

Operations Performance Metrics Monthly Report



March 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 April 10, 2017.

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March 2017 Operations Performance Highlights

- Peak load of 21,689 MW occurred on 03/15/2017 HB 19
- All-time winter capability period peak load of 25,738 MW occurred on 1/7/2014 HB 18
- 2.3 hours of Thunder Storm Alerts were declared
- 0 hours of NERC TLR level 3 curtailment
- On 03/08/2017 there was a high wind storm event that led to multiple transmission line outages. West Zone generation and Ontario imports were reduced to manage system reliability.
- NYISO achieved a wind energy record of 1,574 MW on 03/02/2017 HB12 providing 9% of the state's power generation.
- The following table identifies the estimated production cost savings associated with the Broader Regional Market initiatives.

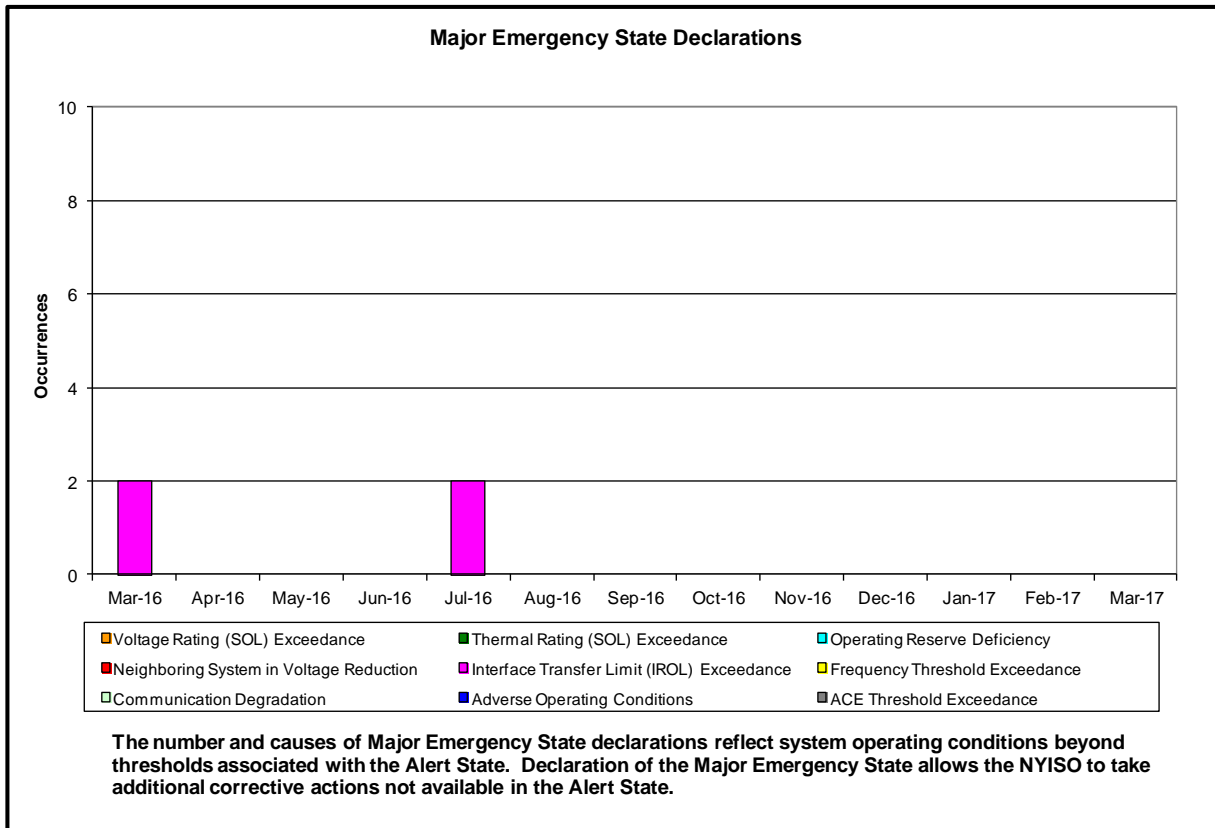
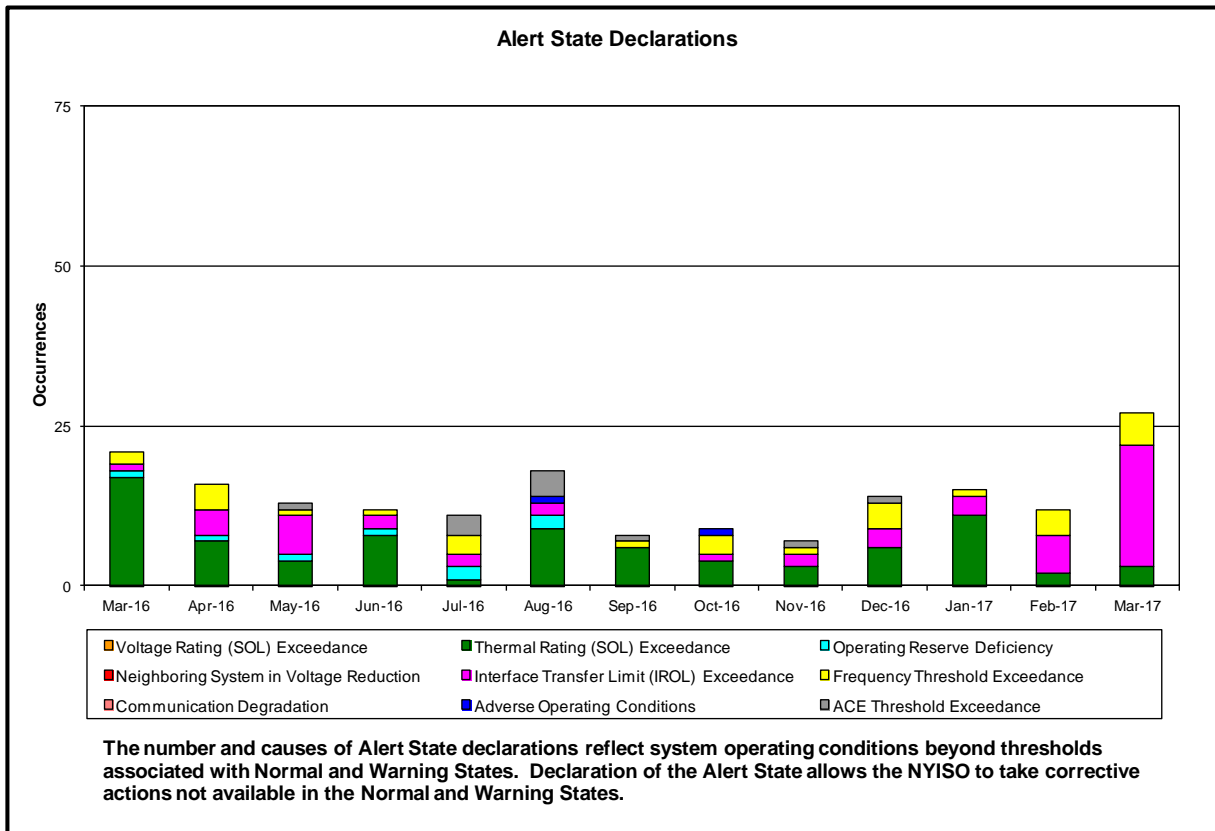
	Current Month Value (\$M)	Year-to-Date Value (\$M)
NY Savings from PJM-NY Congestion Coordination	\$2.93	\$5.46
NY Savings from PJM-NY Coordinated Transaction Scheduling	(\$0.10)	(\$0.07)
NY Savings from NE-NY Coordinated Transaction Scheduling	(\$0.14)	(\$0.56)
Total NY Savings	\$2.69	\$4.83
Regional Savings from PJM-NY Coordinated Transaction Scheduling	\$0.26	\$0.46
Regional Savings from NE-NY Coordinated Transaction Scheduling	\$0.12	\$0.28
Total Regional Savings	\$0.38	\$0.74

