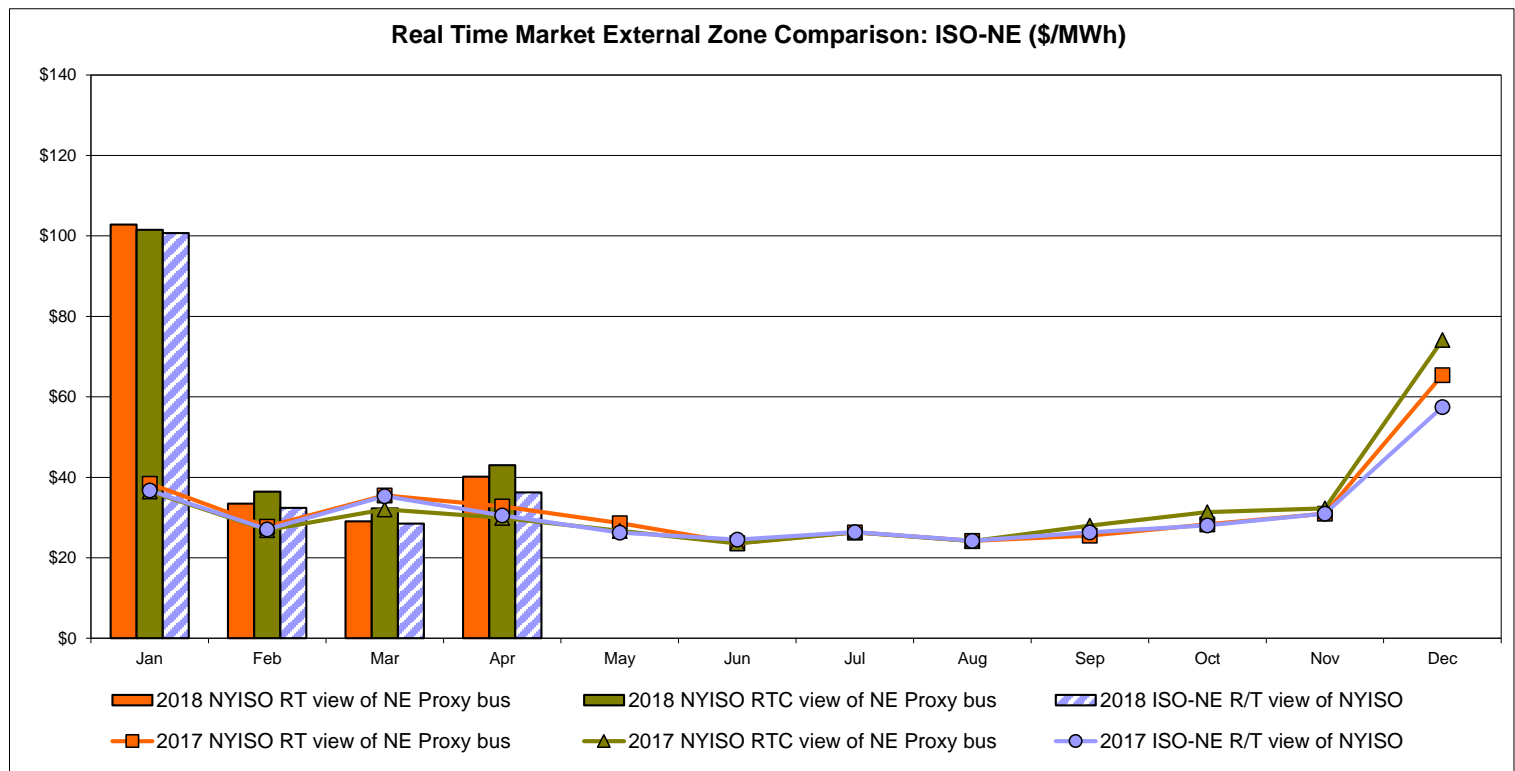
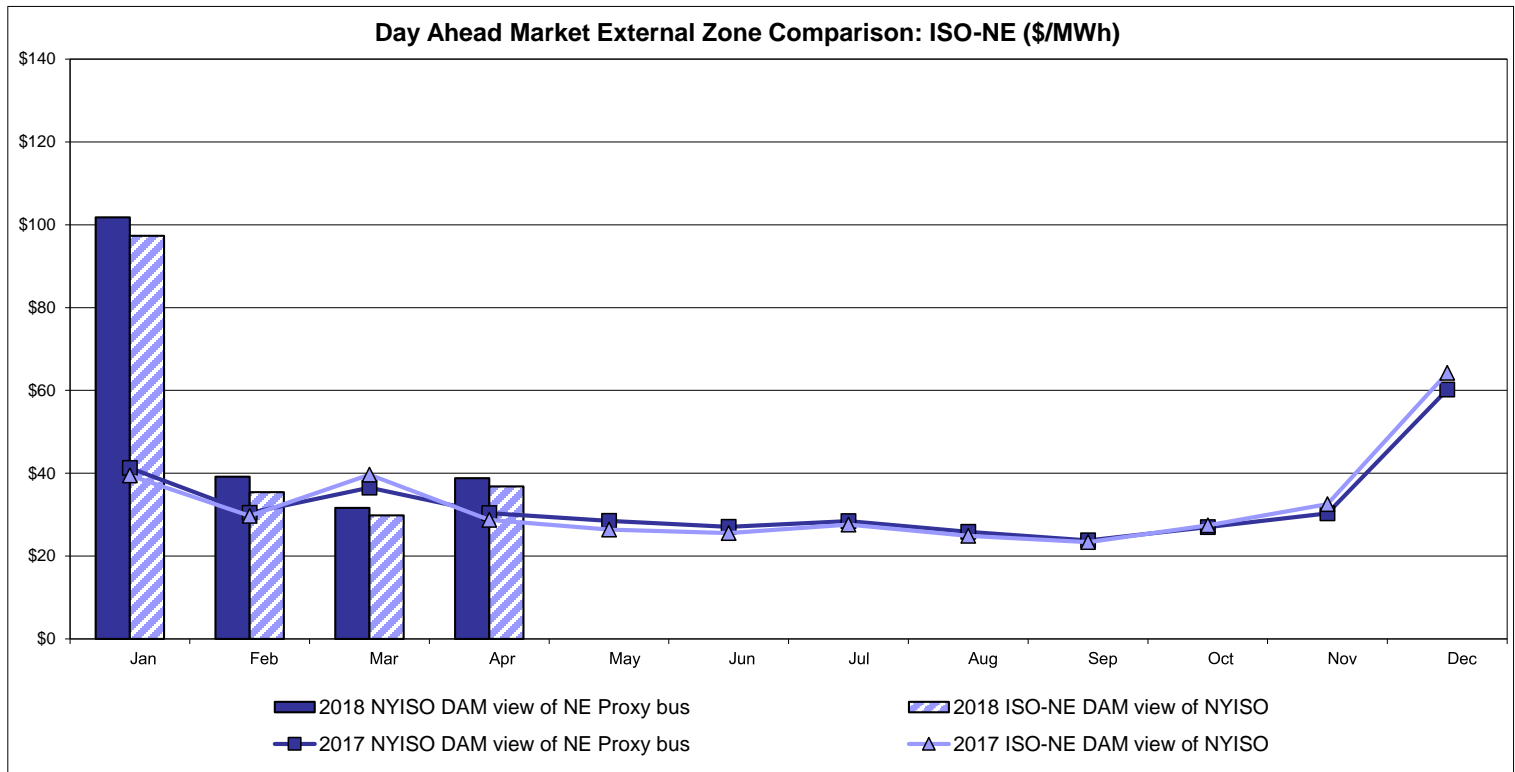
**DAM Zonal Unweighted Monthly Average LBMP Components  
thru April 30, 2018**



**RT Zonal Unweighted Monthly Average LBMP Components  
thru April 30, 2018**

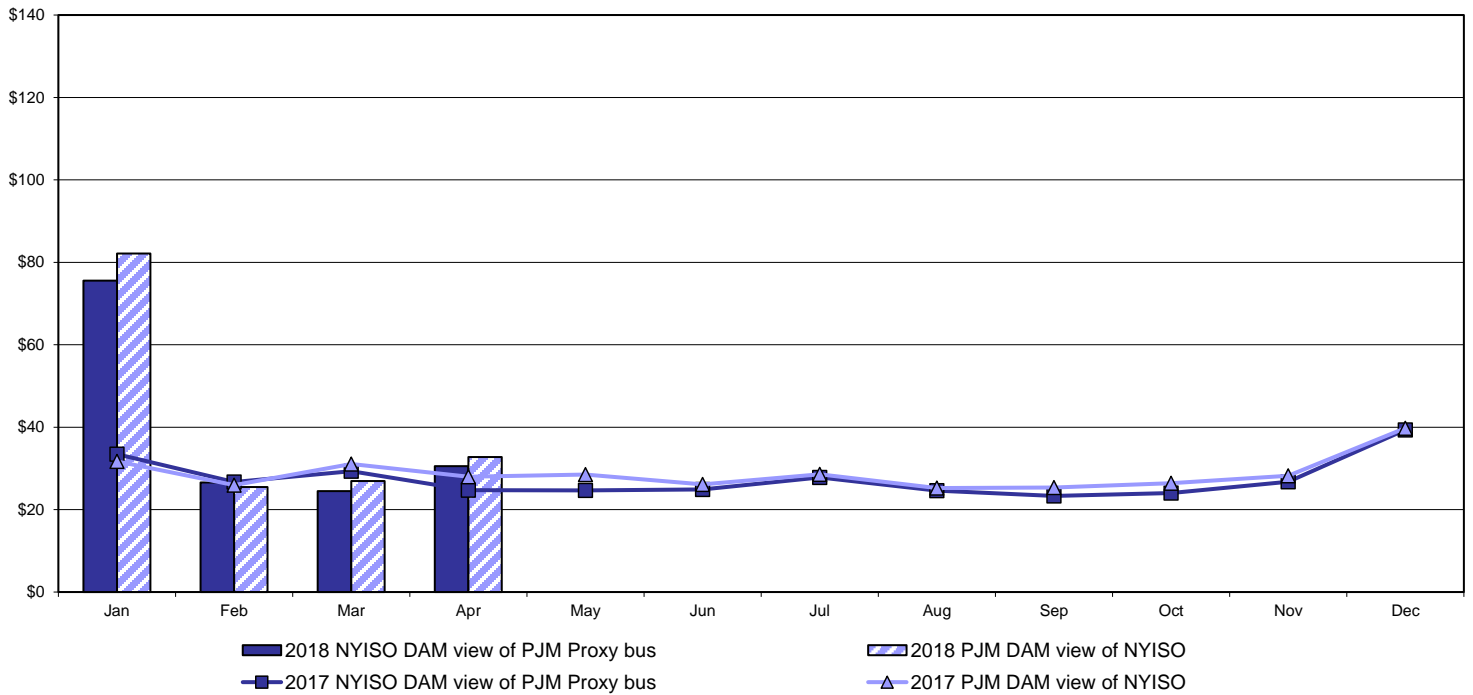


## External Comparison ISO-New England

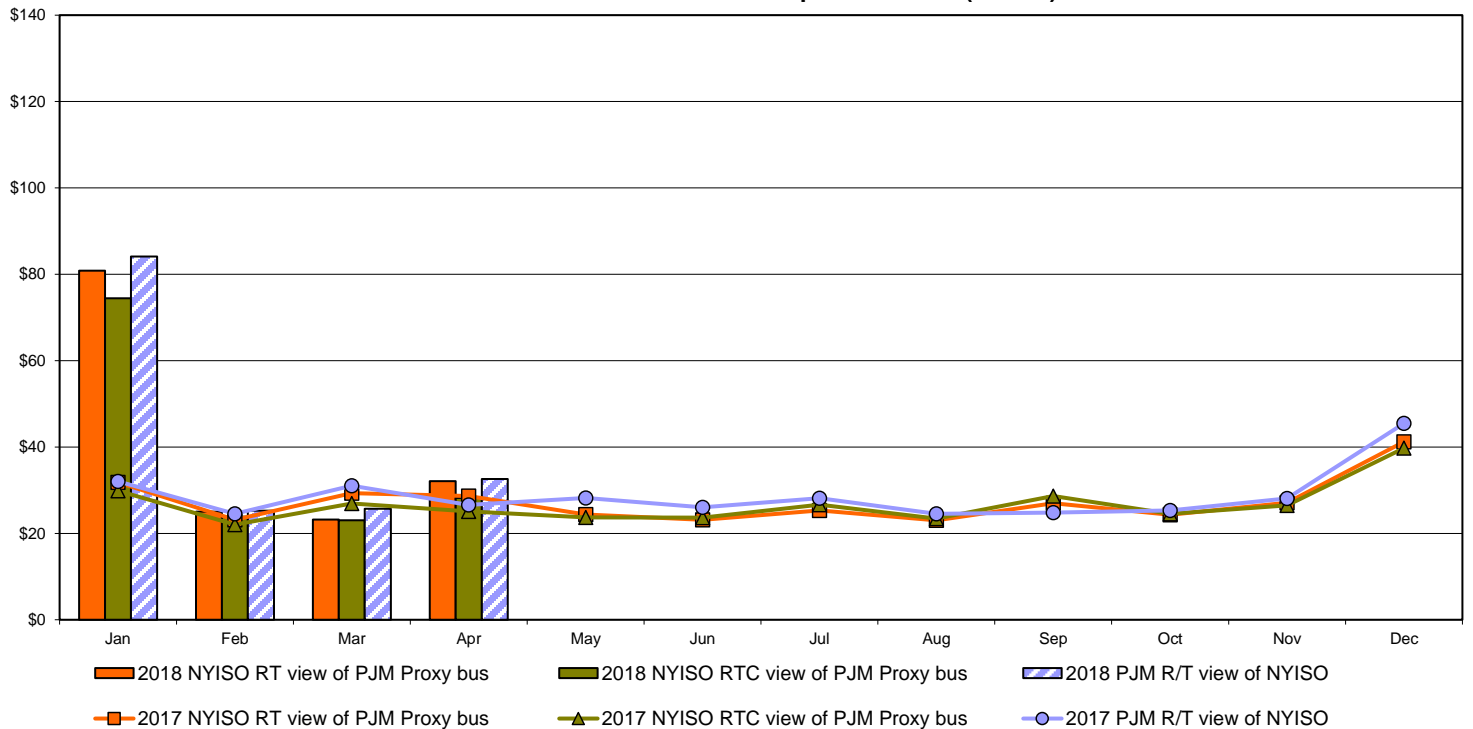


## External Comparison PJM

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

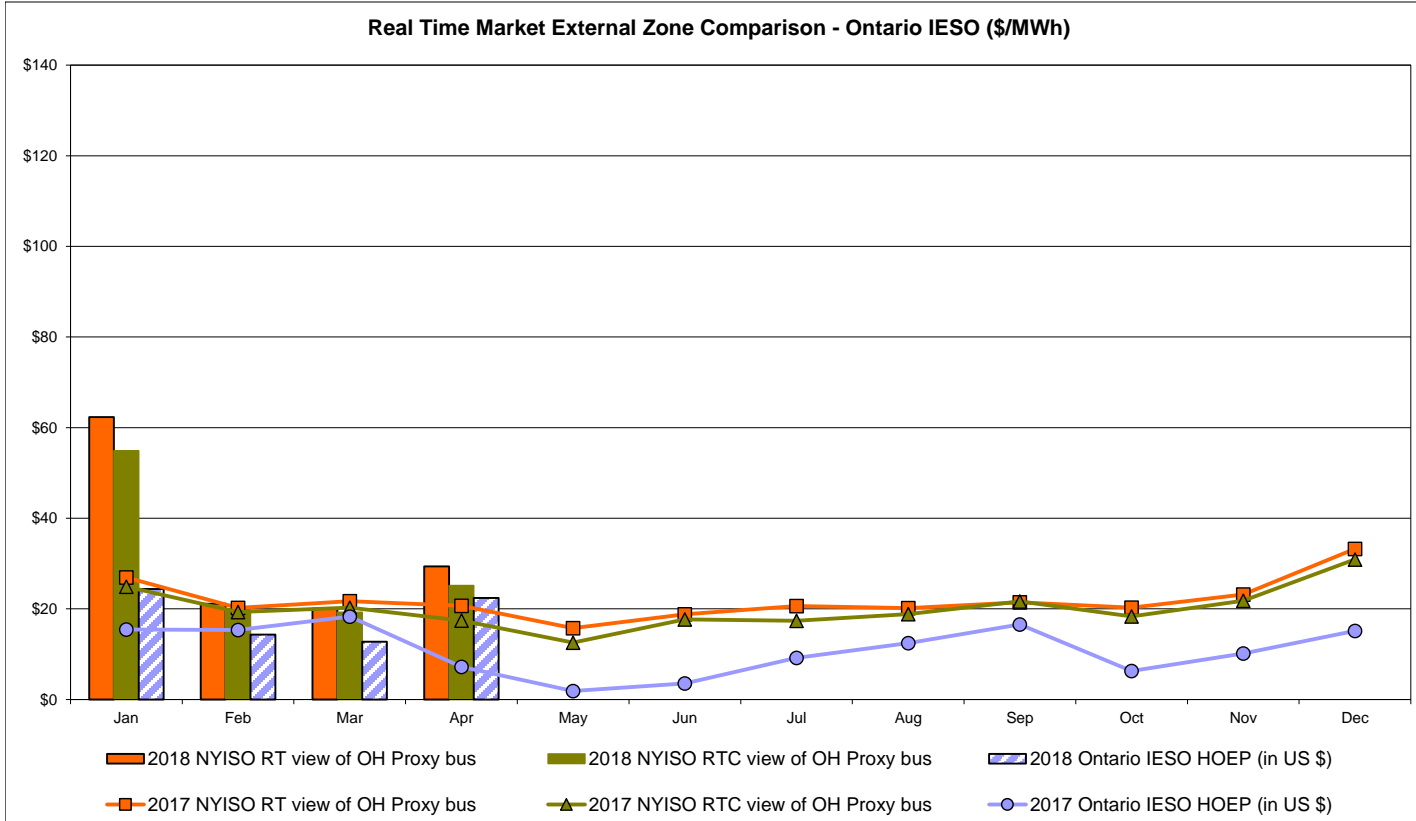
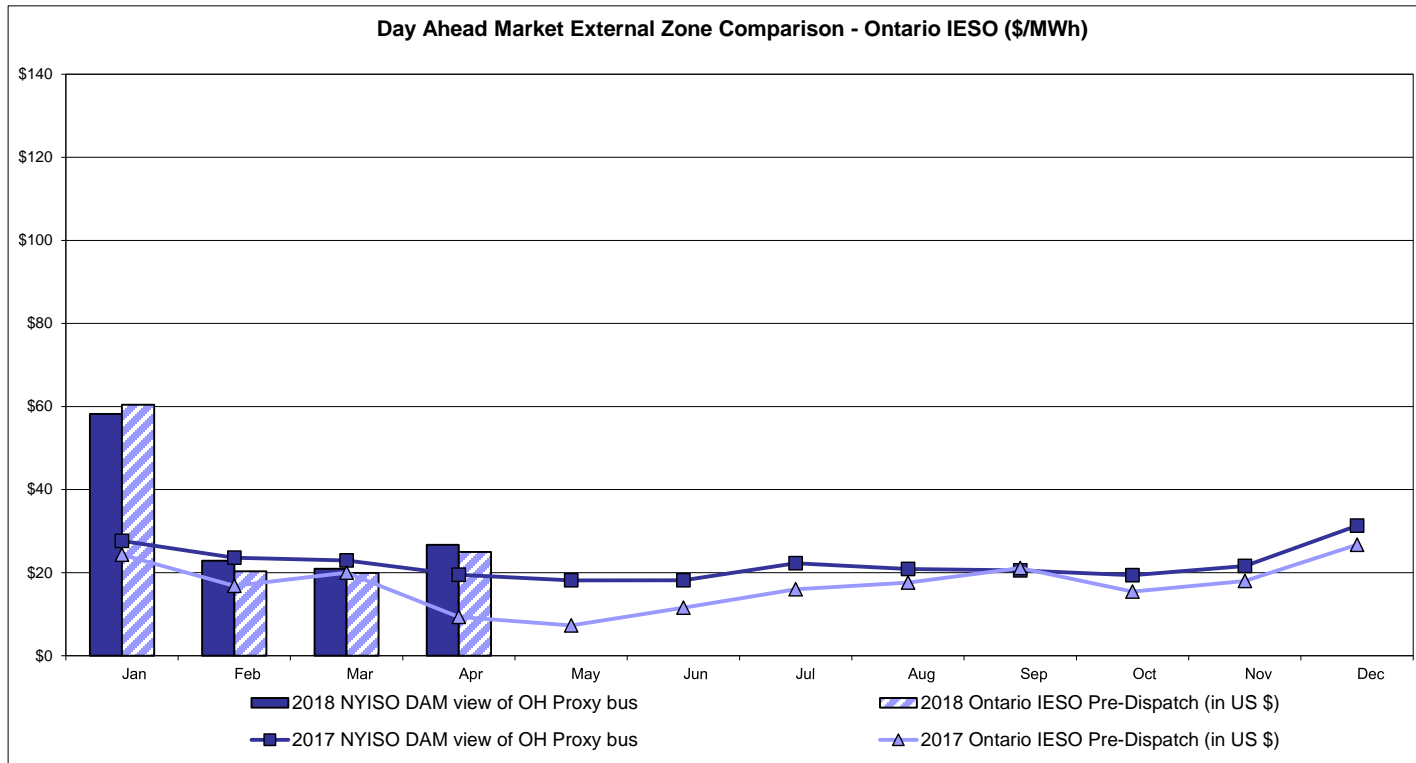


**Real Time Market External Zone Comparison - PJM (\$/MWh)**



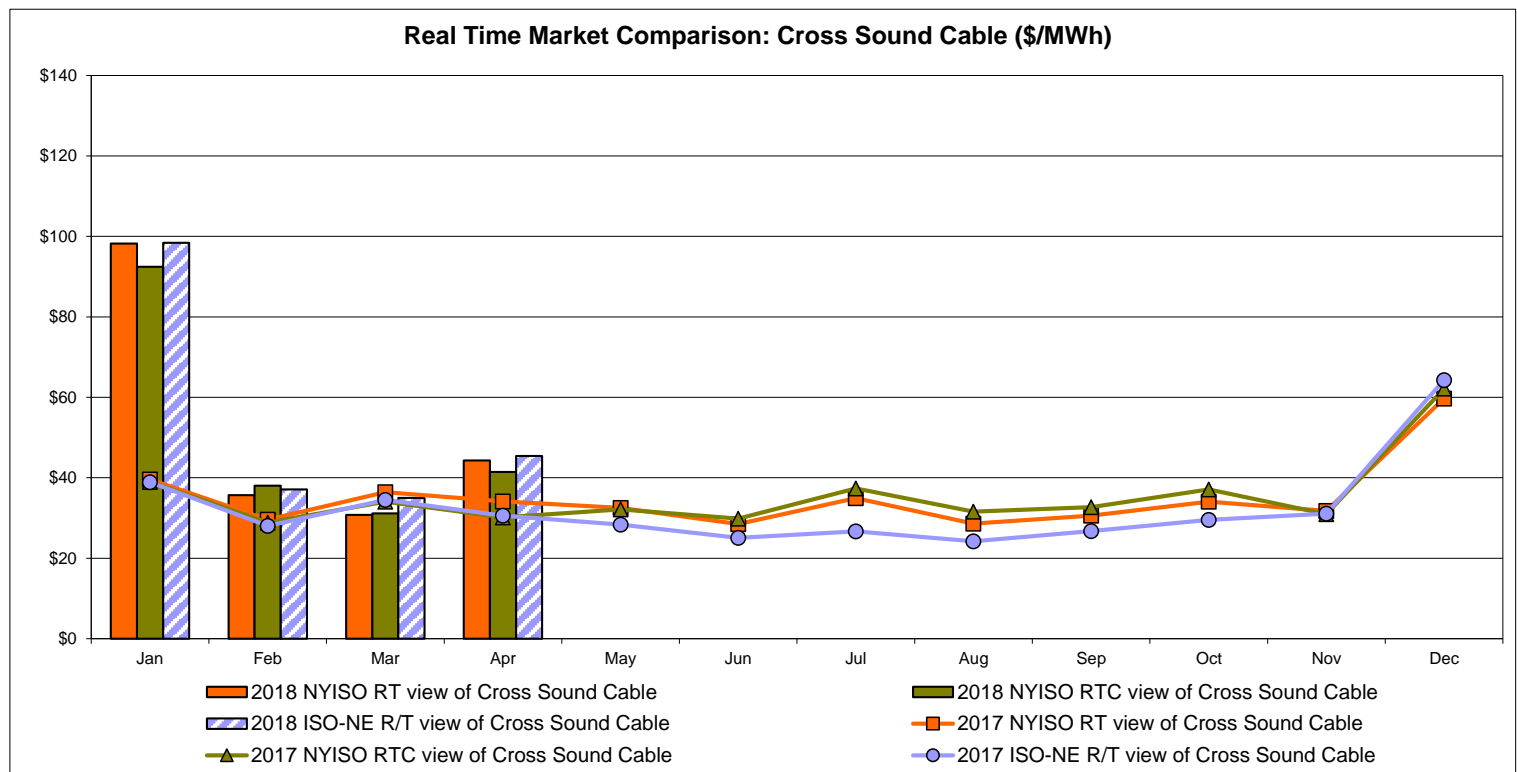
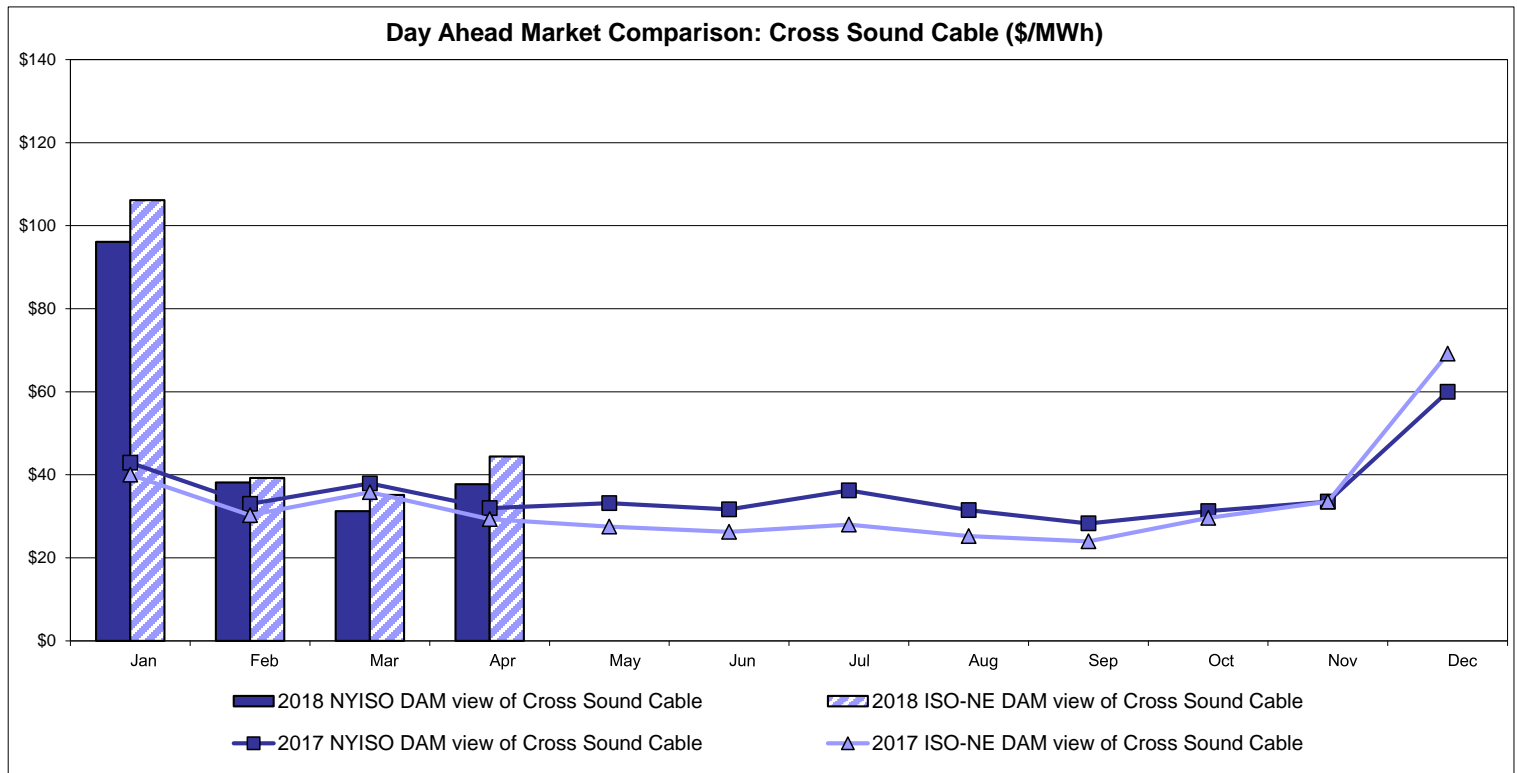


## External Comparison Ontario IESO



Notes: Exchange factor used for April 2018 was 0.785422557335847 to US  
 HOEP: Hourly Ontario Energy Price  
 Pre-Dispatch: Projected Energy Price

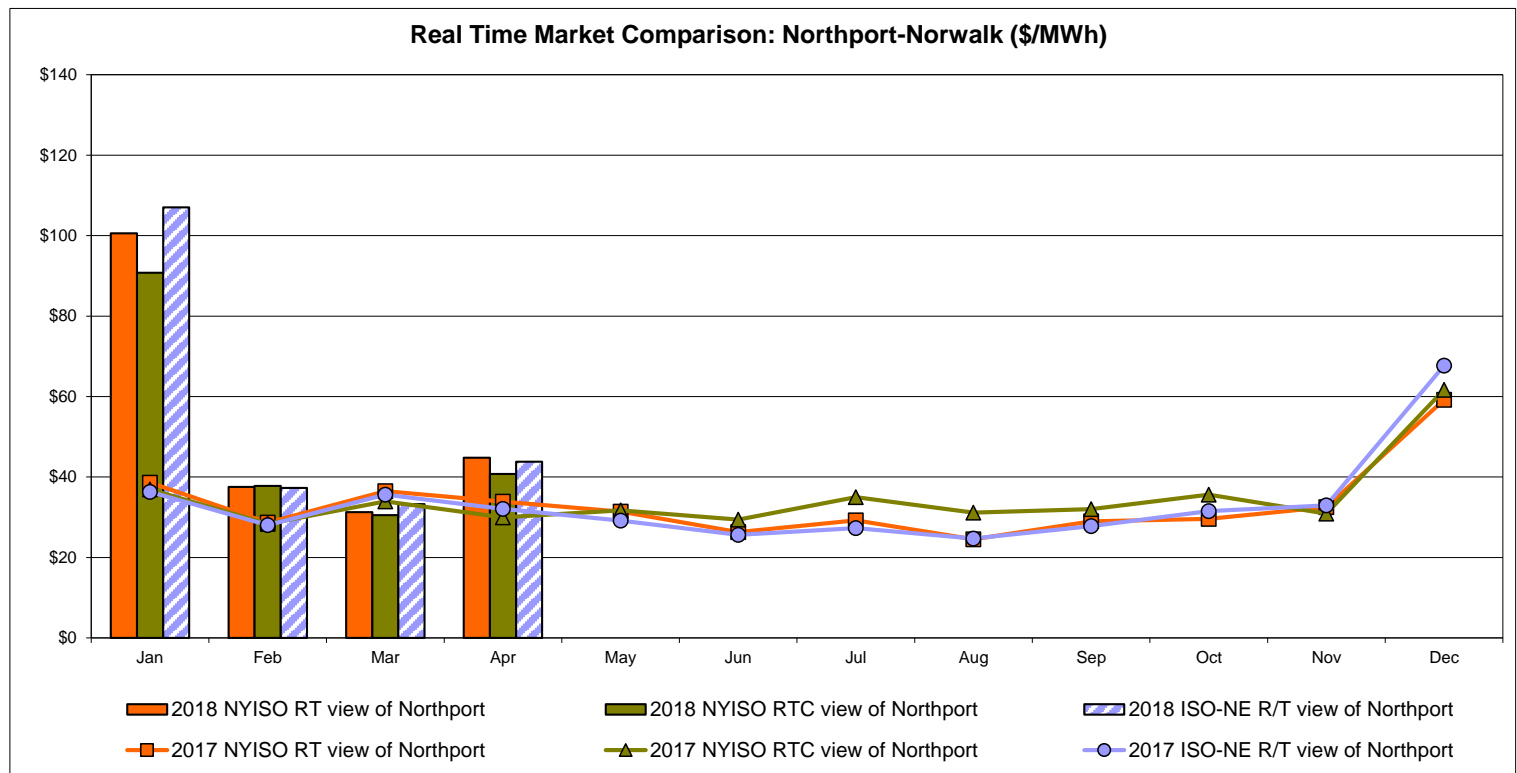
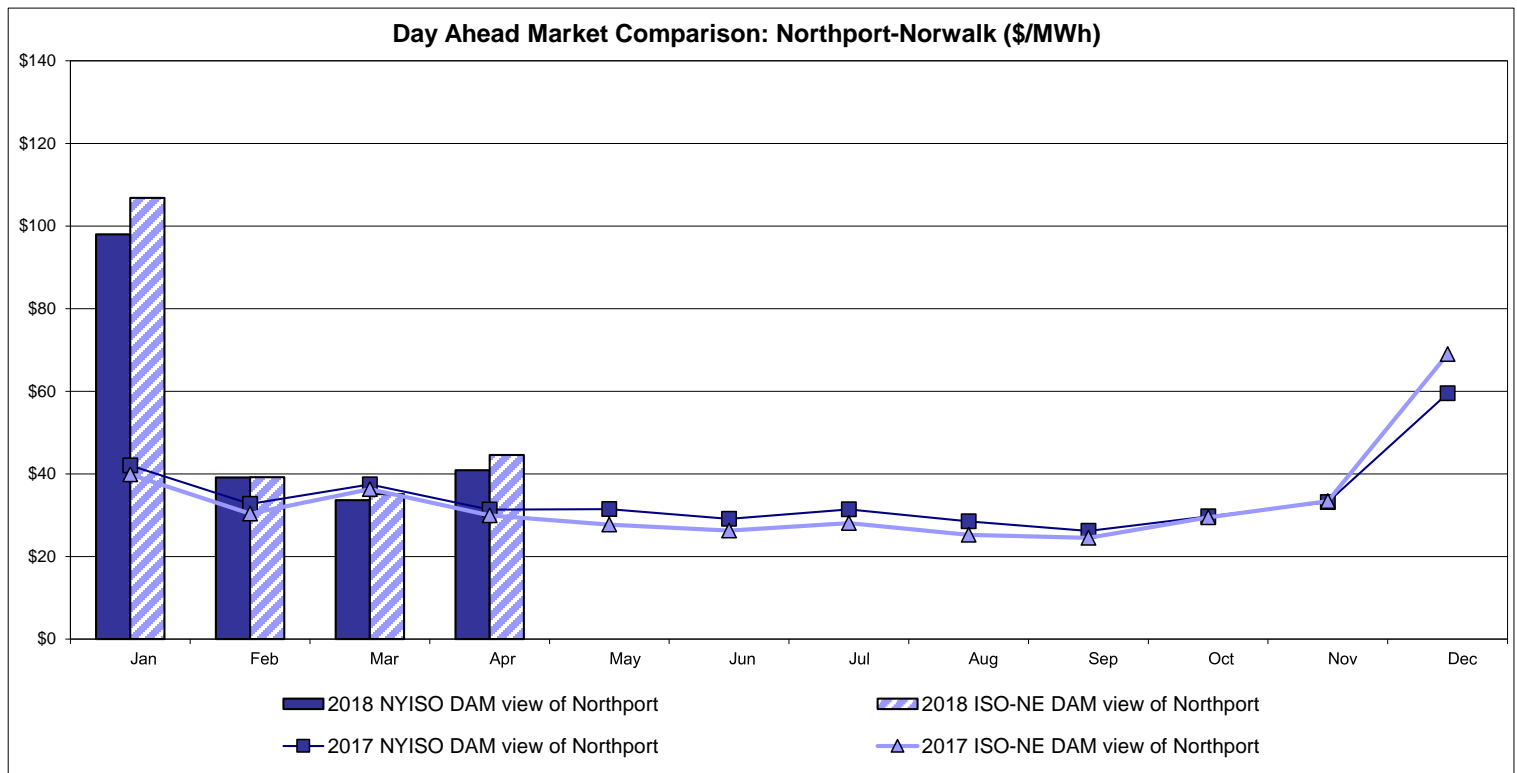
## External Controllable Line: Cross Sound Cable (New England)