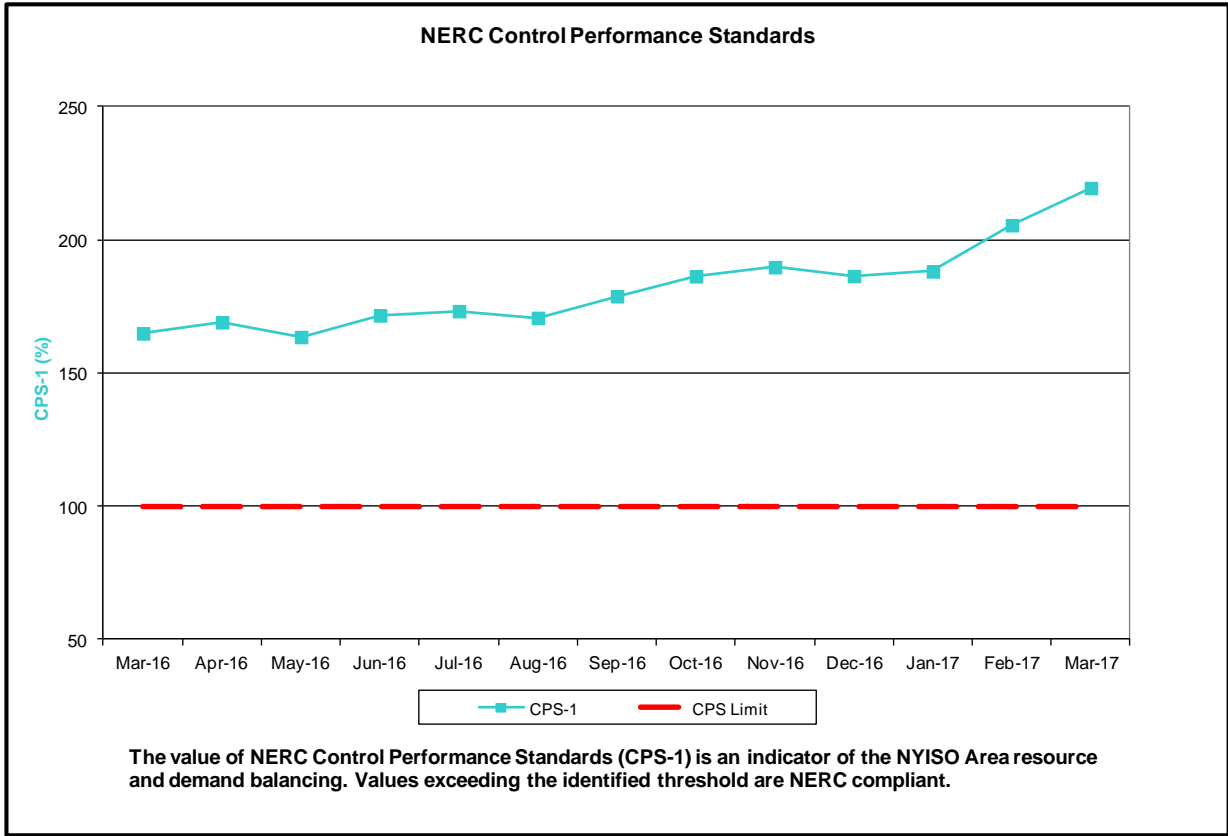
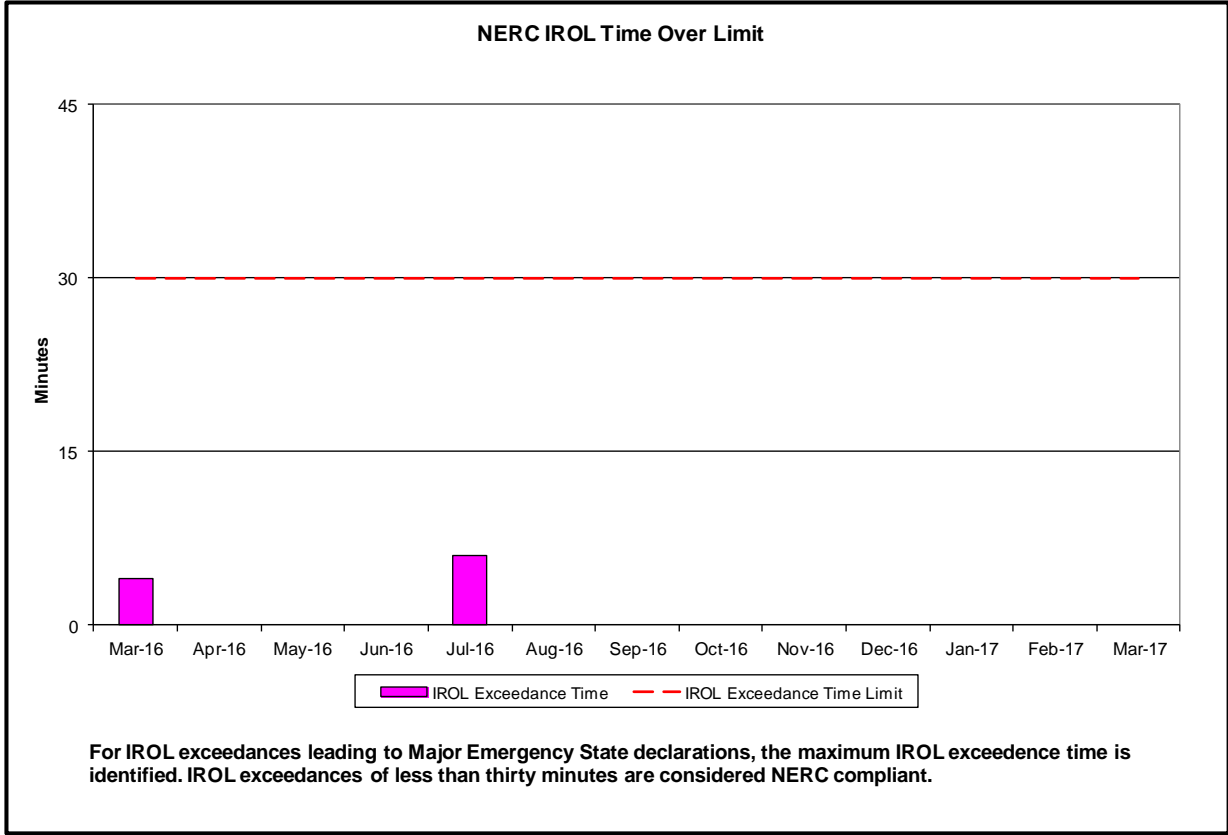
- Statewide uplift cost monthly average was **(\$0.67)/MWh**
- The following table identifies the Monthly ICAP spot market prices by locality and price delta

Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
April 2017 Spot Price	\$0.35	\$3.25	\$3.25	\$0.35
March 2017 Spot Price	\$0.71	\$3.30	\$3.30	\$0.71
Delta	(\$0.36)	(\$0.05)	(\$0.05)	(\$0.36)

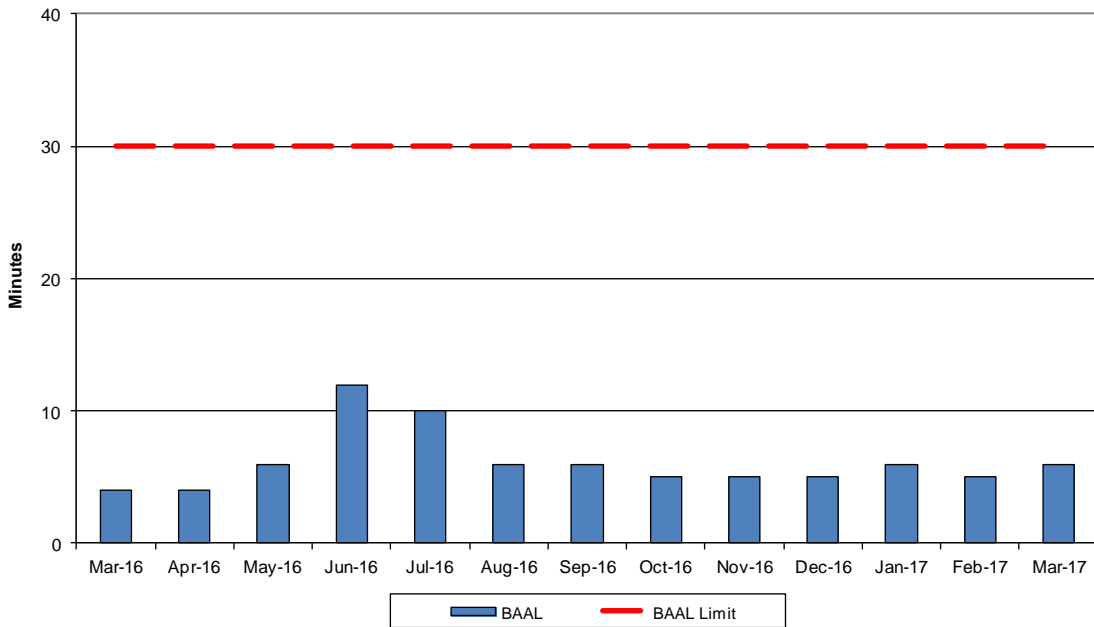
- NYCA - Price decreases by \$0.36 due to increase in generator UCAP available and imports.
- NYCA Price converged with the LI Price
- LHV Price converged with the NYC Price