**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)

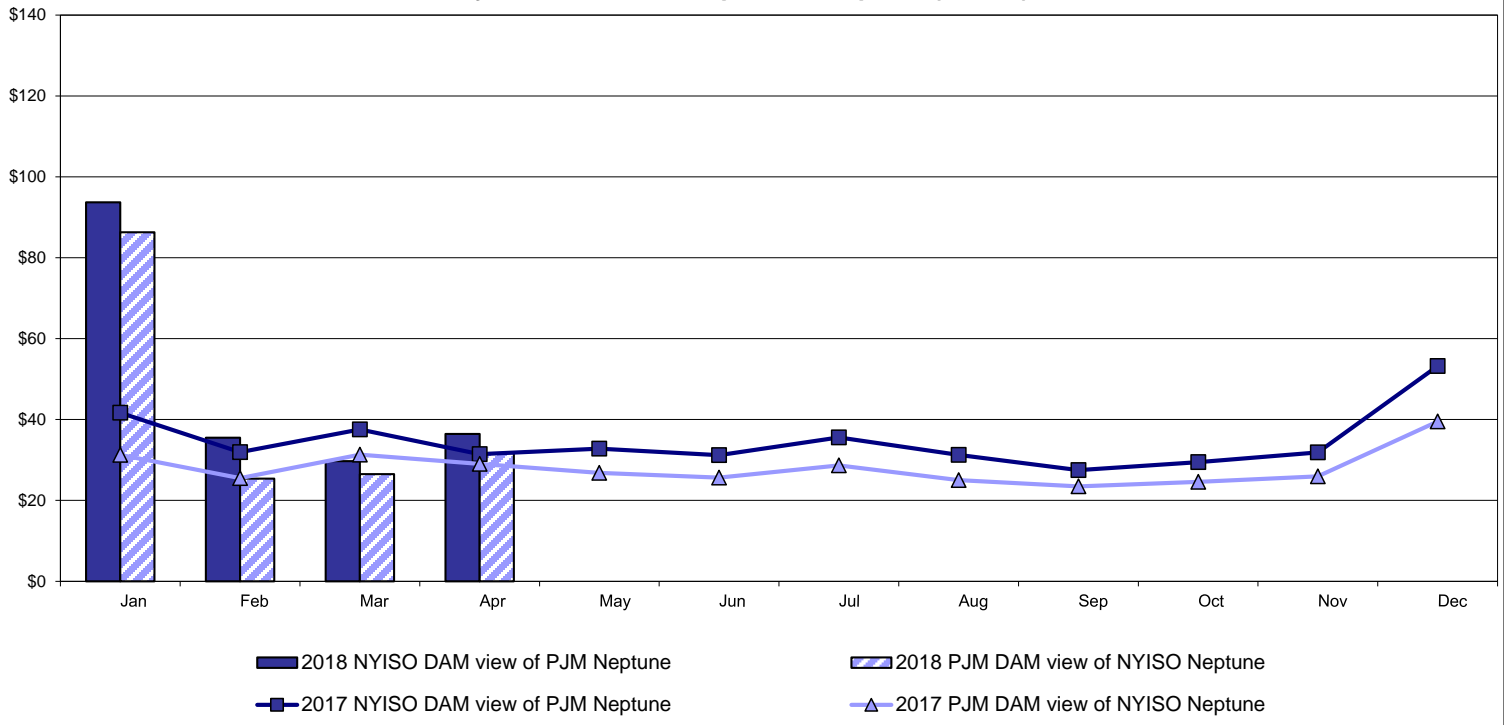


Note:

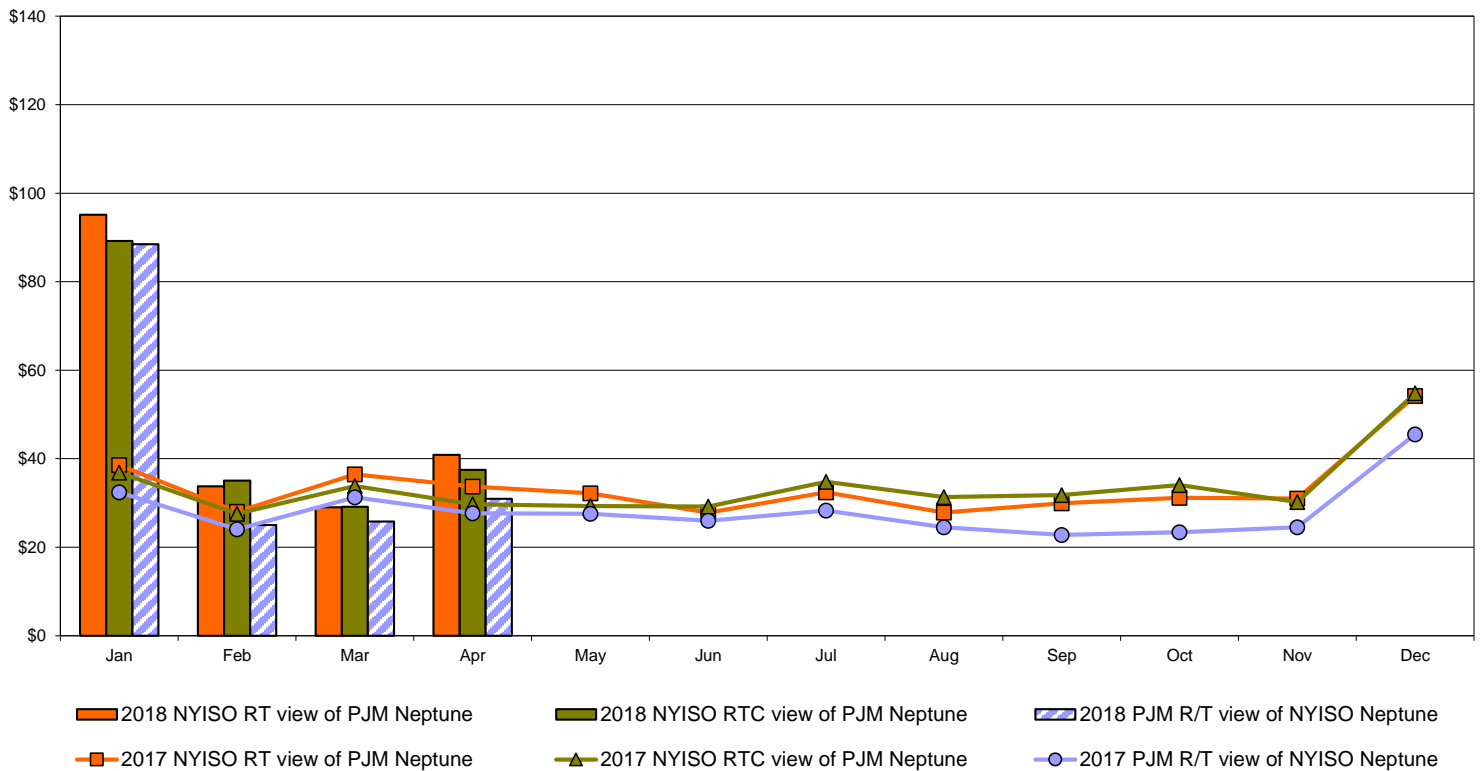
ISO-NE Forecast is an advisory posting @ 18:00 day before.  
 The DAM and R/T prices at the Northport 138 interface are used for ISO-NE.  
 The DAM and R/T prices at the 1385 interface are used for NYISO.

## External Controllable Line: Neptune (PJM)

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

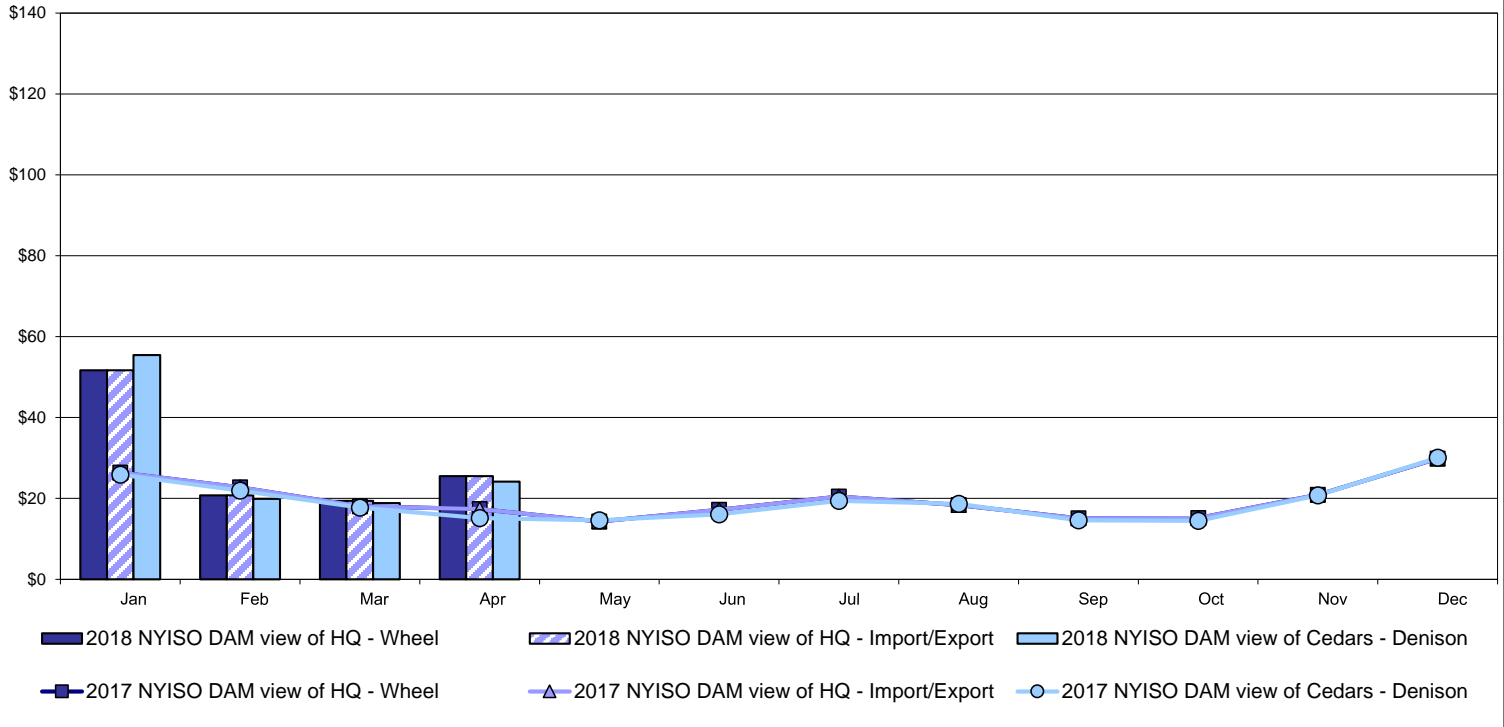


Real Time Market Comparison: Neptune (\$/MWh)

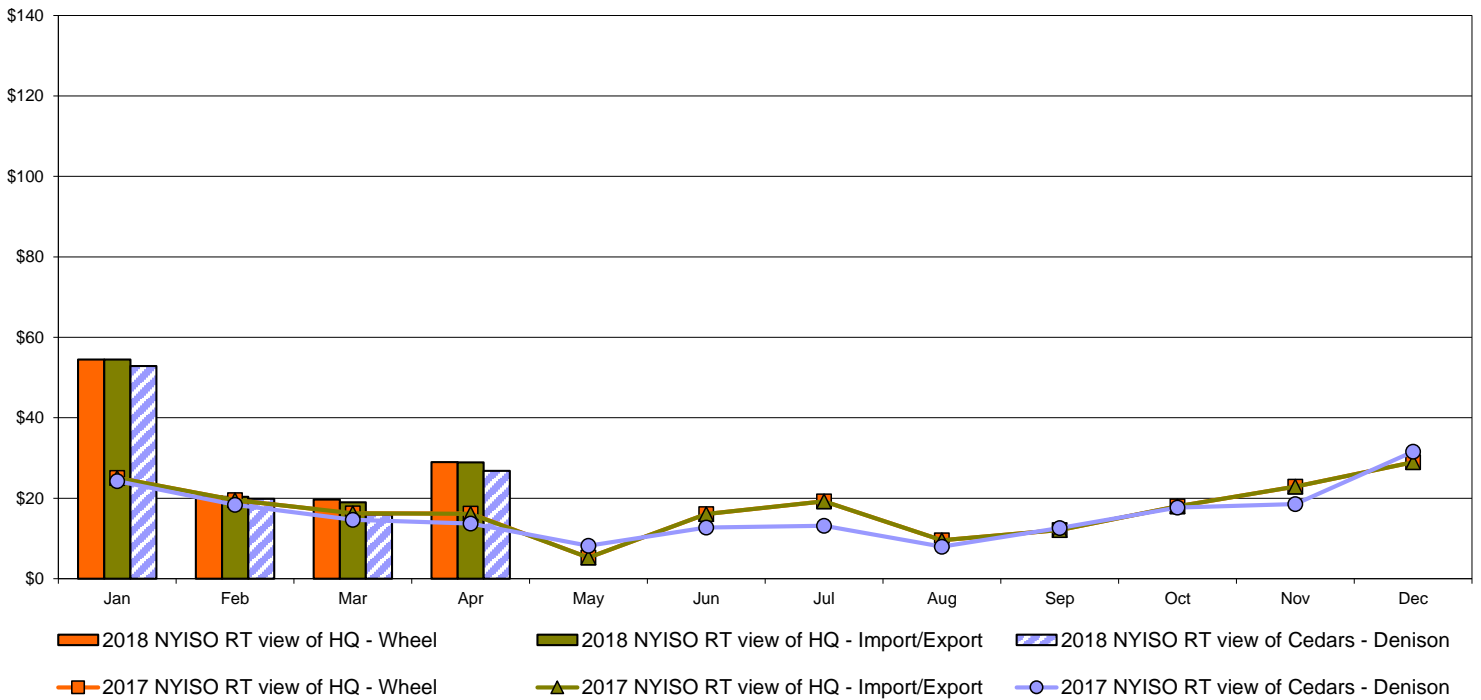


## External Comparison Hydro-Quebec

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

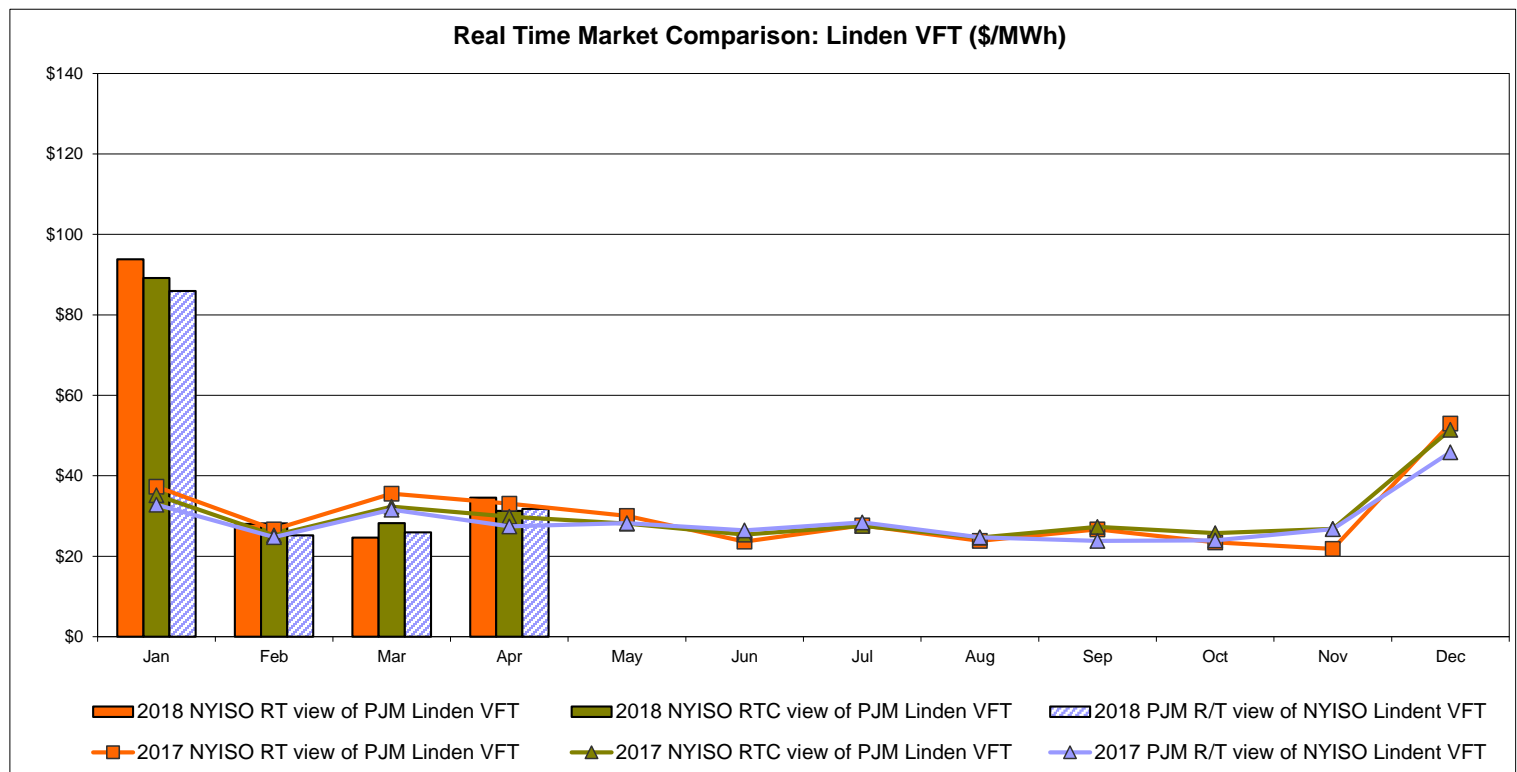
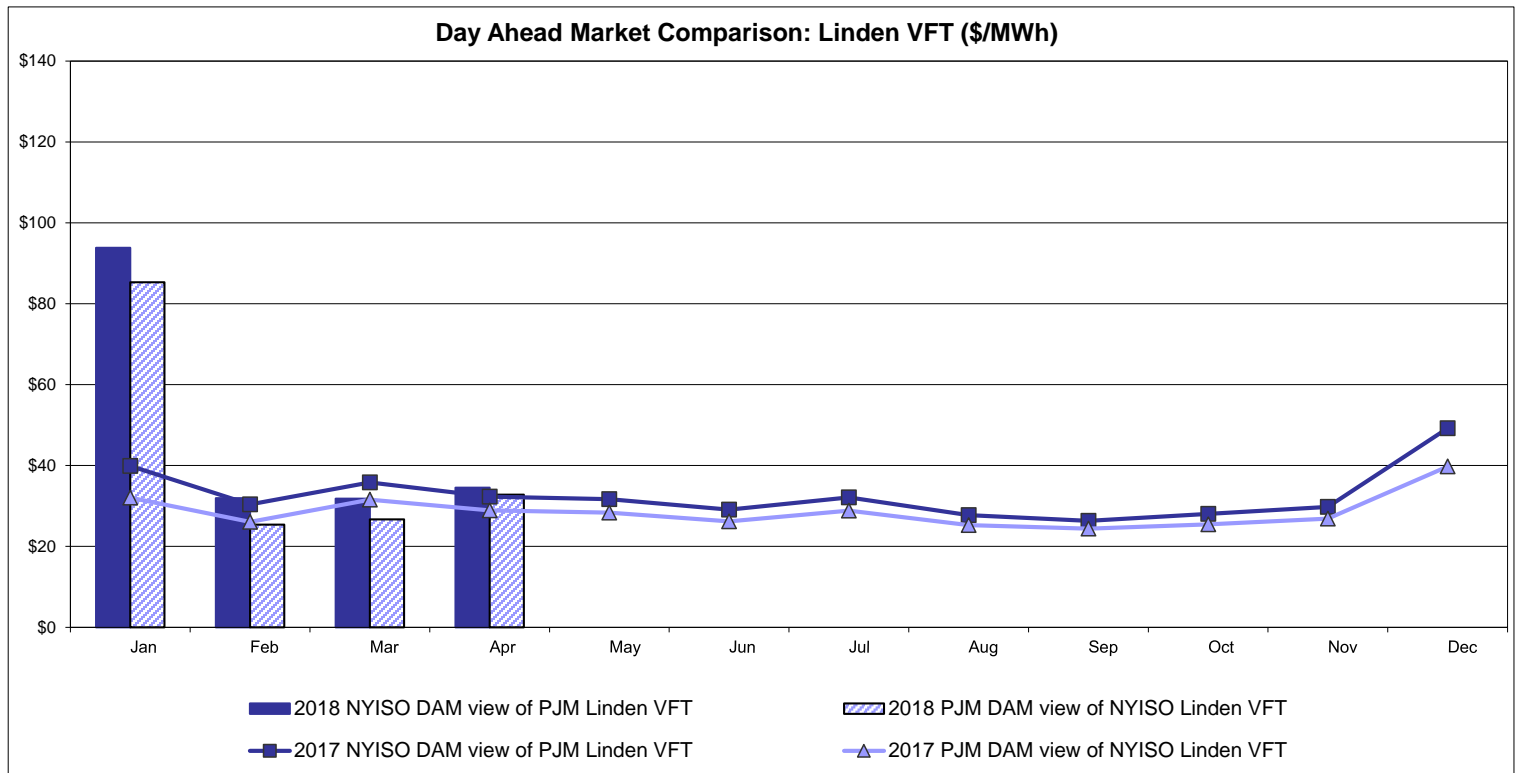


Real Time Market External Zone Comparison - HQ (\$/MWh)

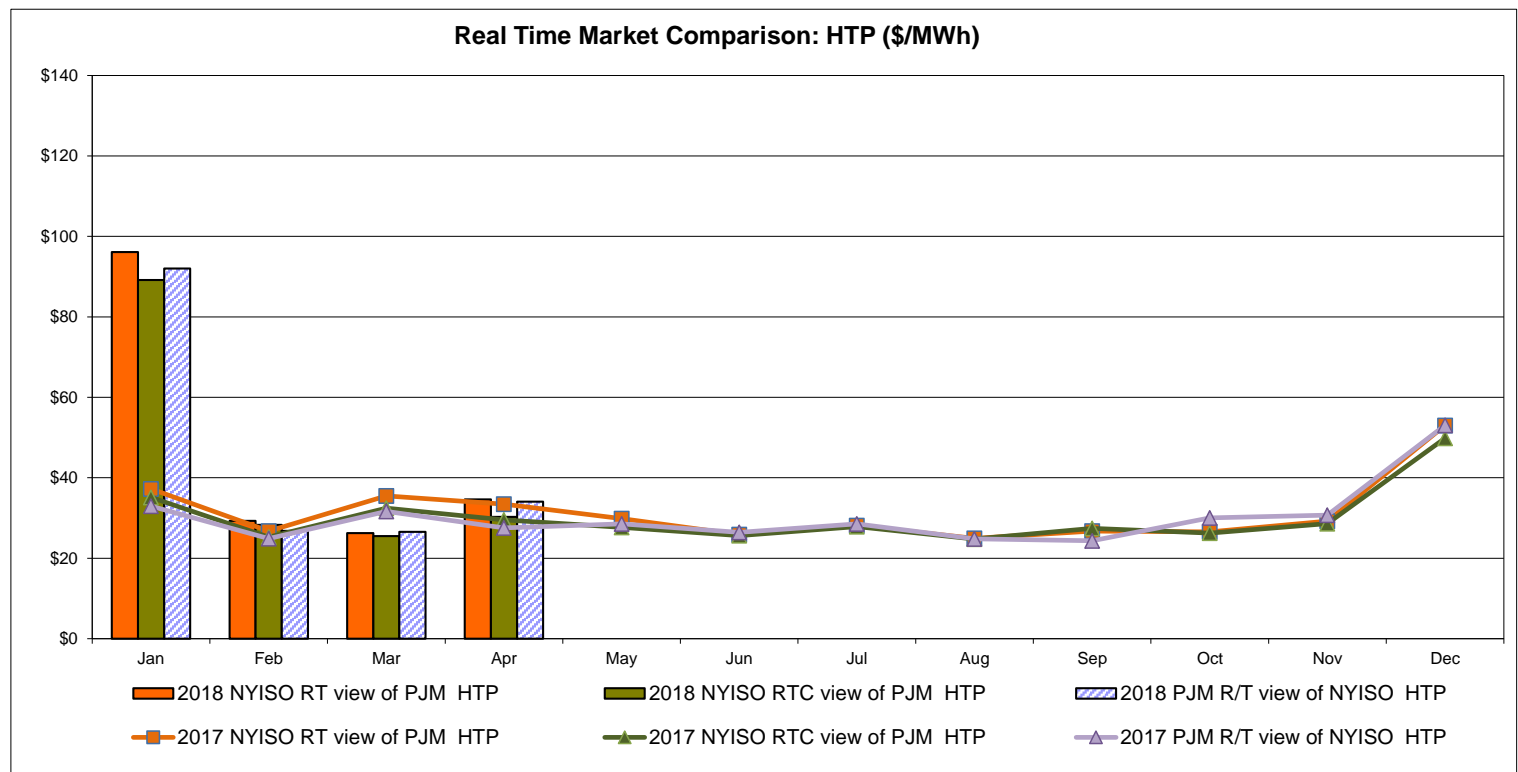
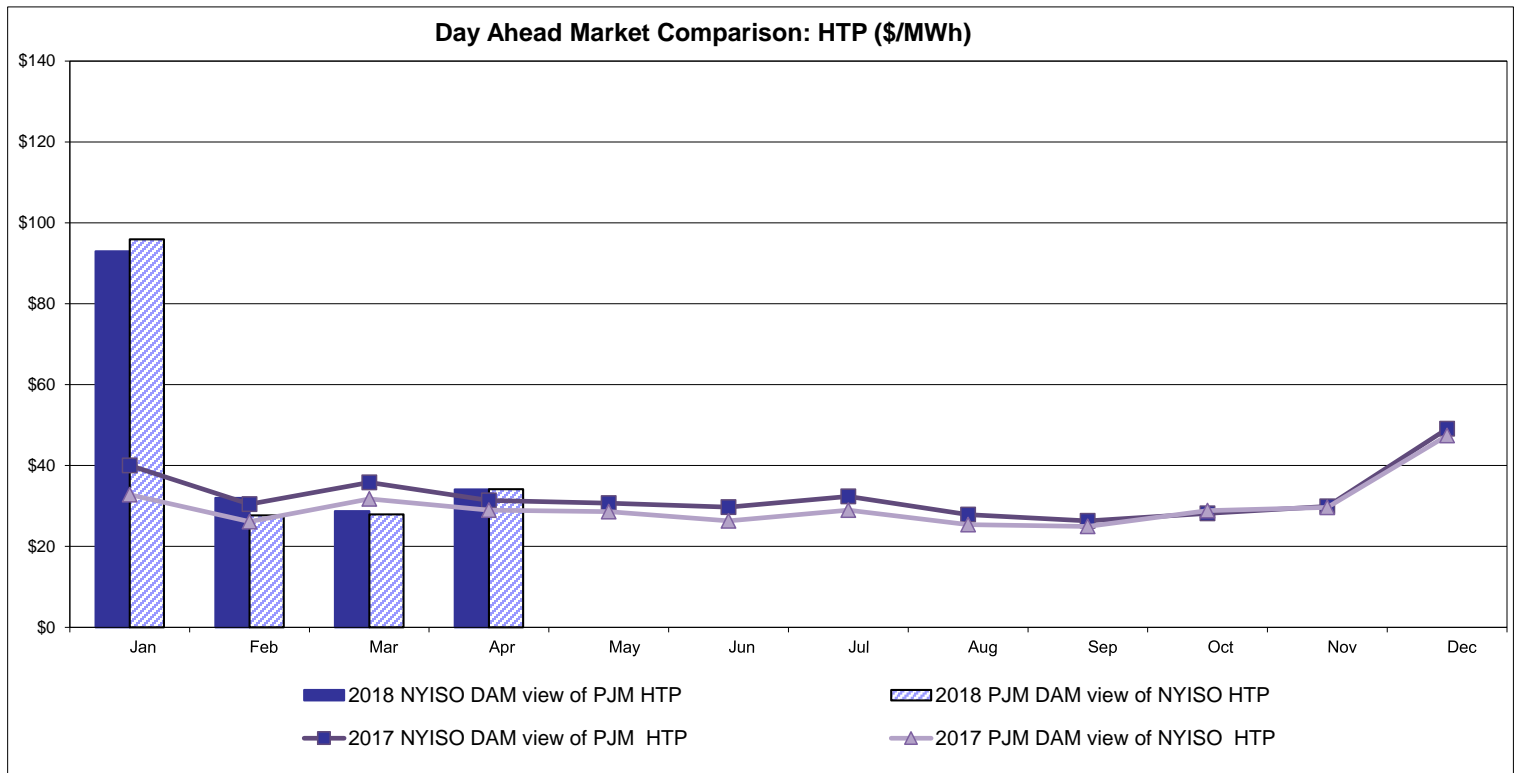


Note:  
Hydro-Quebec Prices are unavailable.