- Reliability Performance Metrics



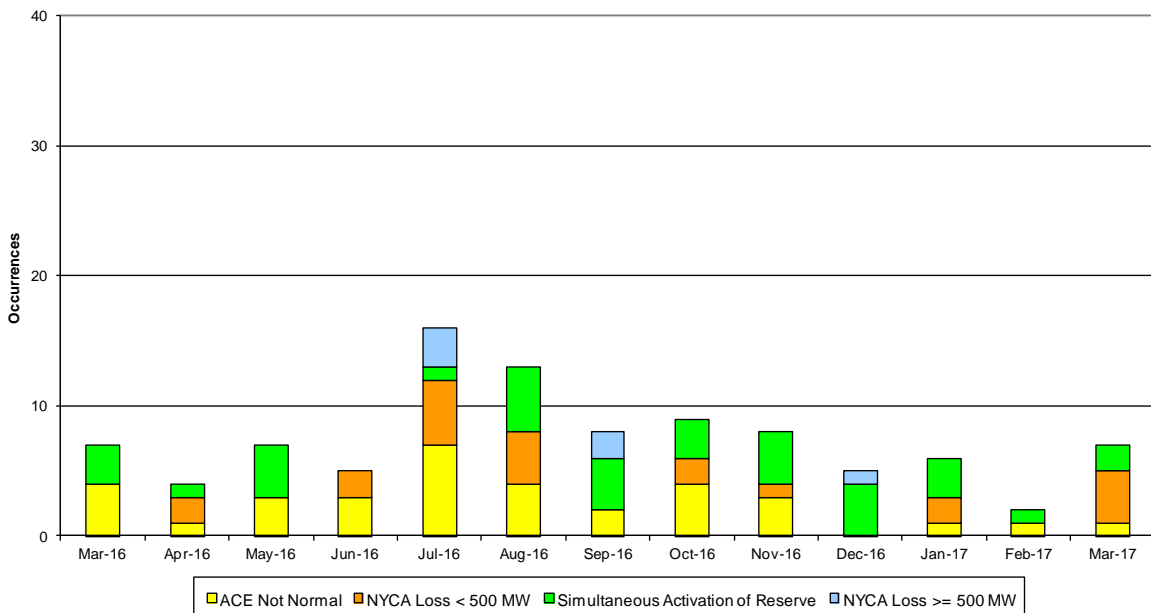


NERC Balancing Authority ACE Limit Standard



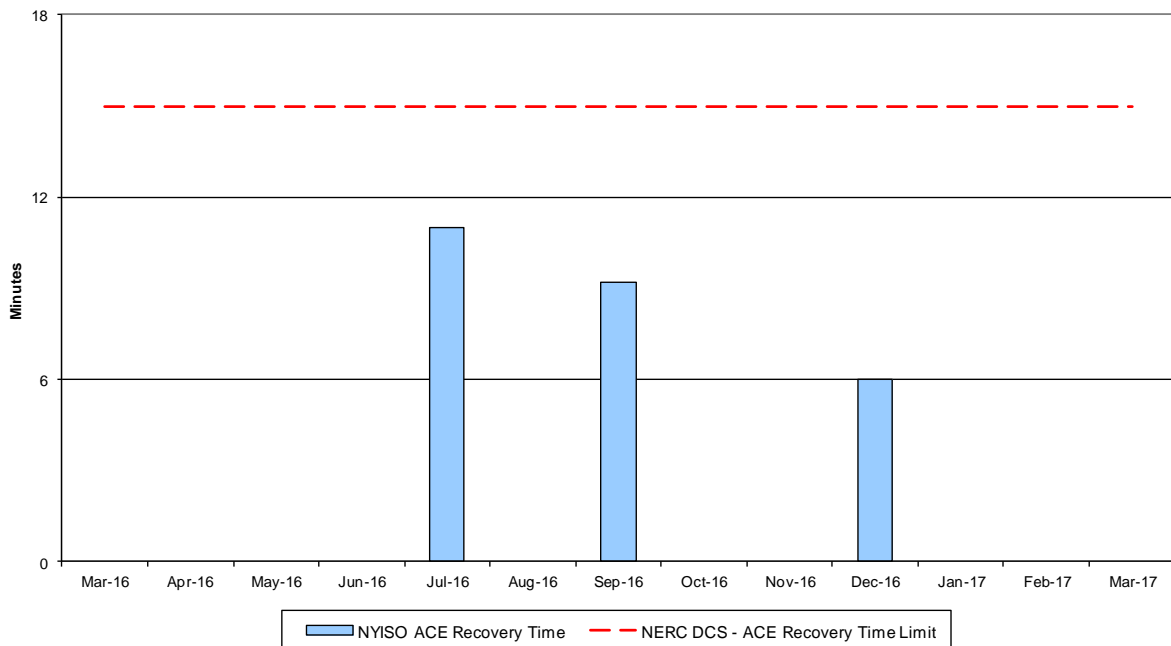
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



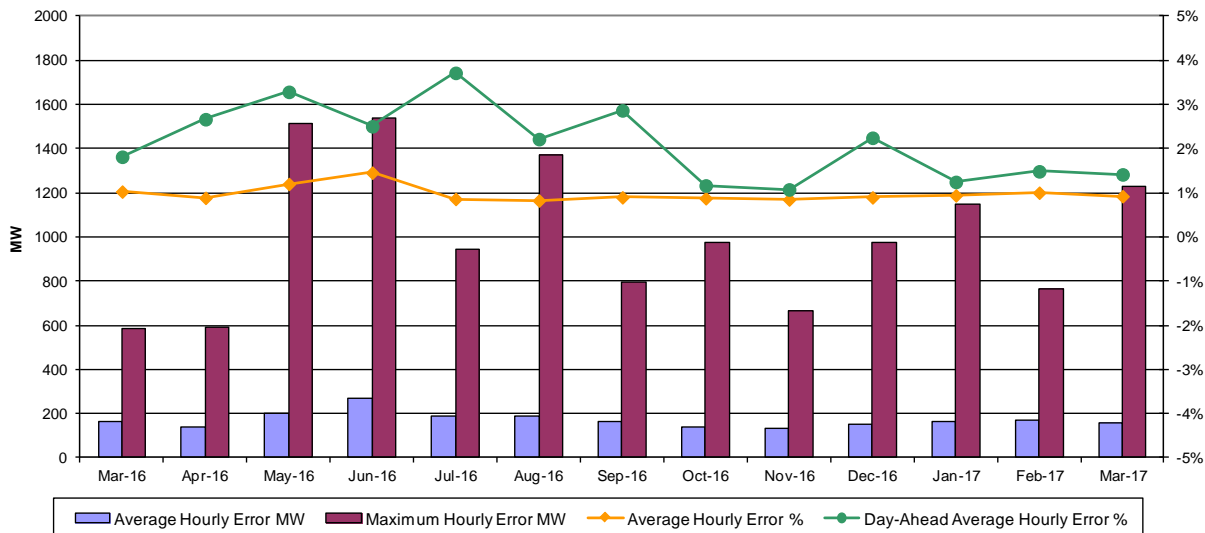
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