## External Controllable Line: Linden VFT (PJM)



## External Controllable Line: Hudson (PJM)

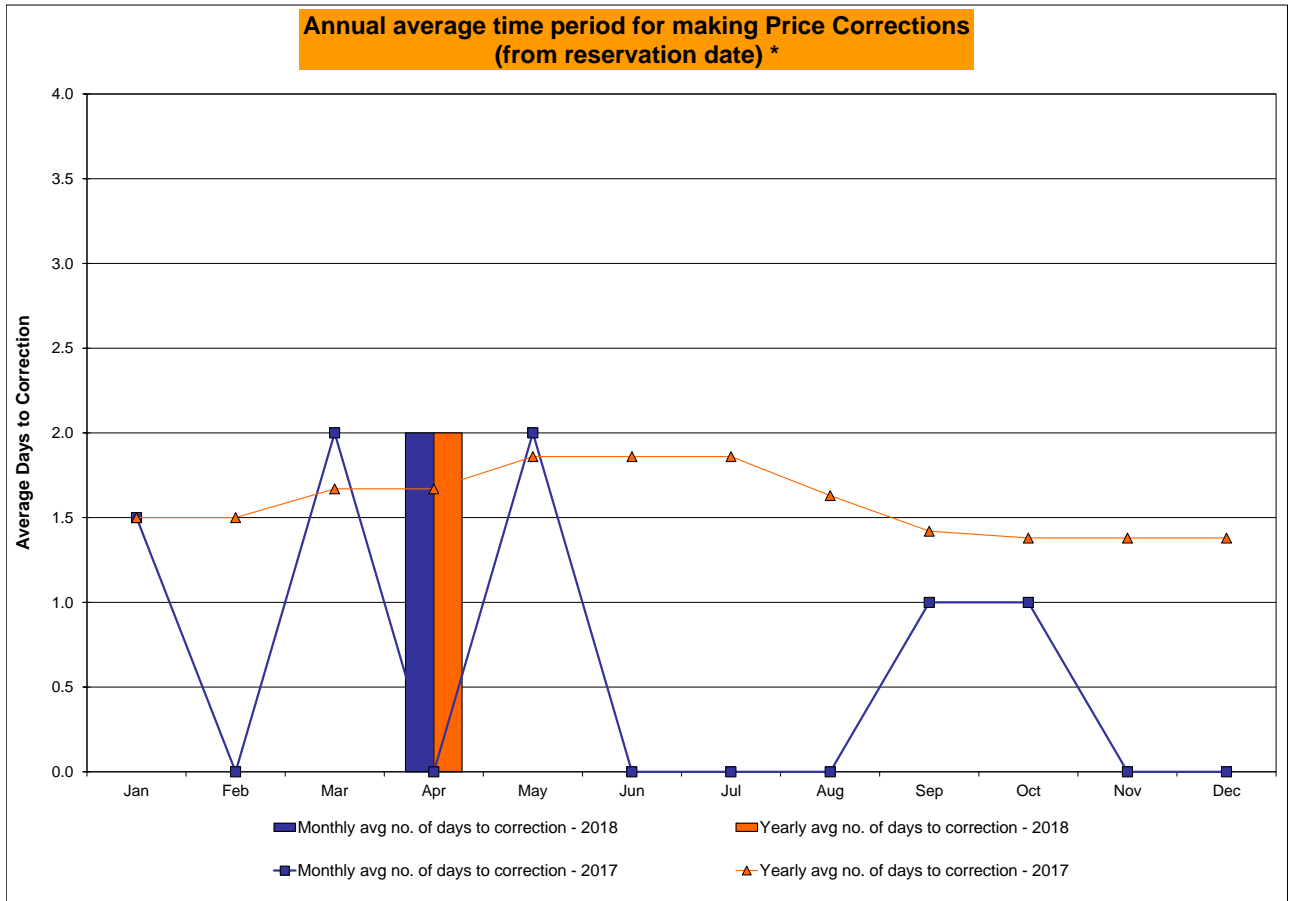
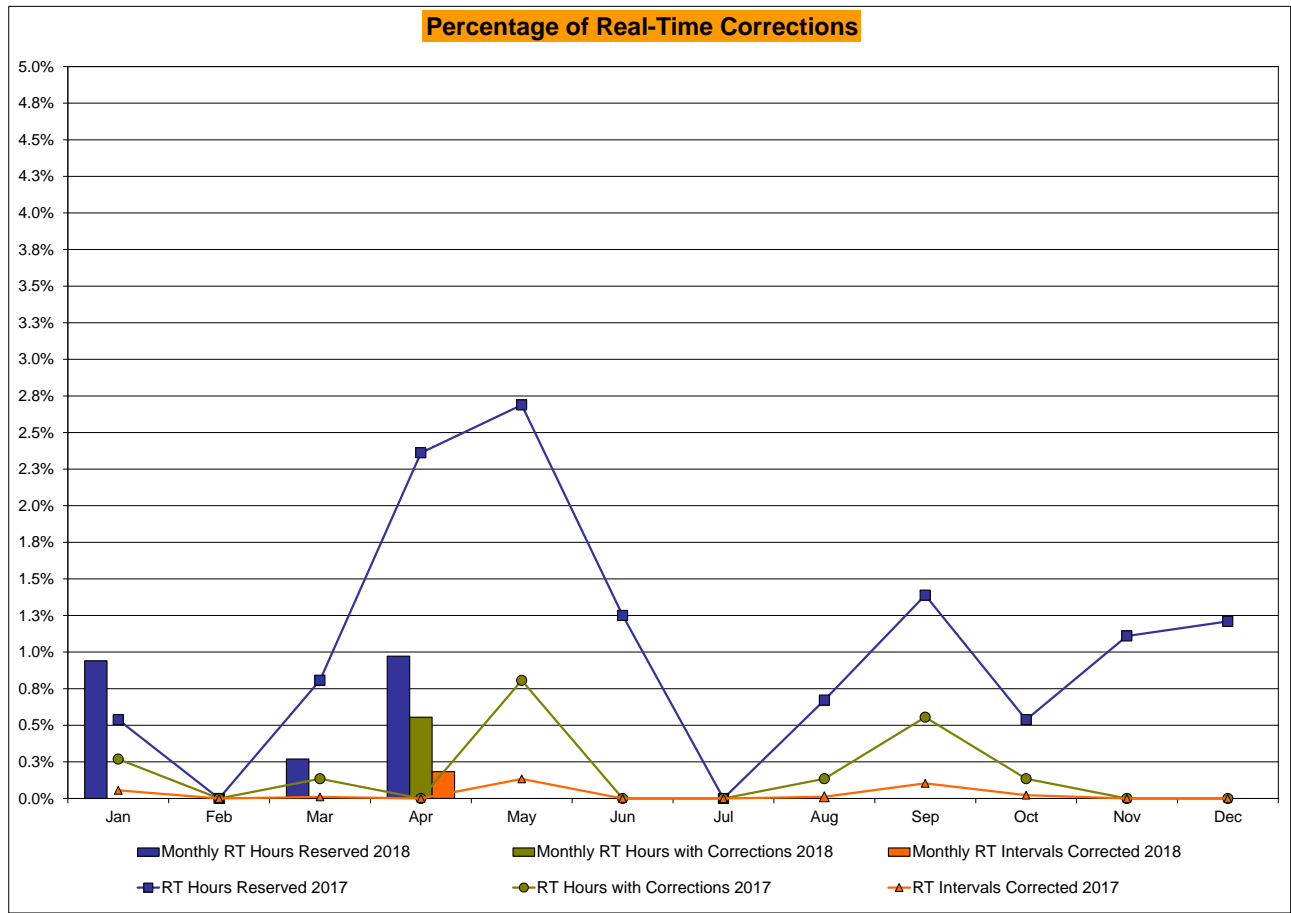


## NYISO Real Time Price Correction Statistics

<b>2018</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>Hour Corrections</b>													
Number of hours with corrections	in the month	0	0	0	4								
Number of hours	in the month	744	672	743	720								
% of hours with corrections	in the month	0.00%	0.00%	0.00%	0.56%								
% of hours with corrections	year-to-date	0.00%	0.00%	0.00%	0.14%								
<b>Interval Corrections</b>													
Number of intervals corrected	in the month	0	0	0	16								
Number of intervals	in the month	9,021	8,112	9,002	8,717								
% of intervals corrected	in the month	0.00%	0.00%	0.00%	0.18%								
% of intervals corrected	year-to-date	0.00%	0.00%	0.00%	0.05%								
<b>Hours Reserved</b>													
Number of hours reserved	in the month	7	0	2	7								
Number of hours	in the month	744	672	743	720								
% of hours reserved	in the month	0.94%	0.00%	0.27%	0.97%								
% of hours reserved	year-to-date	0.94%	0.49%	0.42%	0.56%								
<b>Days to Correction *</b>													
Avg. number of days to correction	in the month	0.00	0.00	0.00	2.00								
Avg. number of days to correction	year-to-date	0.00	0.00	0.00	2.00								
<b>Days Without Corrections</b>													
Days without corrections	in the month	31	28	31	28								
Days without corrections	year-to-date	31	59	90	118								
<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>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

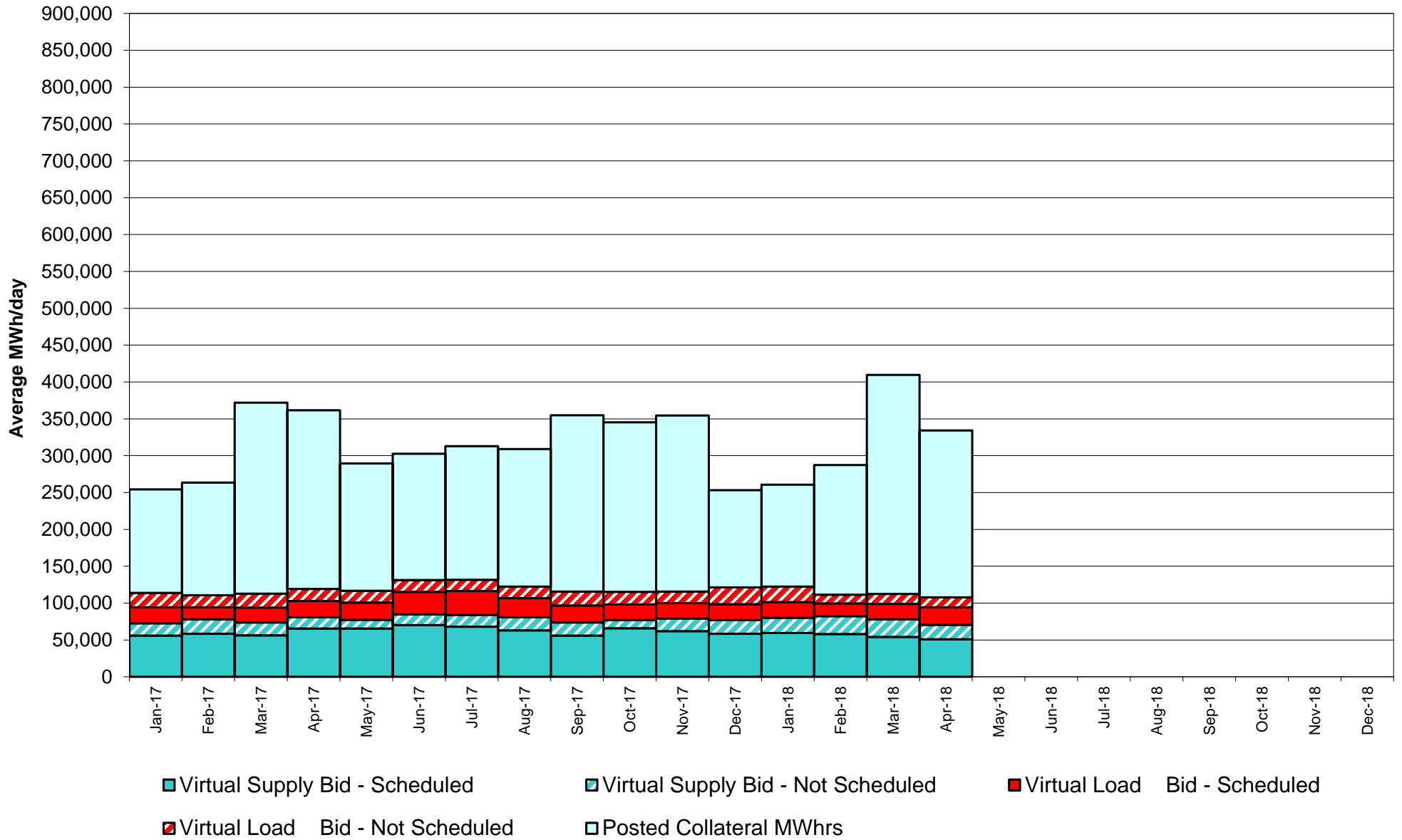
\* Calendar days from reservation date.



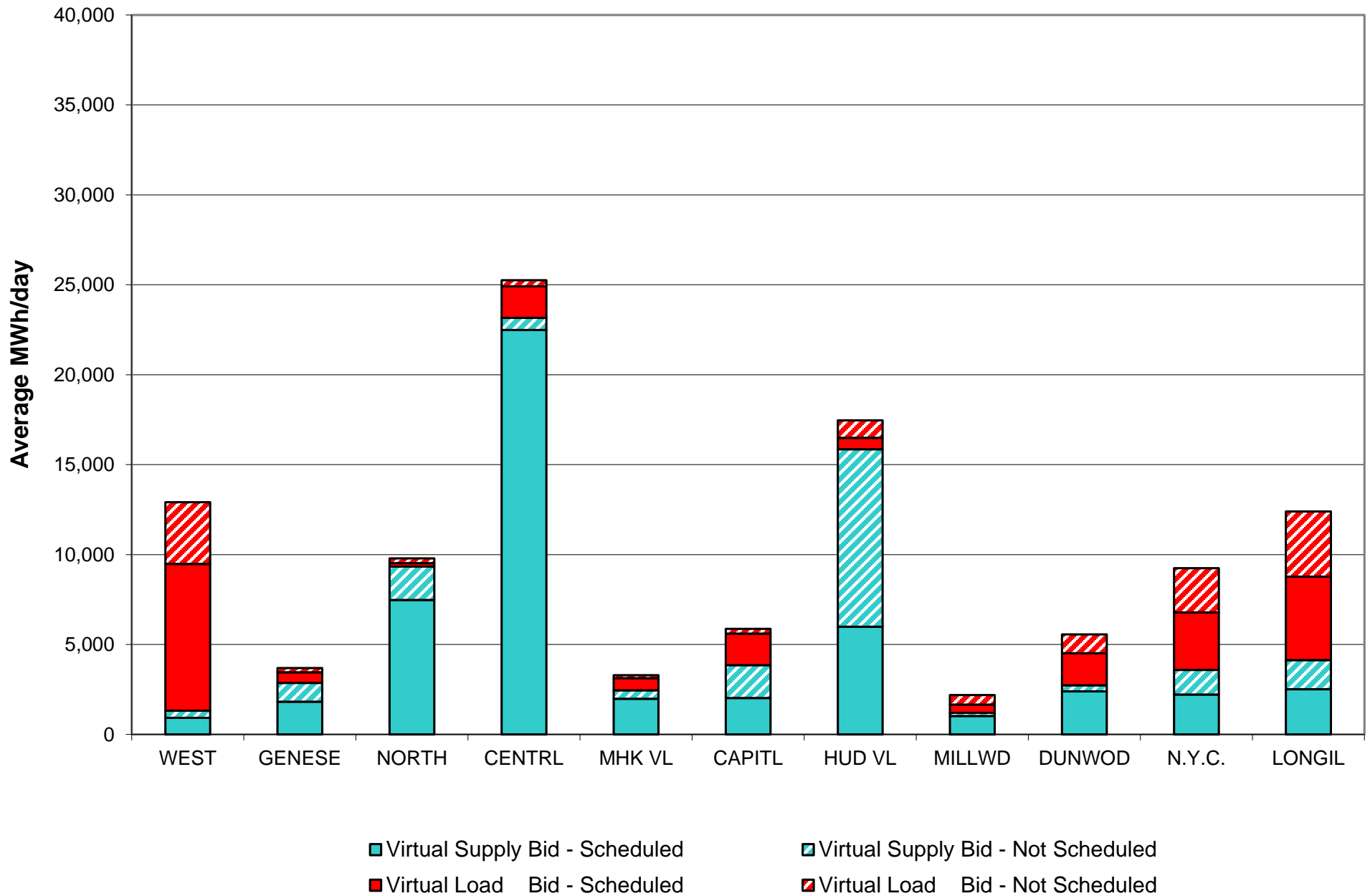


\* Calendar days from reservation date.

# NYISO Virtual Trading Average MWh per day



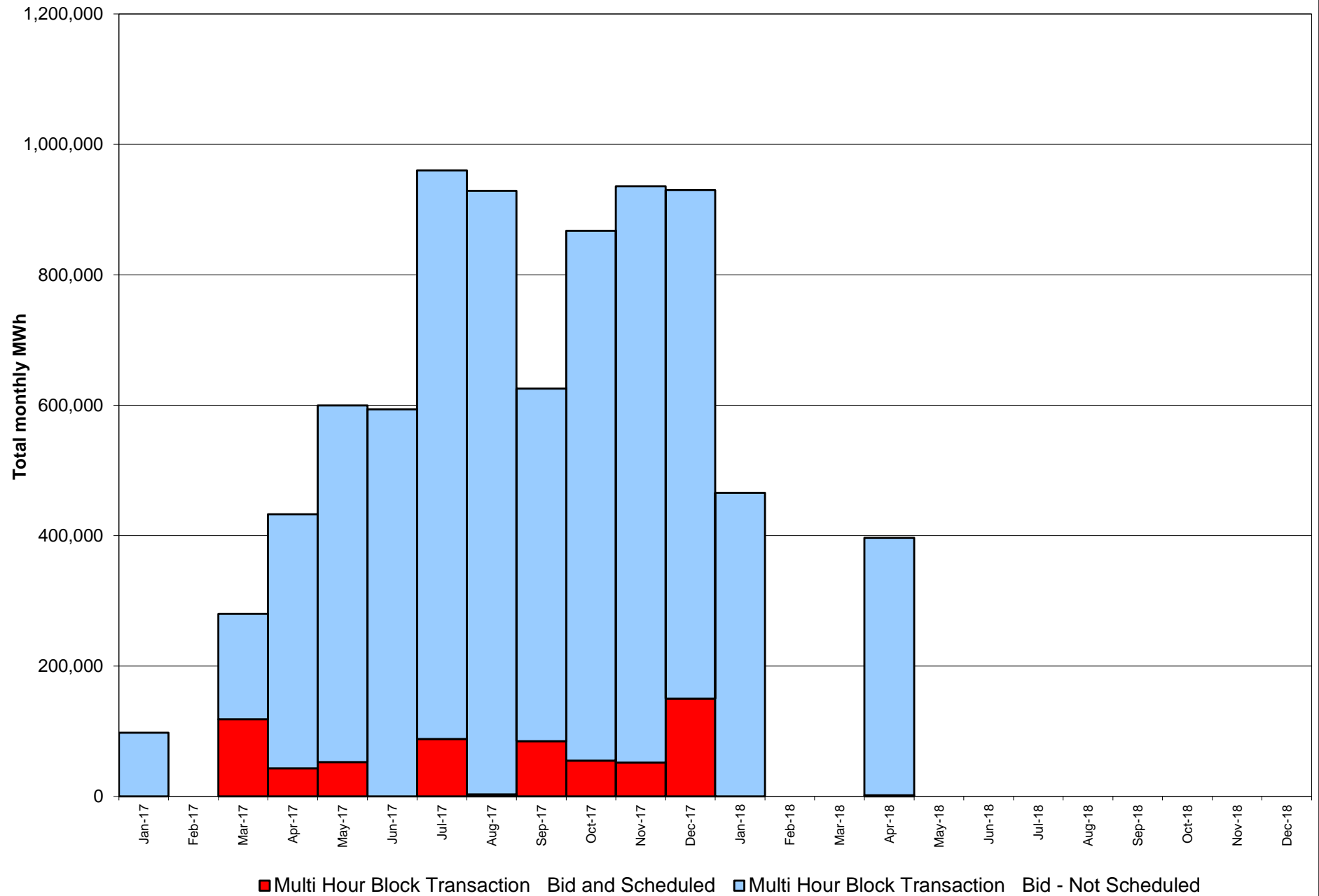
# Virtual Load and Supply Zonal Statistics through April 30, 2018



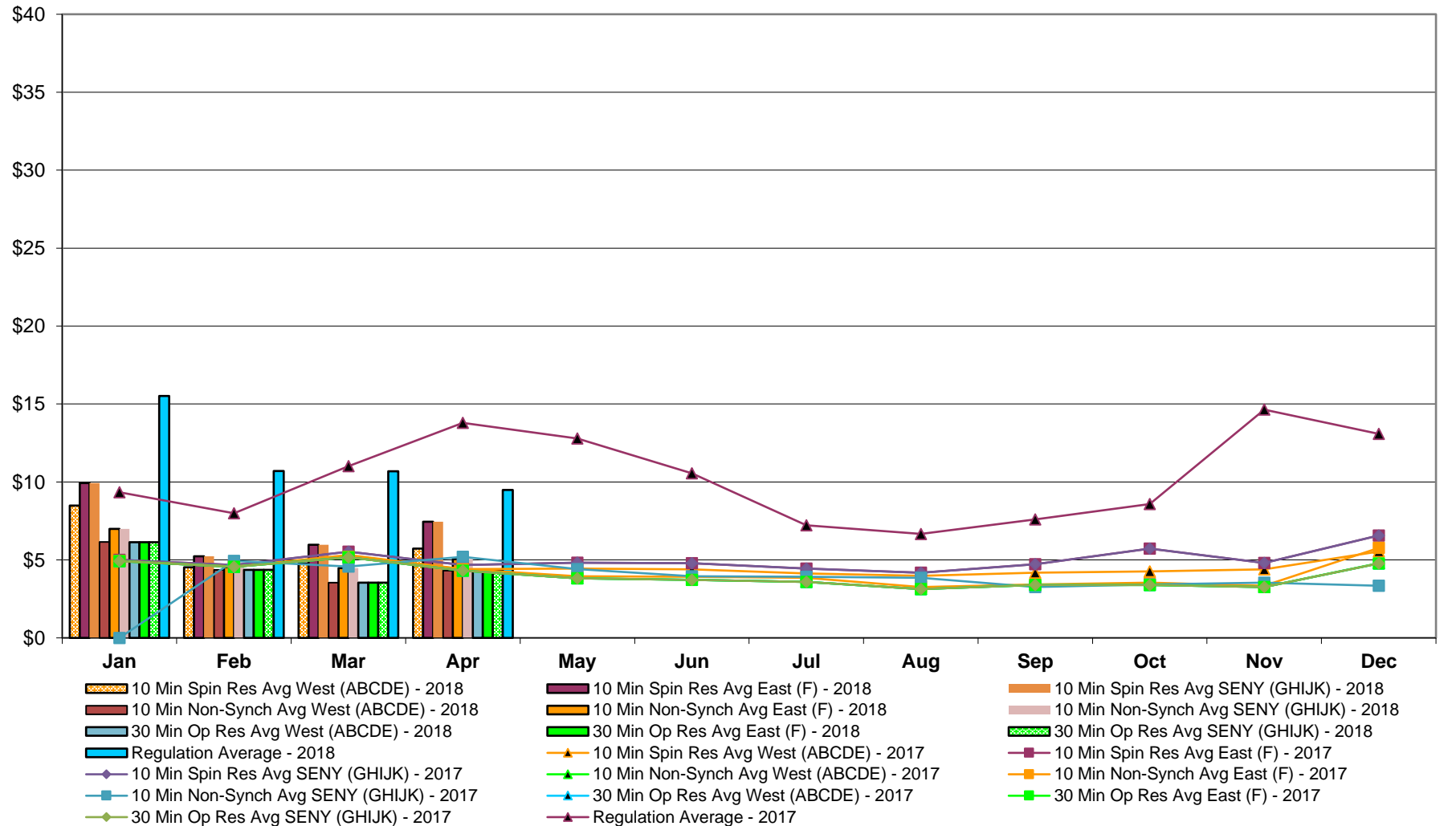
## Virtual Load and Supply Zonal Statistics (Average MWh/day) - 2018

		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
WEST	Jan-18	4,761	4,241	1,938	427	MHK VL	Jan-18	763	456	2,040	266	DUNWOD	Jan-18	1,795	1,509	2,215	620
	Feb-18	3,058	1,941	1,478	603		Feb-18	512	130	1,910	269		Feb-18	742	658	5,891	824
	Mar-18	7,263	2,535	860	659		Mar-18	569	139	1,896	309		Mar-18	1,367	755	3,530	487
	Apr-18	8,154	3,433	926	393		Apr-18	670	173	1,986	470		Apr-18	1,781	1,047	2,395	333
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				
GENESE	Jan-18	554	310	3,772	2,739	CAPITL	Jan-18	2,291	1,751	1,887	2,212	N.Y.C.	Jan-18	4,302	5,885	1,359	704
	Feb-18	525	172	1,723	2,671		Feb-18	1,822	269	1,331	2,799		Feb-18	5,644	4,187	1,181	1,086
	Mar-18	537	143	1,381	2,488		Mar-18	1,731	156	1,330	2,851		Mar-18	2,346	4,931	1,727	1,285
	Apr-18	587	234	1,818	1,047		Apr-18	1,743	263	2,032	1,826		Apr-18	3,190	2,460	2,212	1,376
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				
NORTH	Jan-18	274	282	8,259	3,265	HUD VL	Jan-18	1,562	1,285	5,029	7,218	LONGIL	Jan-18	3,335	3,714	1,932	1,622
	Feb-18	352	369	7,449	2,777		Feb-18	888	740	4,703	8,761		Feb-18	2,800	2,591	3,061	2,605
	Mar-18	249	367	6,995	2,136		Mar-18	845	1,098	5,169	10,837		Mar-18	3,613	3,021	3,308	1,768
	Apr-18	189	269	7,479	1,848		Apr-18	639	973	5,990	9,863		Apr-18	4,649	3,620	2,505	1,620
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				
CENTRL	Jan-18	983	434	28,975	647	MILLWD	Jan-18	923	988	2,033	757	NYISO	Jan-18	21,542	20,854	59,437	20,478
	Feb-18	595	215	28,161	483		Feb-18	486	337	1,284	1,197		Feb-18	17,423	11,608	58,172	24,075
	Mar-18	1,977	208	26,643	614		Mar-18	720	141	1,144	421		Mar-18	21,217	13,494	53,984	23,855
	Apr-18	1,753	334	22,490	677		Apr-18	466	526	1,031	163		Apr-18	23,821	13,330	50,864	19,613
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				

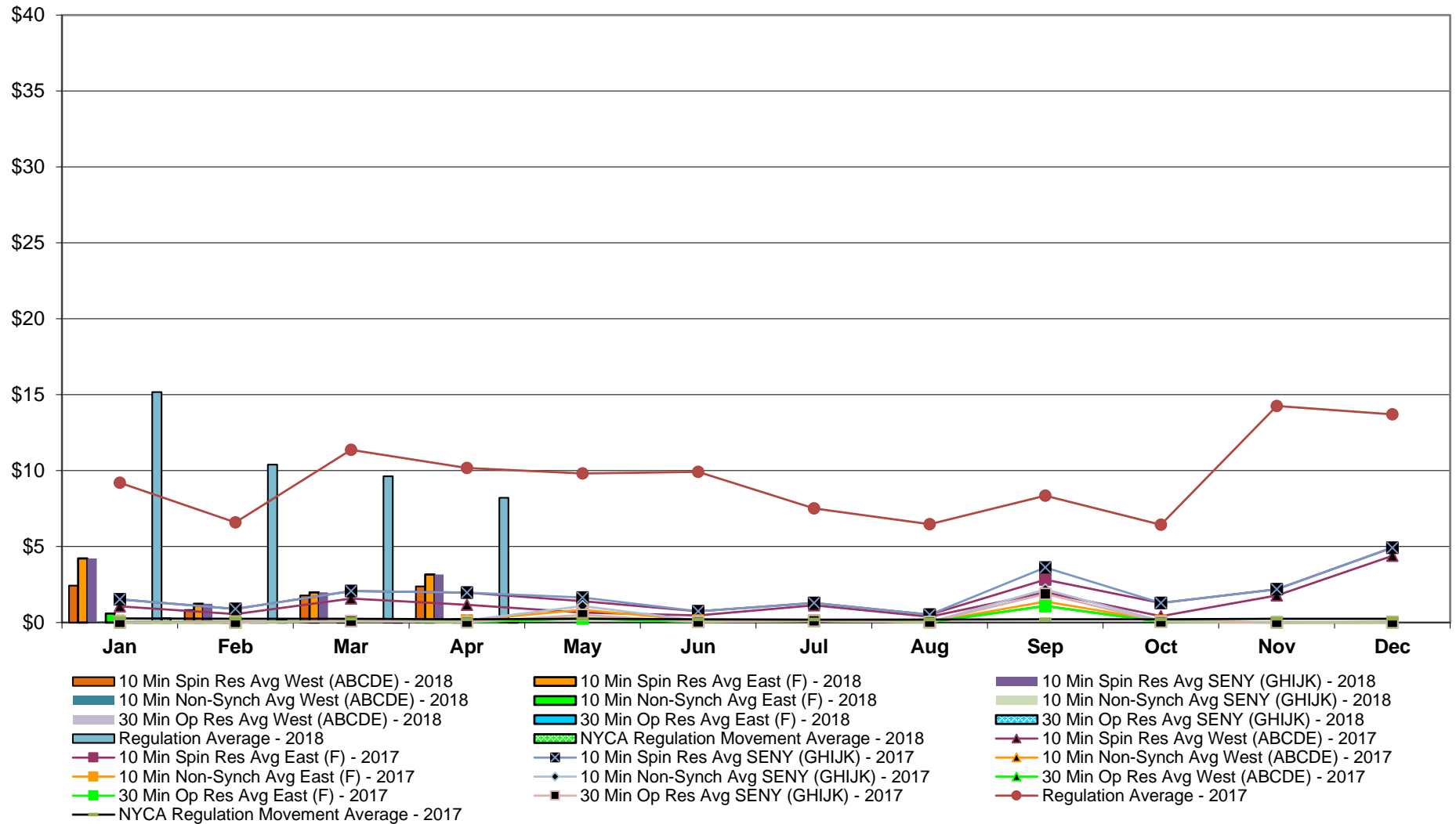
# NYISO Multi Hour Block Transactions Monthly Total MWh



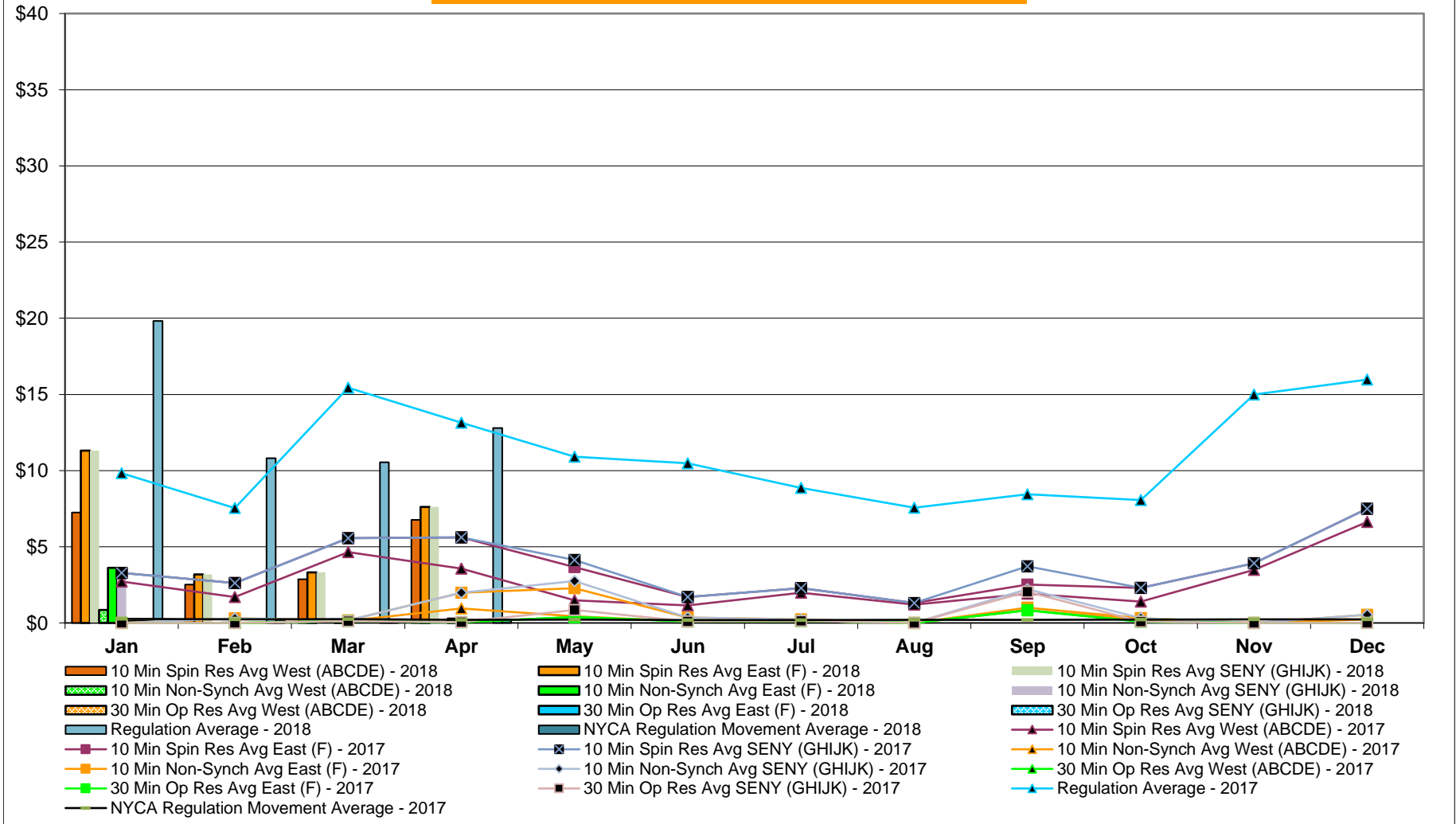
## NYISO Monthly Average Ancillary Service Prices Day Ahead Market 2017 - 2018