DCS Event Time to ACE Recovery

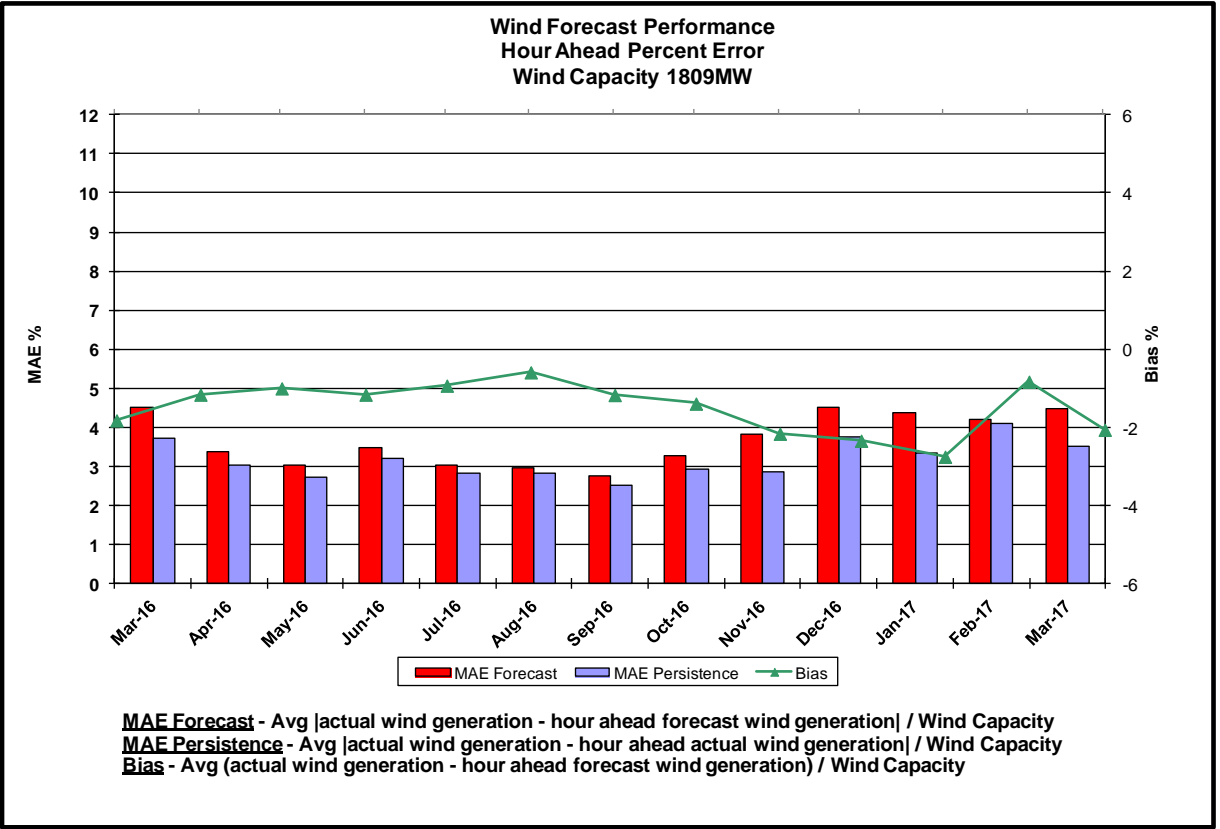
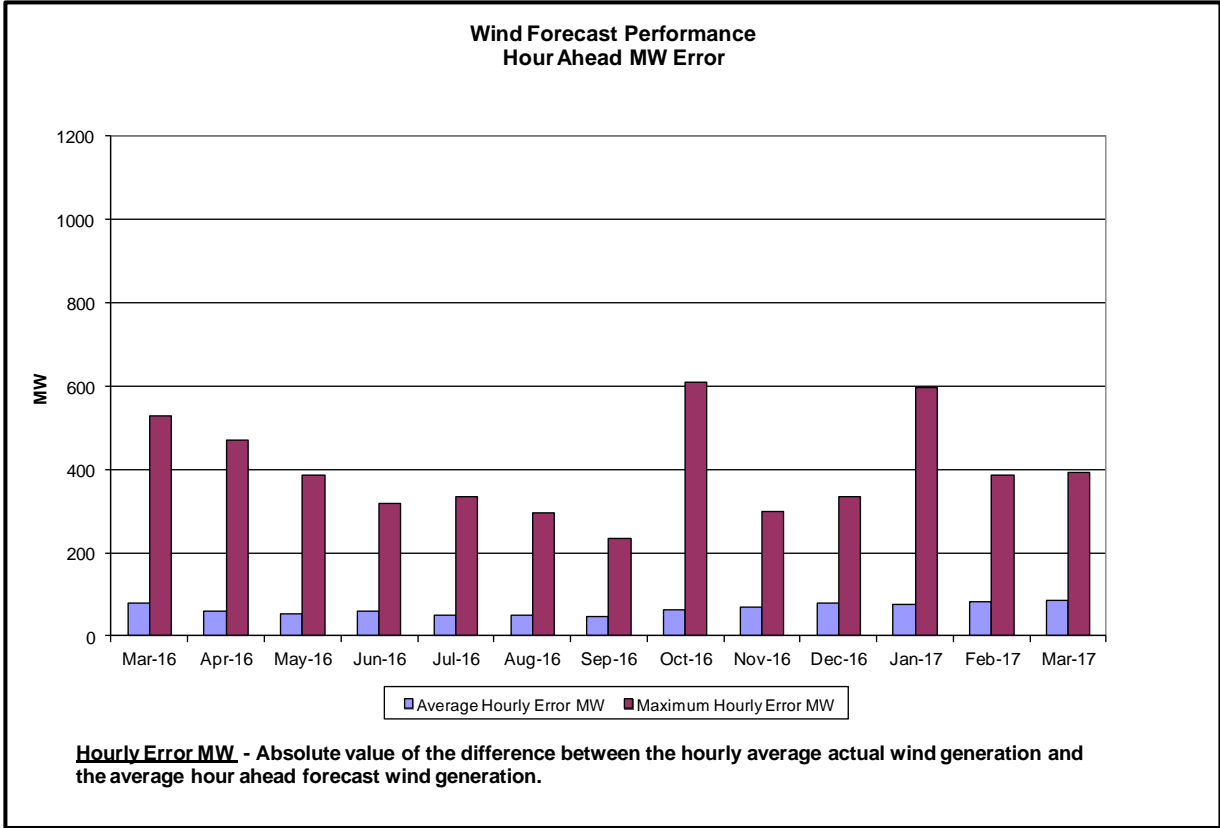


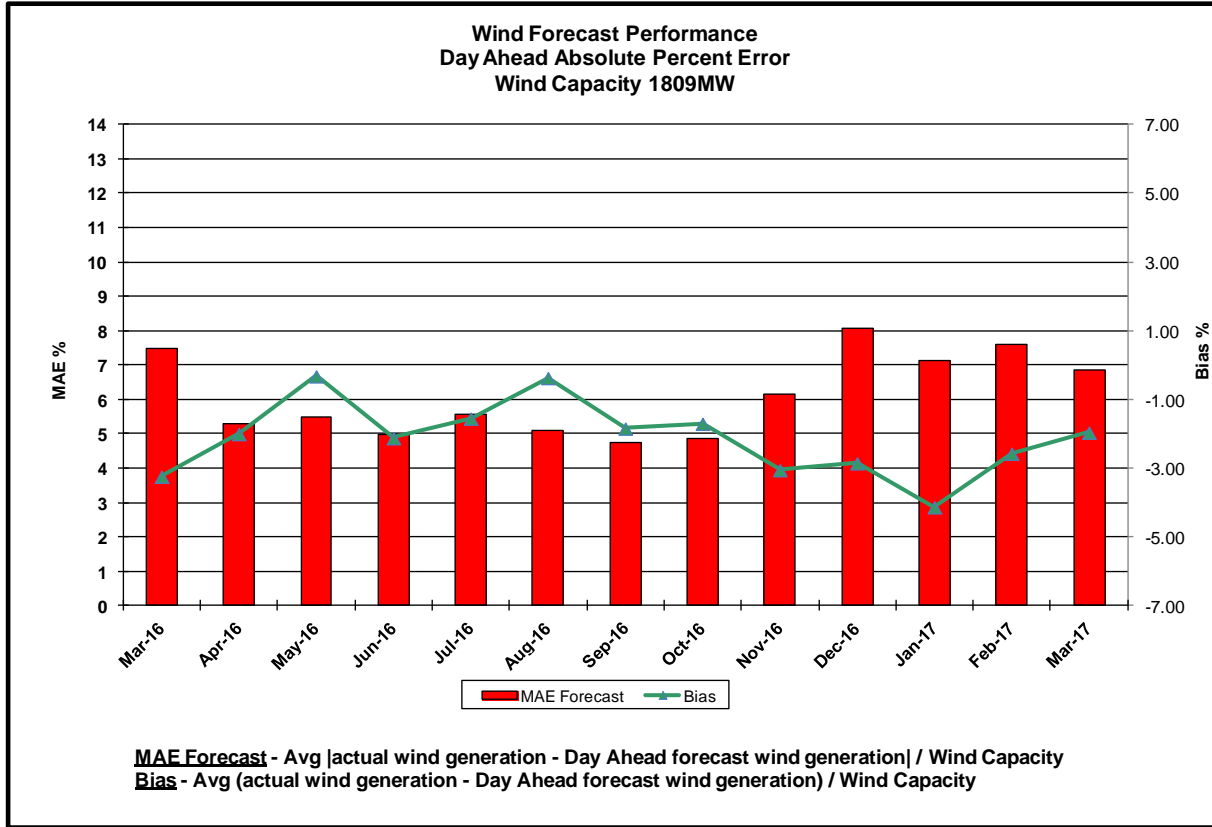
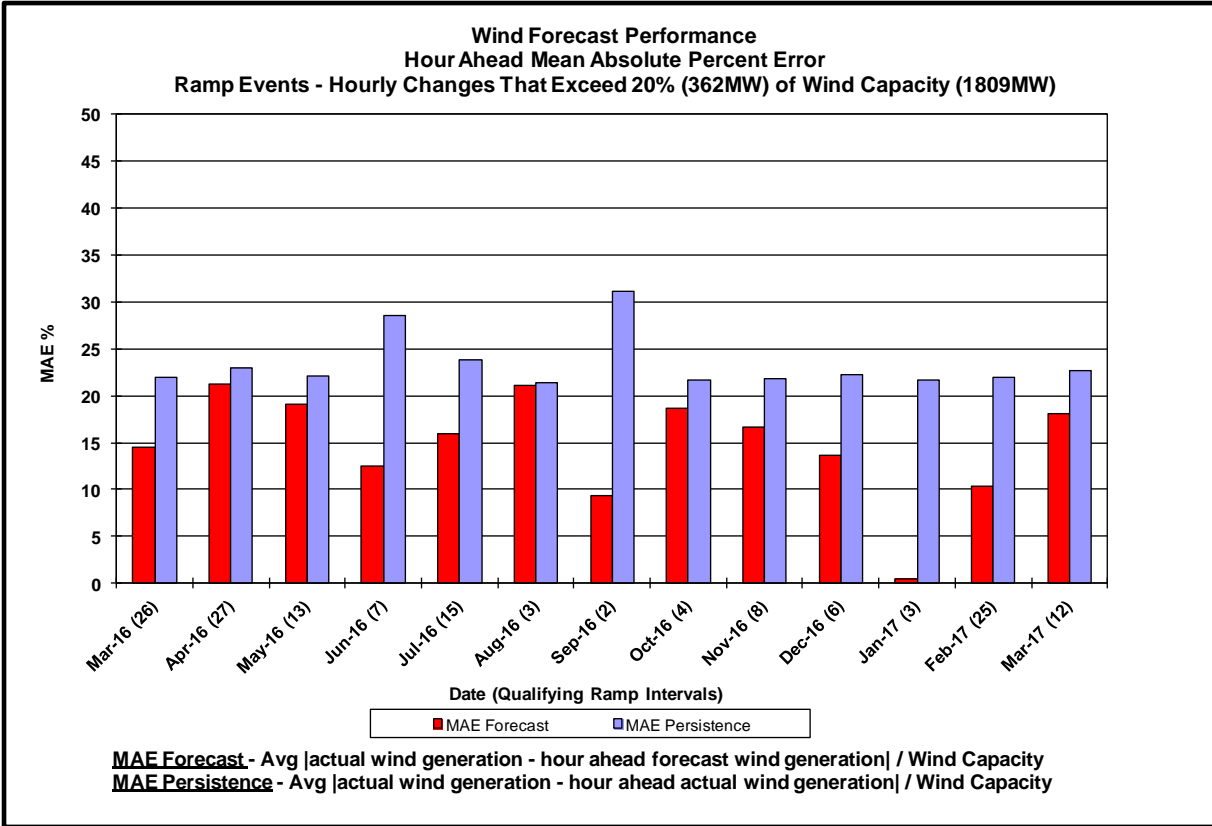
For NYISO initiated Reportable Disturbances, the maximum ACE recovery time is identified. Recovery times of less than 15 minutes are considered NERC compliant.

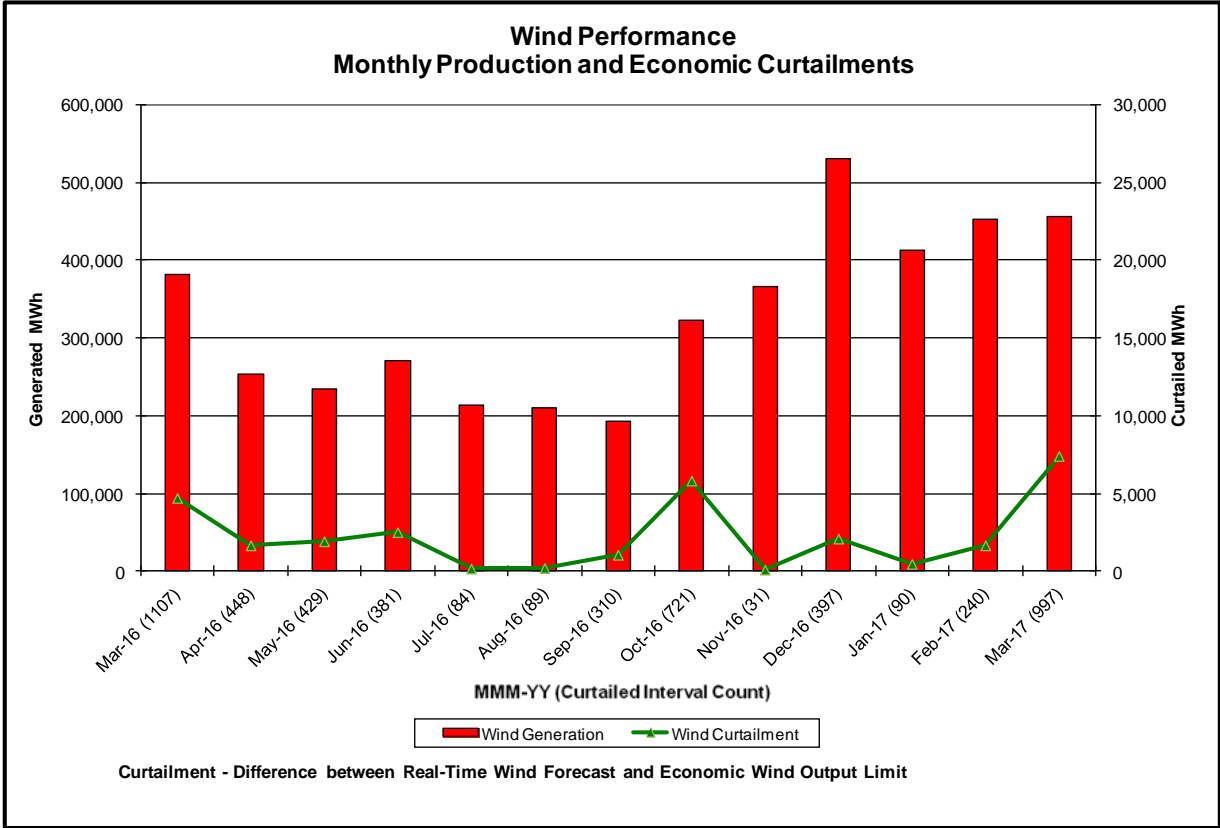
Load Forecast Performance

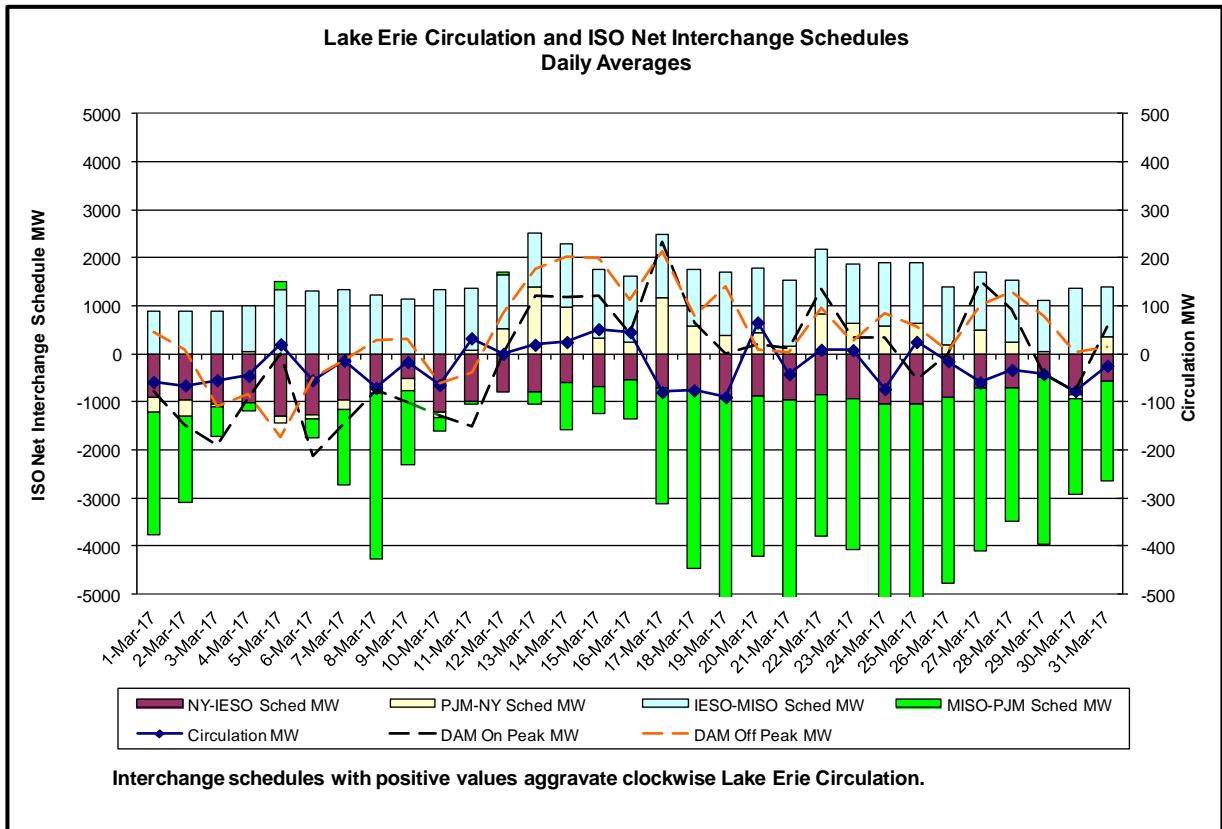
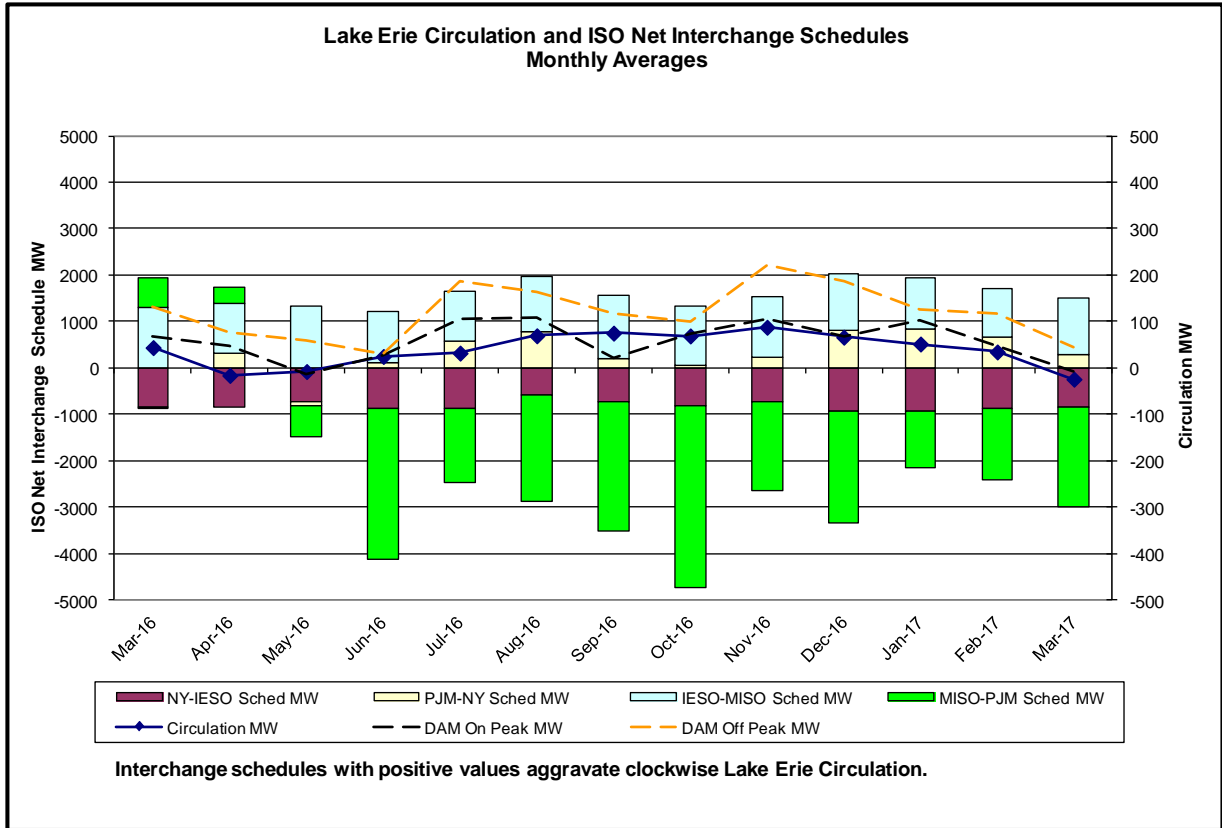


Hourly Error MW - Absolute value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.