## NYISO Monthly Average Ancillary Service Prices RTC Market 2017 - 2018



## NYISO Monthly Average Ancillary Service Prices Real Time Market 2017 - 2018



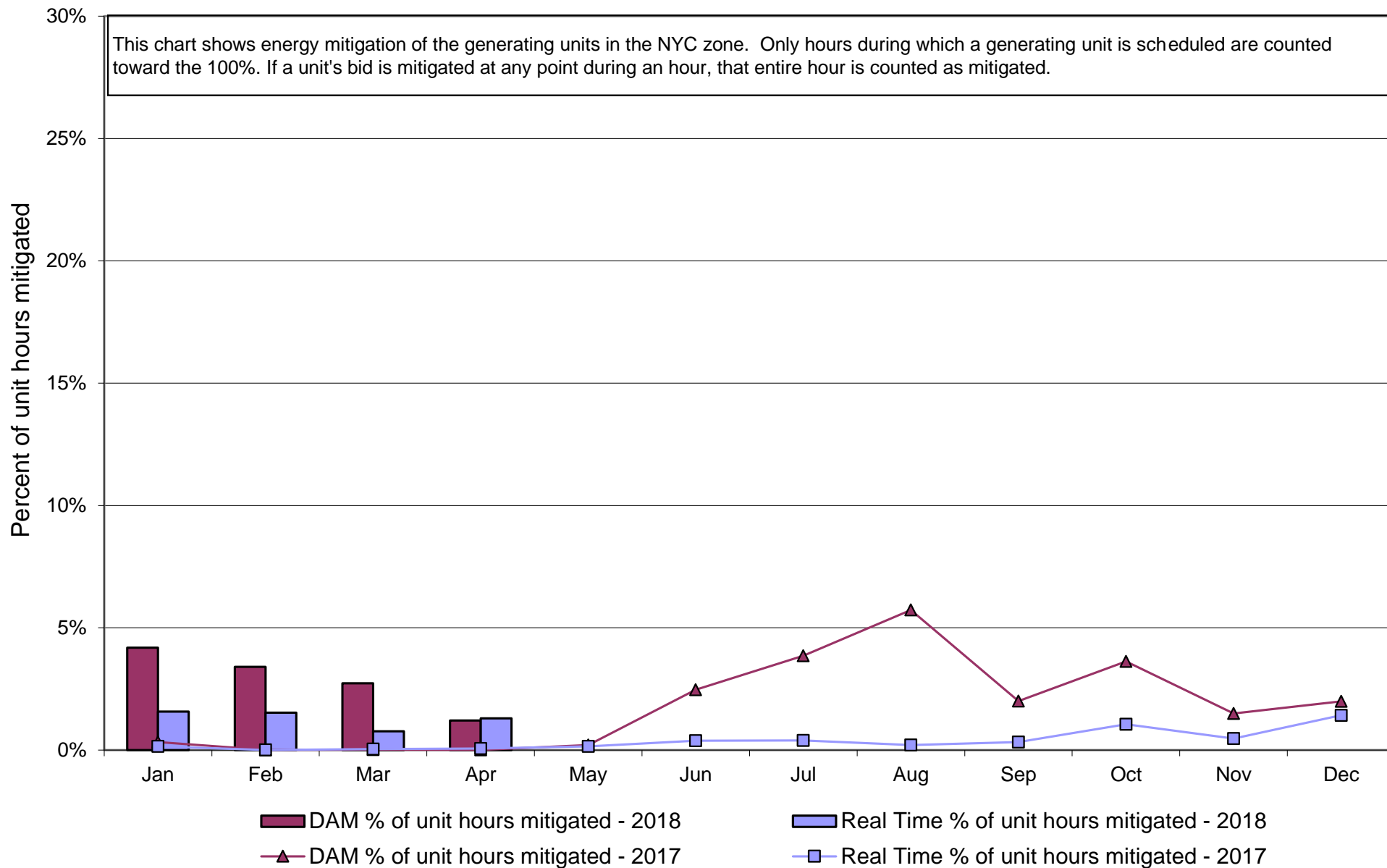


# NYISO Markets Ancillary Services Statistics - Unweighted Price (\$/MWH)

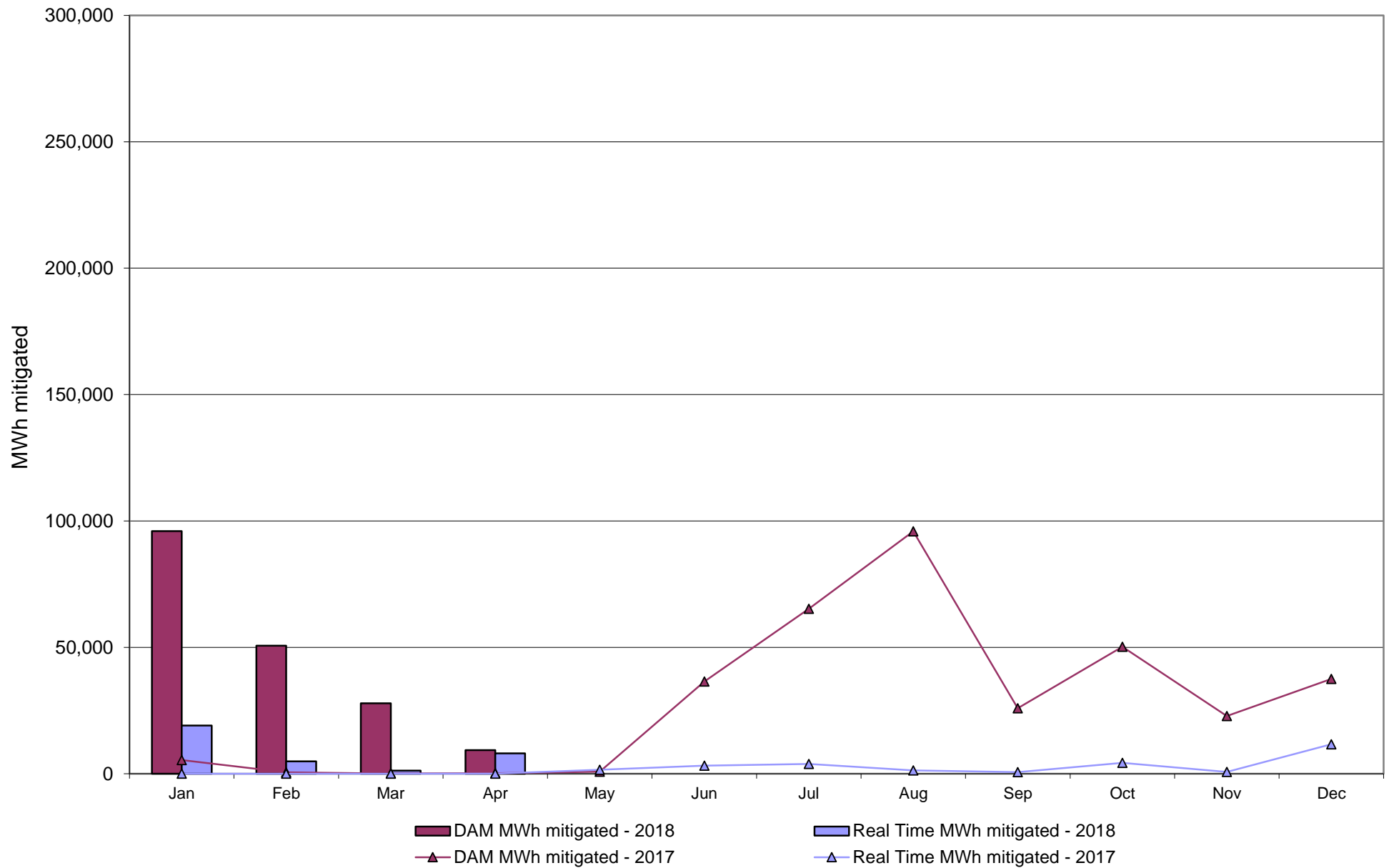
<b>2018</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b><u>Day Ahead Market</u></b>												
10 Min Spin SENE (GHIJK)	9.93	5.24	5.97	7.45								
10 Min Spin East (F)	9.93	5.24	5.97	7.45								
10 Min Spin West (ABCDE)	8.49	4.53	4.78	5.73								
10 Min Non Synch SENE (GHIJK)	6.99	4.54	4.48	5.05								
10 Min Non Synch East (F)	6.99	4.54	4.48	5.05								
10 Min Non Synch West (ABCDE)	6.15	4.36	3.54	4.31								
30 Min SENE (GHIJK)	6.14	4.36	3.54	4.31								
30 Min East (F)	6.14	4.36	3.54	4.31								
30 Min West (ABCDE)	6.14	4.36	3.54	4.31								
Regulation	15.51	10.70	10.68	9.49								
<b><u>RTC Market</u></b>												
10 Min Spin SENE (GHIJK)	4.23	1.24	1.98	3.17								
10 Min Spin East (F)	4.23	1.24	1.98	3.17								
10 Min Spin West (ABCDE)	2.43	0.82	1.79	2.38								
10 Min Non Synch SENE (GHIJK)	0.59	0.03	0.01	0.22								
10 Min Non Synch East (F)	0.59	0.03	0.01	0.22								
10 Min Non Synch West (ABCDE)	0.08	0.02	0.00	0.00								
30 Min SENE (GHIJK)	0.08	0.02	0.00	0.00								
30 Min East (F)	0.08	0.02	0.00	0.00								
30 Min West (ABCDE)	0.08	0.02	0.00	0.00								
Regulation	15.17	10.40	9.63	8.22								
NYCA Regulation Movement	0.26	0.21	0.20	0.22								
<b><u>Real Time Market</u></b>												
10 Min Spin SENE (GHIJK)	11.31	3.19	3.31	7.62								
10 Min Spin East (F)	11.31	3.19	3.31	7.62								
10 Min Spin West (ABCDE)	7.24	2.52	2.86	6.77								
10 Min Non Synch SENE (GHIJK)	3.61	0.01	0.19	0.28								
10 Min Non Synch East (F)	3.61	0.01	0.19	0.28								
10 Min Non Synch West (ABCDE)	0.85	0.00	0.00	0.00								
30 Min SENE (GHIJK)	0.13	0.00	0.00	0.00								
30 Min East (F)	0.13	0.00	0.00	0.00								
30 Min West (ABCDE)	0.13	0.00	0.00	0.00								
Regulation	19.82	10.82	10.54	12.80								
NYCA Regulation Movement	0.24	0.21	0.20	0.21								
<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><u>Day Ahead Market</u></b>												
10 Min Spin SENE (GHIJK)	5.01	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)	5.01	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)	4.94	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 SENE (GHIJK)	4.94	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)	4.94	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)	4.92	5.20	4.84	5.58	4.68	4.32	5.72	6.15	5.10	4.82	4.39	4.43
30 Min SENE (GHIJK)	4.92	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)	4.92	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)	4.92	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
Regulation	9.34	8.19	8.05	7.93	6.11	7.00	8.19	8.61	7.00	8.57	7.77	13.80
<b><u>RTC Market</u></b>												
10 Min Spin SENE (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)	1.06	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 SENE (GHIJK)	0.06	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)	0.06	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)	0.00	0.00	0.00	0.14	0.04	0.02	1.18	3.80	0.16	0.08	0.00	0.00
30 Min SENE (GHIJK)	0.00	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)	0.00	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)	0.00	0.00	0.00	0.14	0.04	0.02	0.93	3.27	0.15	0.08	0.00	0.00
Regulation	9.21	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	0.27	0.21	0.20	0.25	0.25	0.23	0.23	0.24	0.24	0.26	0.24	0.26
<b><u>Real Time Market</u></b>												
10 Min Spin SENE (GHIJK)	3.29	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)	3.29	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)	2.71	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 SENE (GHIJK)	0.00	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)	0.00	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)	0.00	0.00	0.00	0.26	0.03	0.04	1.65	3.56	0.21	0.11	0.00	0.00
30 Min SENE (GHIJK)	0.00	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)	0.00	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)	0.00	0.00	0.00	0.25	0.03	0.04	0.97	3.12	0.21	0.11	0.00	0.00
Regulation	9.83	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	0.27	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) 2017 - 2018

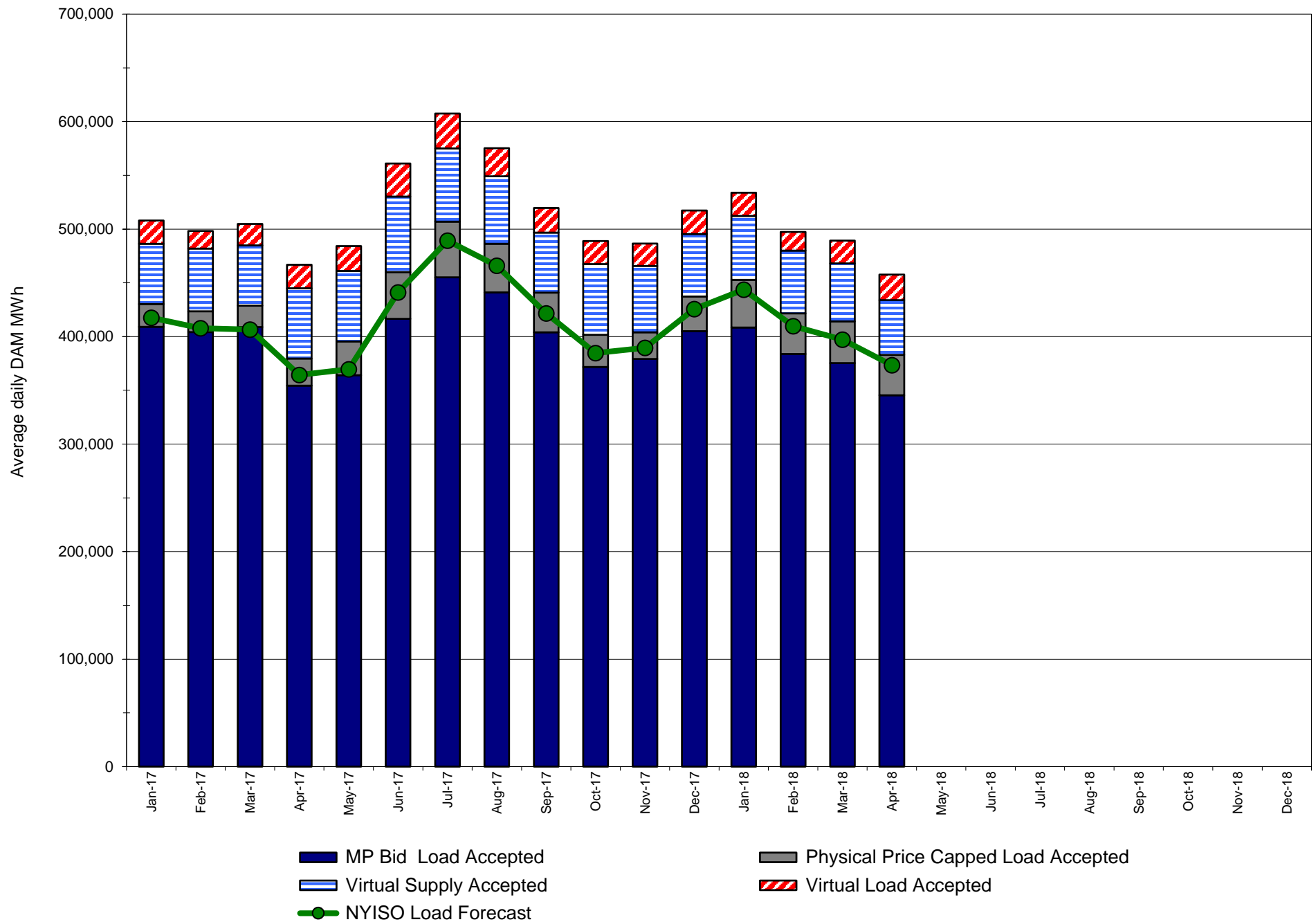
### Percentage of committed unit-hours mitigated



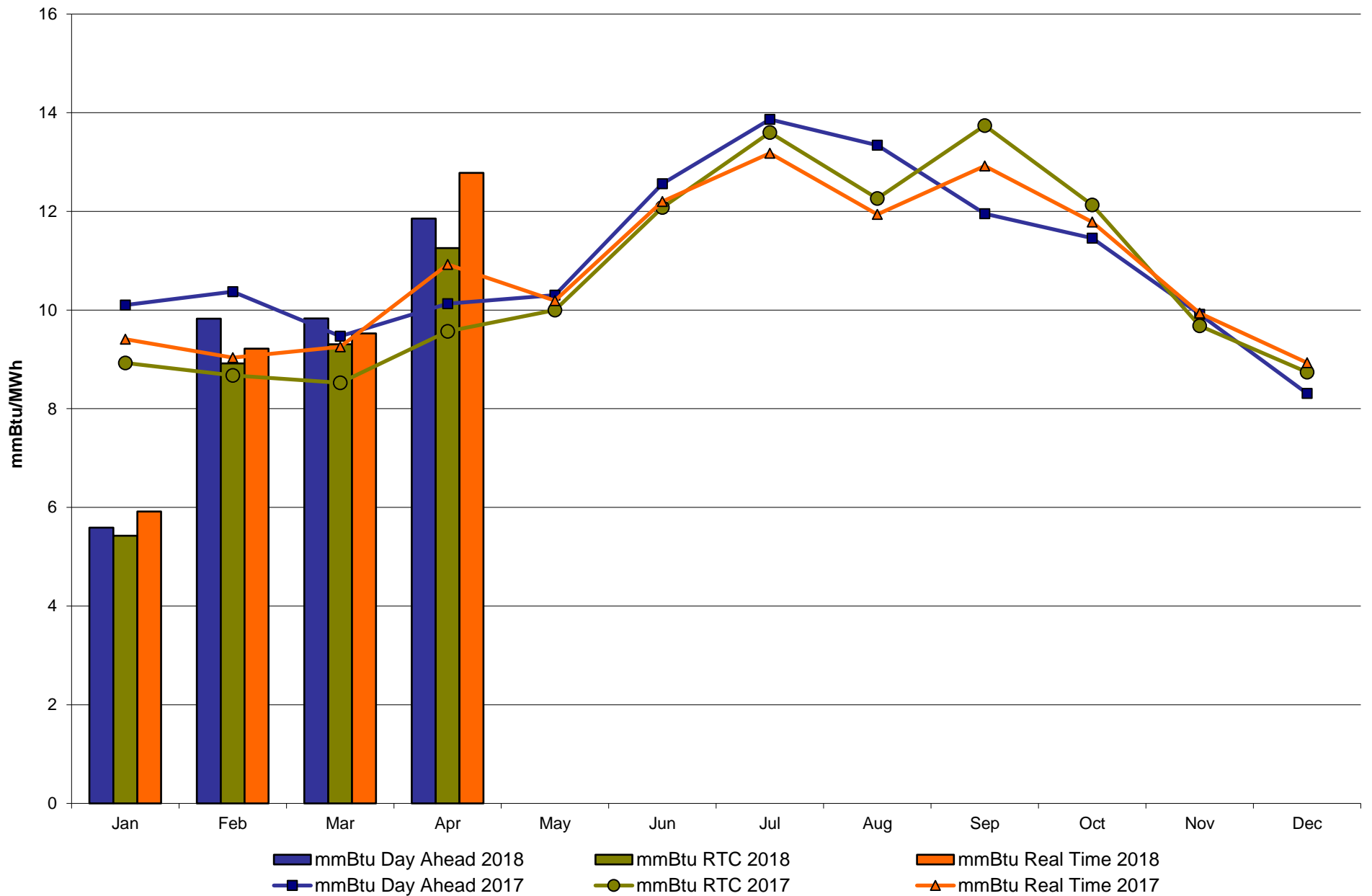
# NYISO In City Energy Mitigation (NYC Zone) 2017 - 2018 Monthly megawatt hours mitigated