Average Hourly Error % - Average value of the ratio of hourly average error magnitude to hourly average actual load demand.
Day-Ahead Average Hourly Error % - 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.

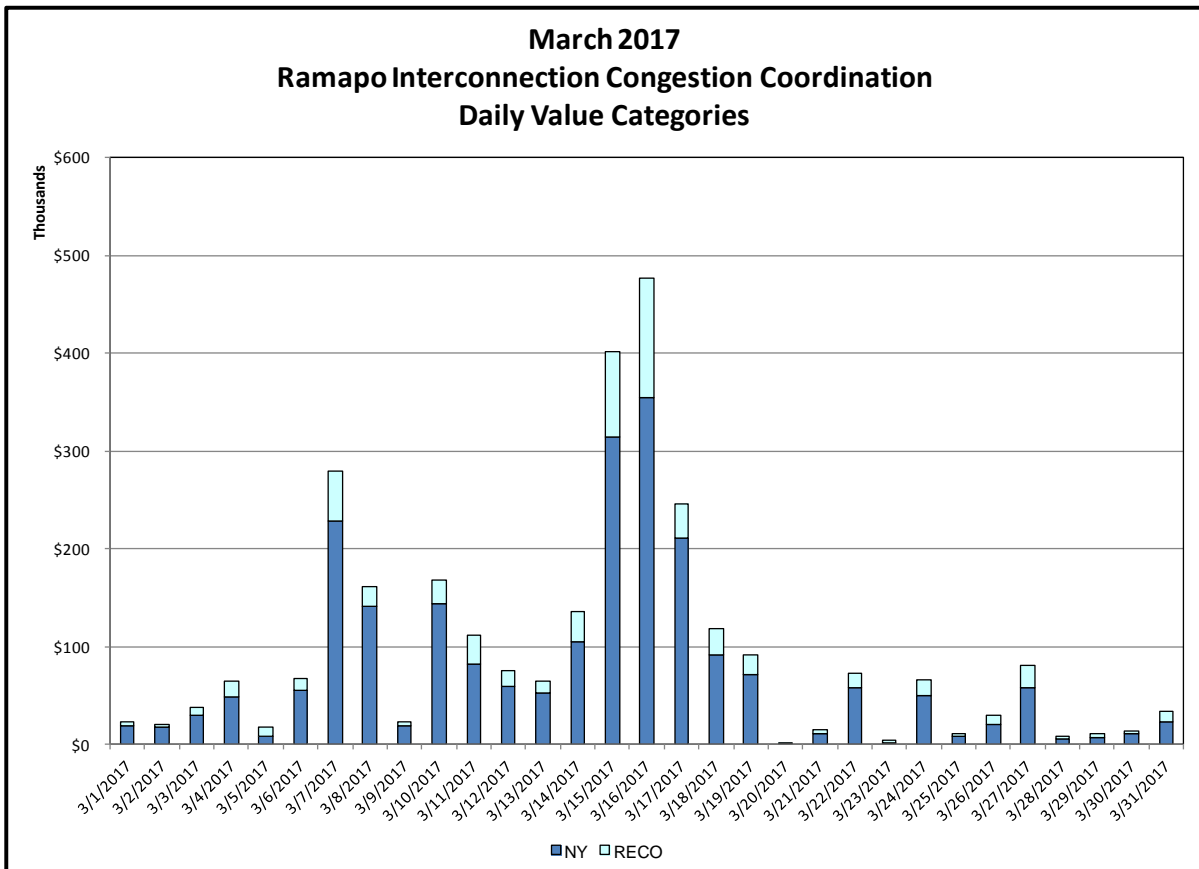
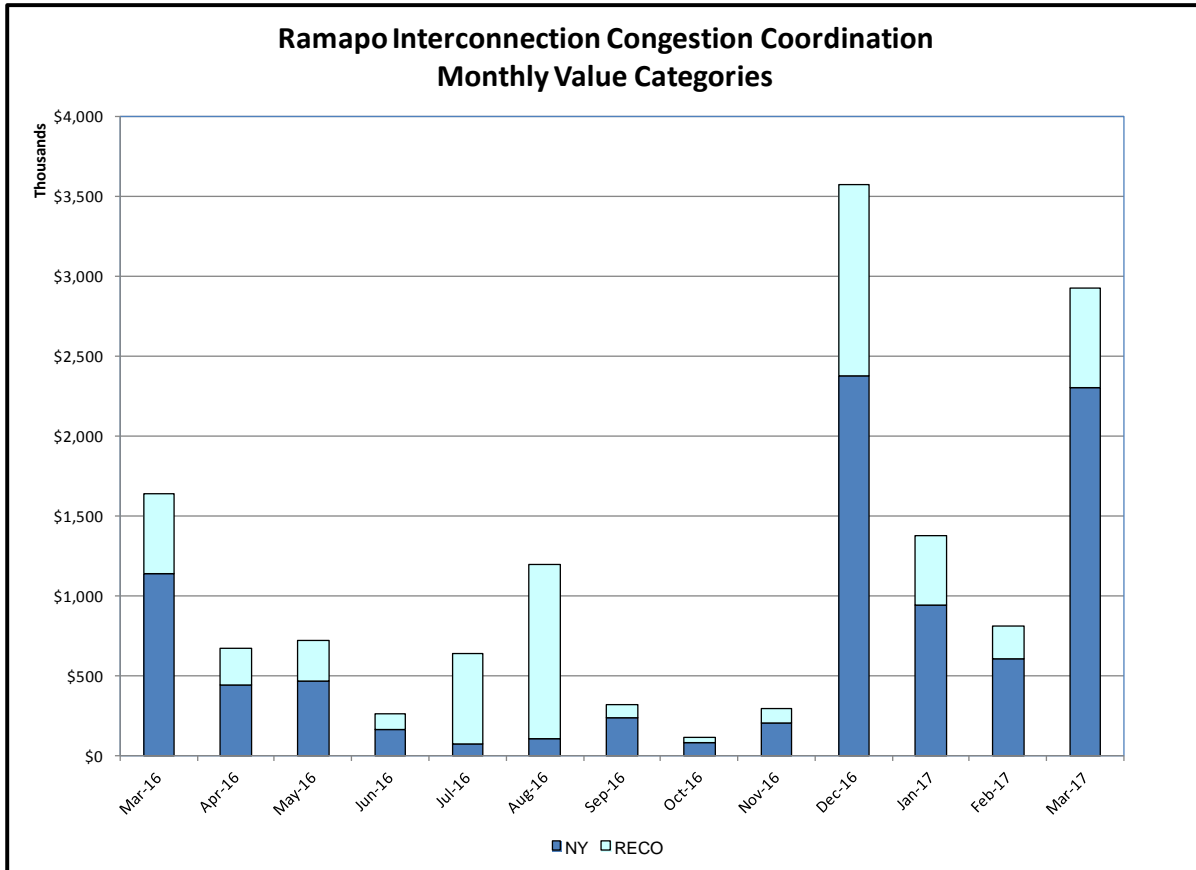