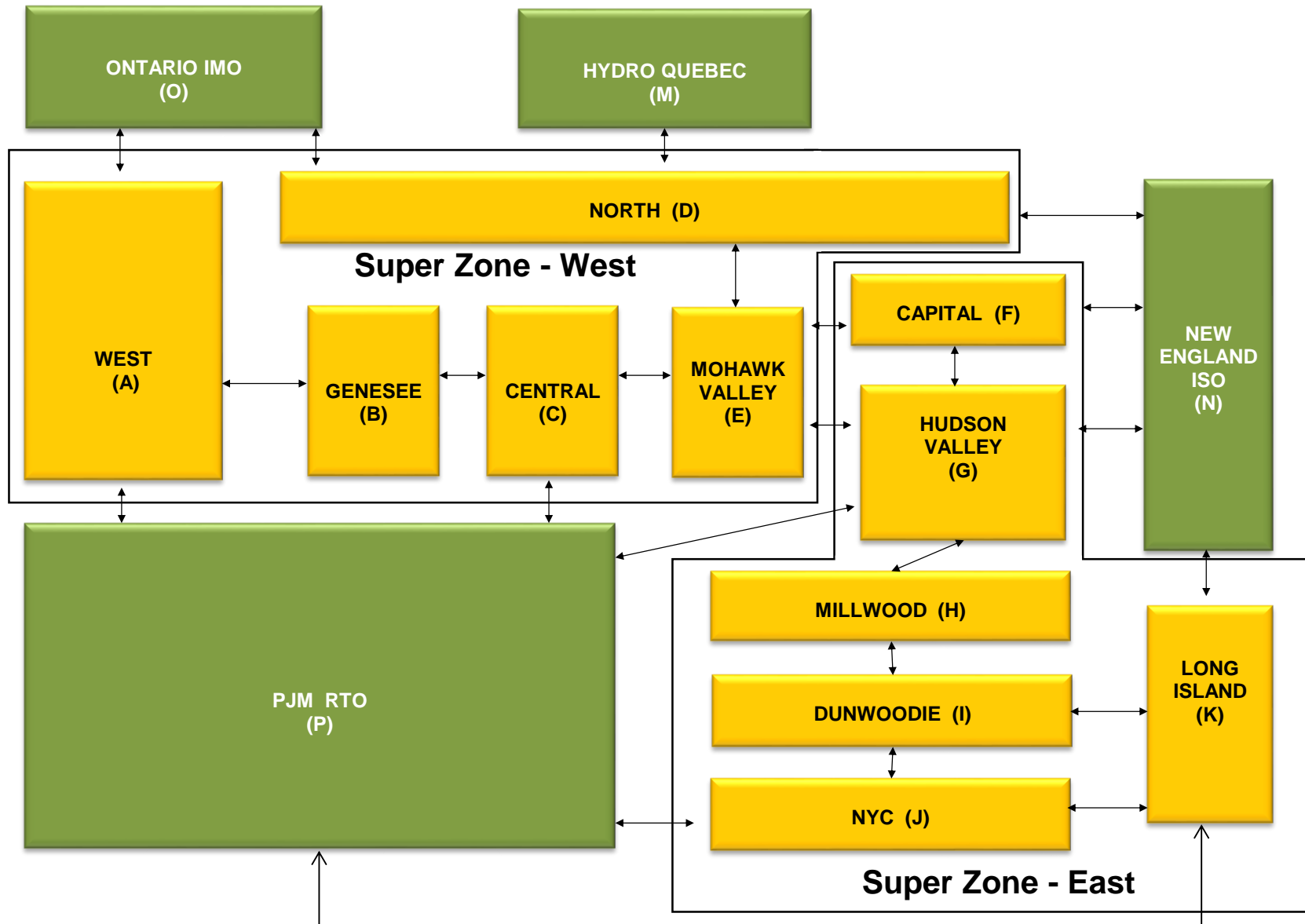
# NYISO Average Daily DAM Load Bid Summary



# Monthly Implied Heat Rate 2017-2018



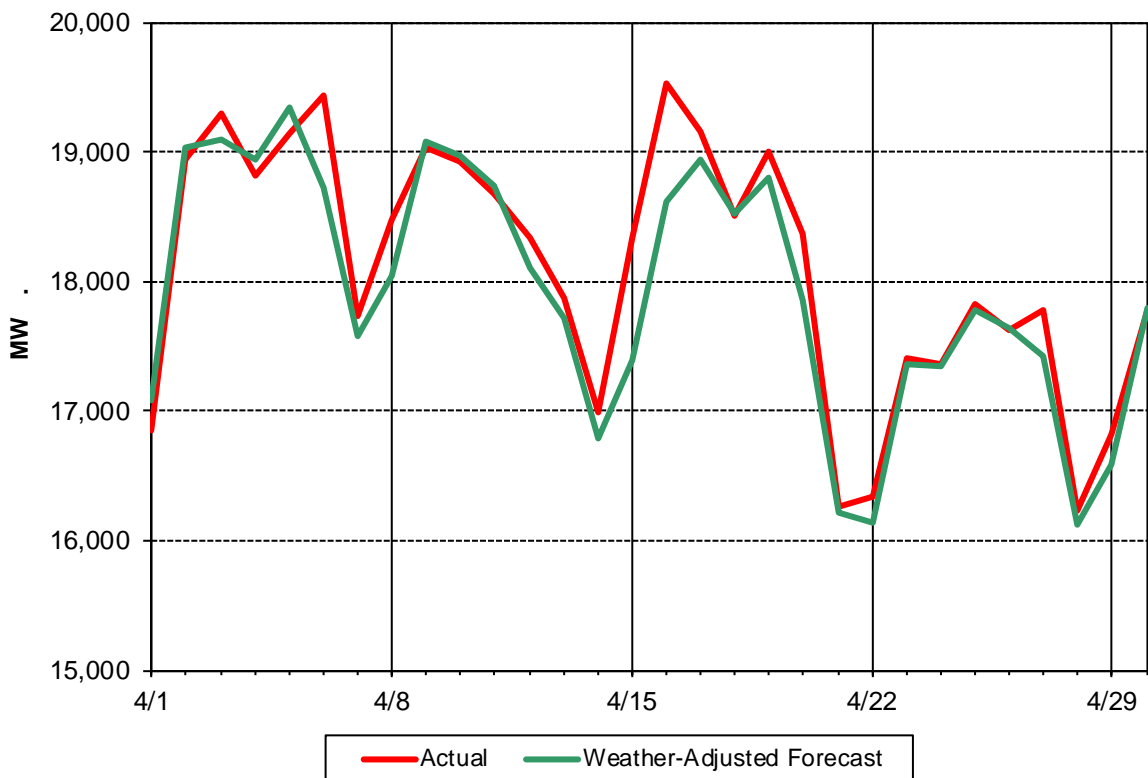
# NYISO LBMP ZONES



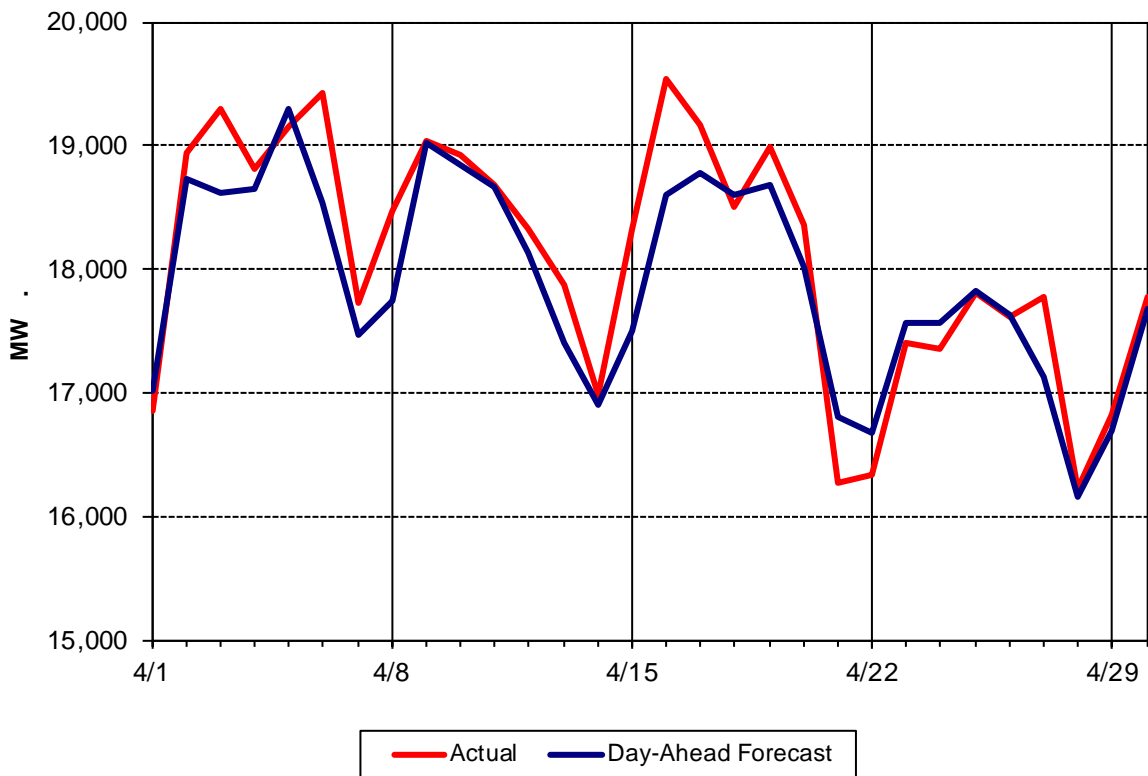
### Billing Codes for Chart C

<u>Chart - C Category Name</u>	<u>Billing Code</u>	<u>Billing Category Name</u>
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 - April 2018**  
**Actual vs. Weather-Adjusted Forecast**

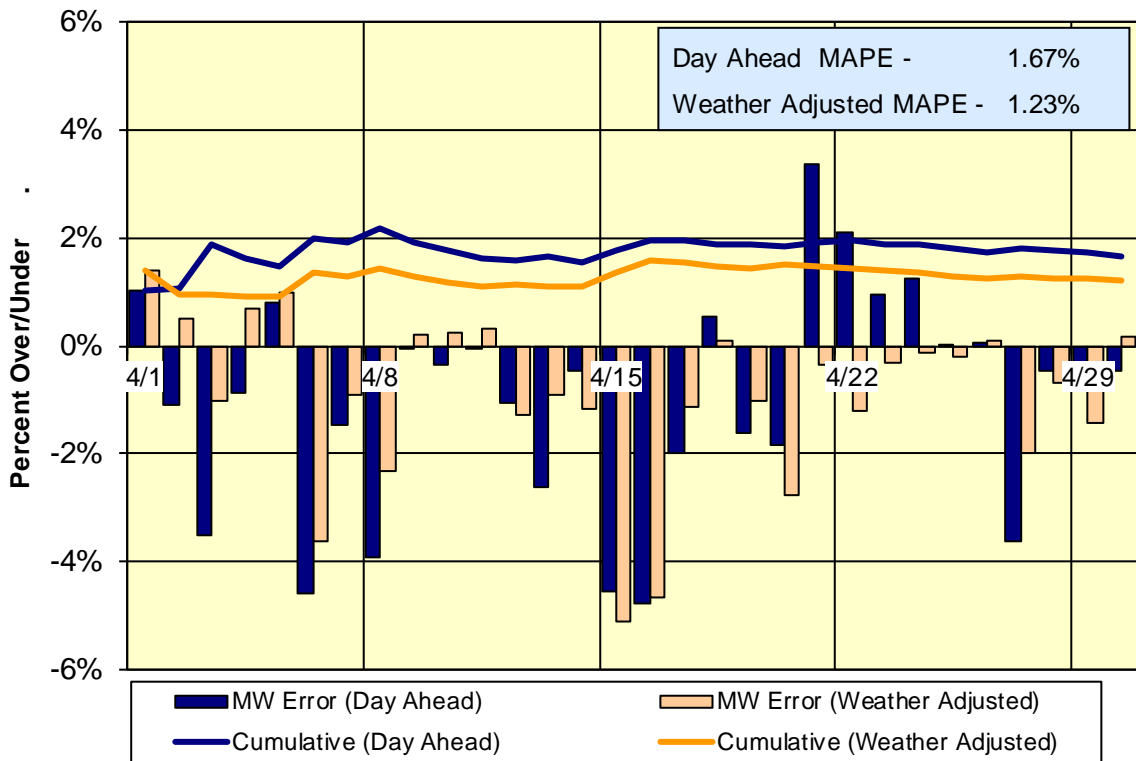


**NYISO Daily Peak Load - April 2018**  
**Actual vs. Forecast**

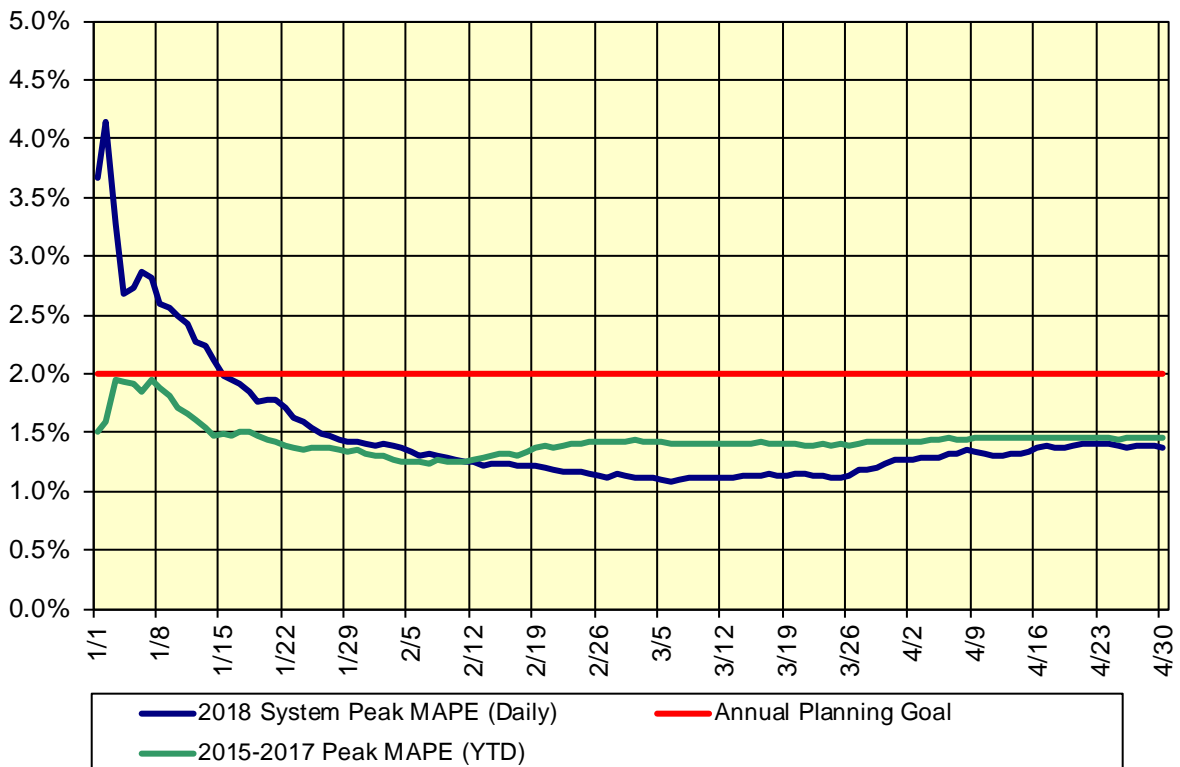




### Day Ahead Peak Forecast - April 2018 Percent Error - Actual & Weather Adjusted



### Day-Ahead Forecast Accuracy - Cumulative Performance 2018 Year-to-Date



**Summary Description of Regulatory Filings, Investigations,  
Rulemakings and Related Orders in NYISO Matters – April 2018**

<b>Filing Date</b>	<b>Filing Summary</b>	<b>Docket</b>	<b>Order Date</b>	<b>Order Summary</b>
01/02/2018	NYISO filing re: answer to Entergy Nuclear request for clarification/rehearing of 11/16/2017 Order on NYISO's RMR compliance filing	ER16-120-004 EL15-37-003	04/23/2018	Order granted in part, denied in part the request for clarification and rehearing and directed NYISO to submit a further compliance filing
01/16/2018 03/15/2018	NYISO compliance filing re: RMR related revisions	ER16-120-005 ER16-120-006	04/24/2018	Order accepted revisions effective 10/20/2015, as requested
03/29/2018	NYISO 205 filing re: provision of synchronized reserves by inverter-based energy storage resources	ER18-1231-000	04/30/2018	Order accepted revisions effective 05/30/2018, as requested
03/30/2018	NYISO 205 filing re: price correction deadlines	ER18-1261-000	04/30/2018	Order accepted revisions effective 05/30/2018, as requested
04/02/2018	NYISO annual compliance report re: unreserved use and late study penalties	OA08-109-000		
04/02/2018	NYISO confidential filing to the NYPSC re: annual FERC Form 715 Annual Transmission Planning and Evaluation Report	PSC Matter No. 10-02007		
04/06/2018	NYISO filing re: refiling of a corrected tariff section base for the 03/19/2018 Order No. 1000 compliance filing	ER13-102-013		
04/06/2018	NYISO 205 filing re: modify the requirement to annually perform certain informational calculations related to DAM Net Congestion Rent settlements	ER18-1307-000		
04/06/2018	NYISO 205 filing re: modify the projected true-up credit requirement	ER18-1308-000		
04/13/2018	NYISO motion to intervene and comment re: Brookfield Energy Marketing tariff waiver request concerning its ICAP monthly auction offer and its external CRIS rights offer requirement	ER18-1177-000		
04/16/2018	NYISO confidential filing to the NYPSC re: three-month Reliability Commitment Data Report for the period ending 03/31/2018	PSC Matter No. 10-02007		
04/17/2018	NYISO filing re: FERC Reporting Requirement 582 – total megawatt-hours of transmission service in interstate commerce for the calendar year 2017	No Docket No.		

04/18/2018	NYISO motion to intervene and comment re: Bayonne Energy Center request for waiver of certain interconnection requirements	ER18-1301-000		
04/20/2018	NYISO 205 filing re: Solar Resources - Forecasting Data and Service Costs	ER18-1408-000		
04/24/2018	NYISO filing re: 1 <sup>st</sup> Quarter 2018 EQR Report	ER02-2001-000		
04/27/2018	NYISO filing on behalf of Niagara Mohawk Power Corporation ("NMPC") re: Interconnection Agreement between NMPC and the Village of Ilion (SA No. 2416)	ER18-1451-000		