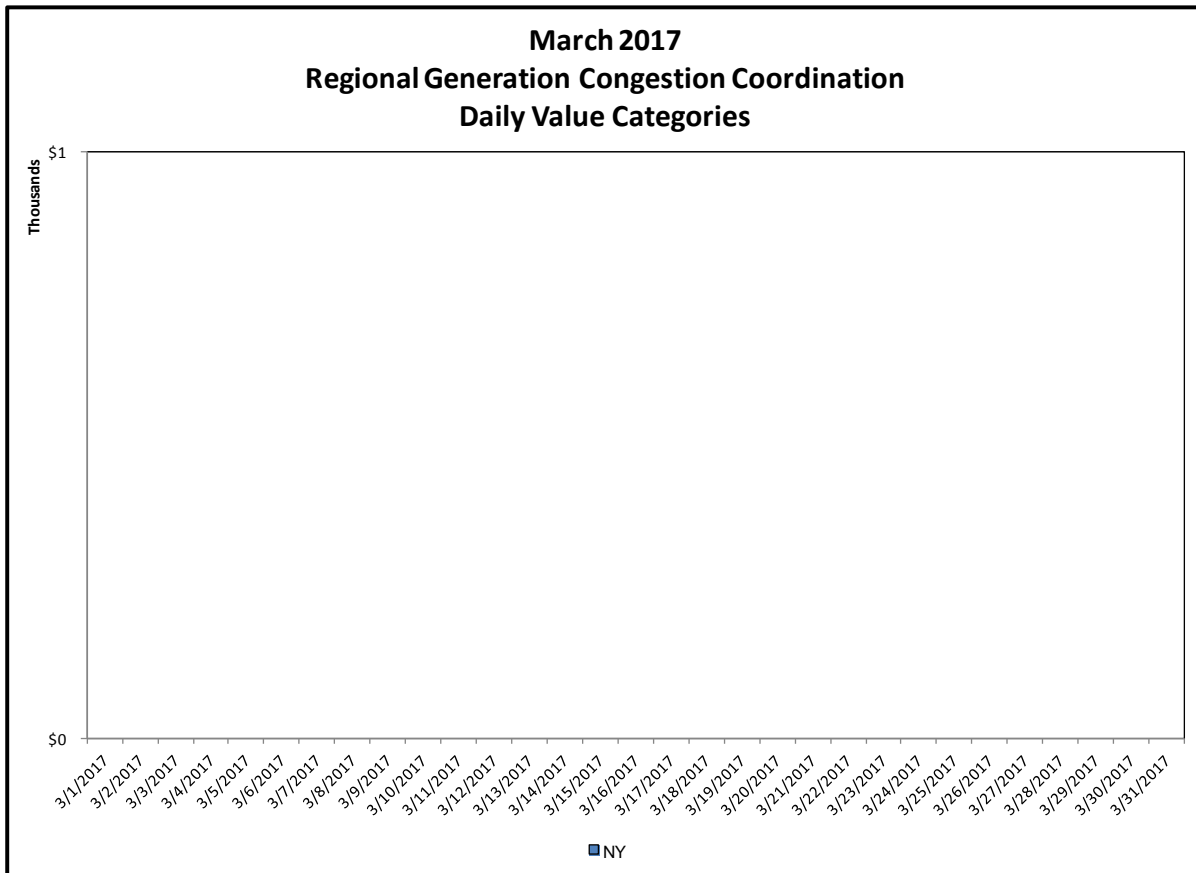
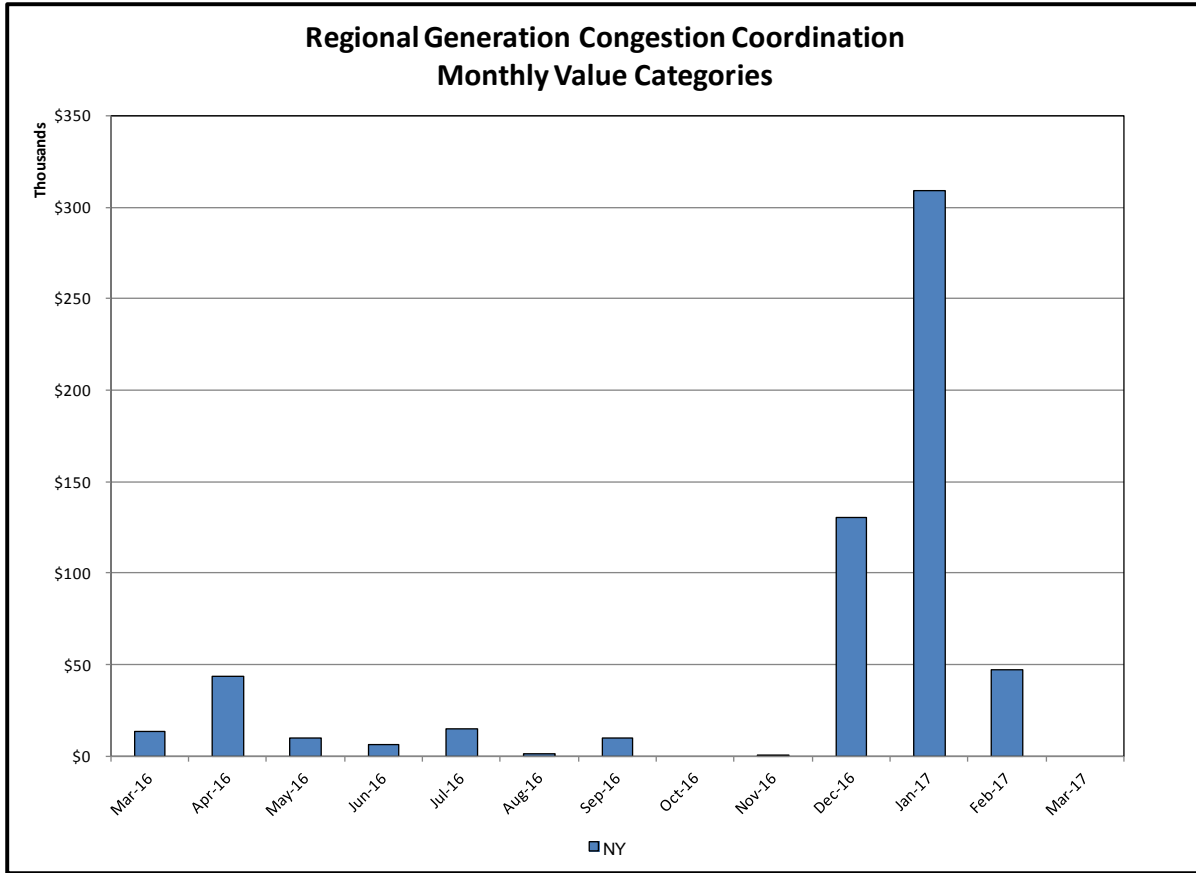


Broader Regional Market Performance Metrics



Ramapo Interconnection Congestion Coordination

<u>Category</u>	<u>Description</u>
NY	Represents the value NY realizes from Market-to-Market Ramapo Coordination. When experiencing congestion, this includes (1) the estimated savings to NY for additional deliveries into NY, plus (2) PJM compensation to NY for additional deliveries into PJM (as compared to the Ramapo Target level, excluding RECO). This is net of any settlements to PJM when they are congested.
RECO	Represents the value of PJM's obligation to deliver 80% of service to RECO load over Ramapo 5018. This includes (1) the estimated reduction in NYCA congestion due to the PJM delivery of RECO over Ramapo 5018, plus (2) PJM compensation to NY for NYCA congestion for the under-delivery or inability to deliver service to RECO load over Ramapo 5018.



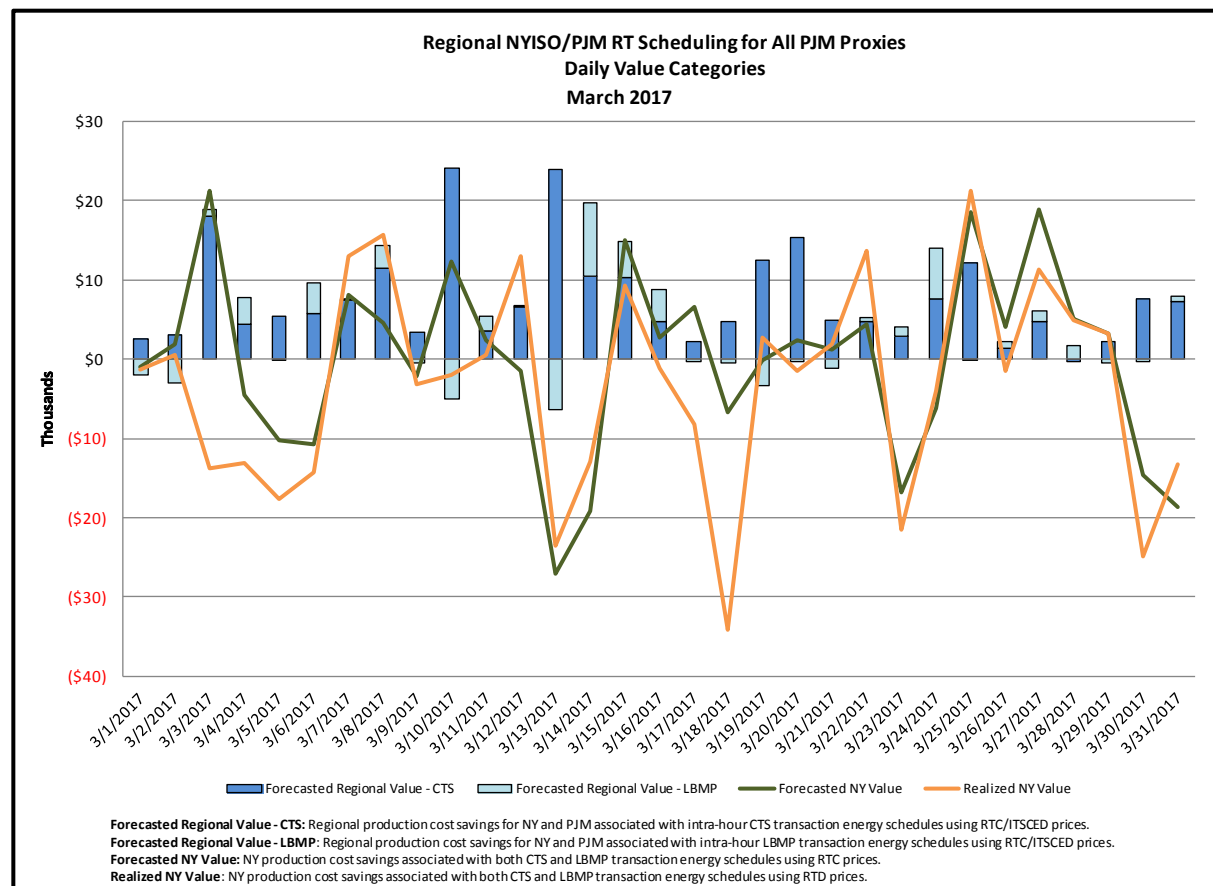
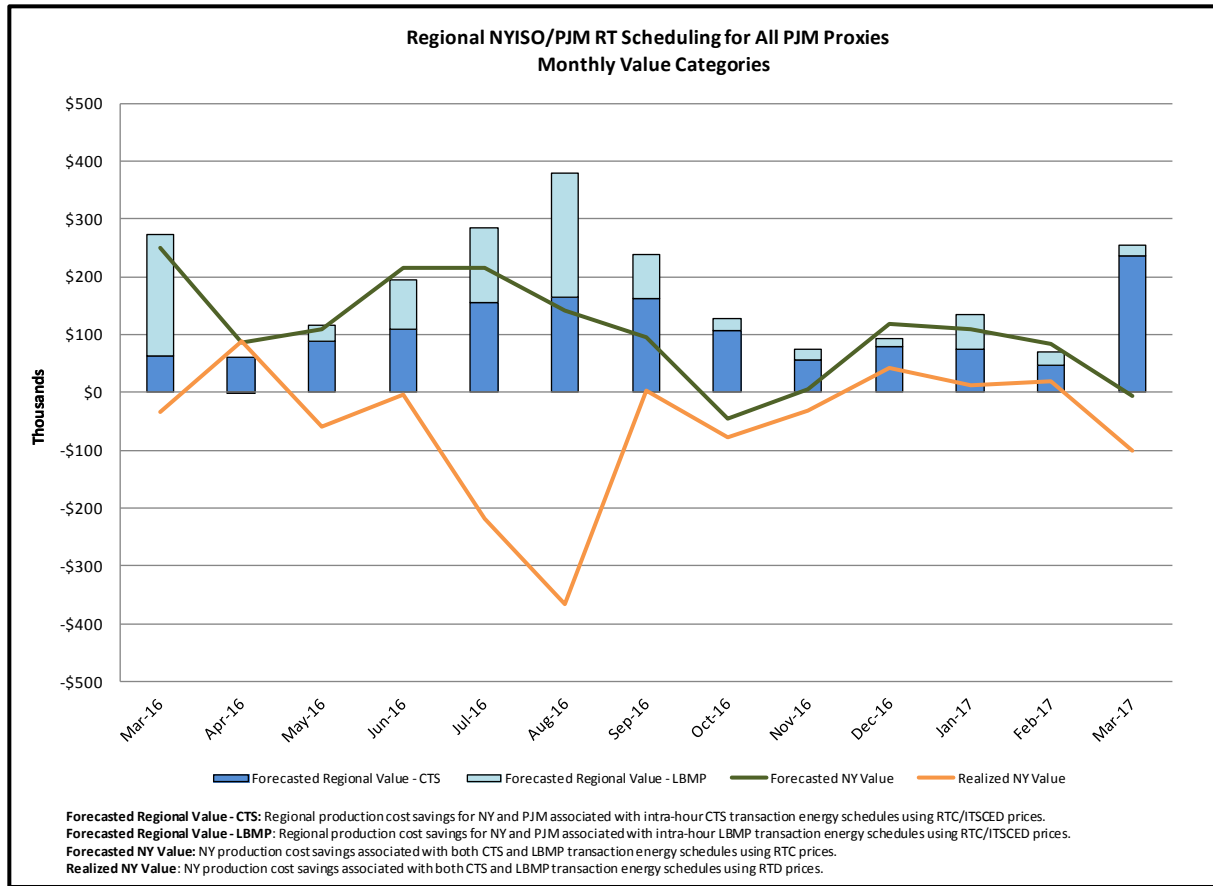
Regional Generation Congestion Coordination

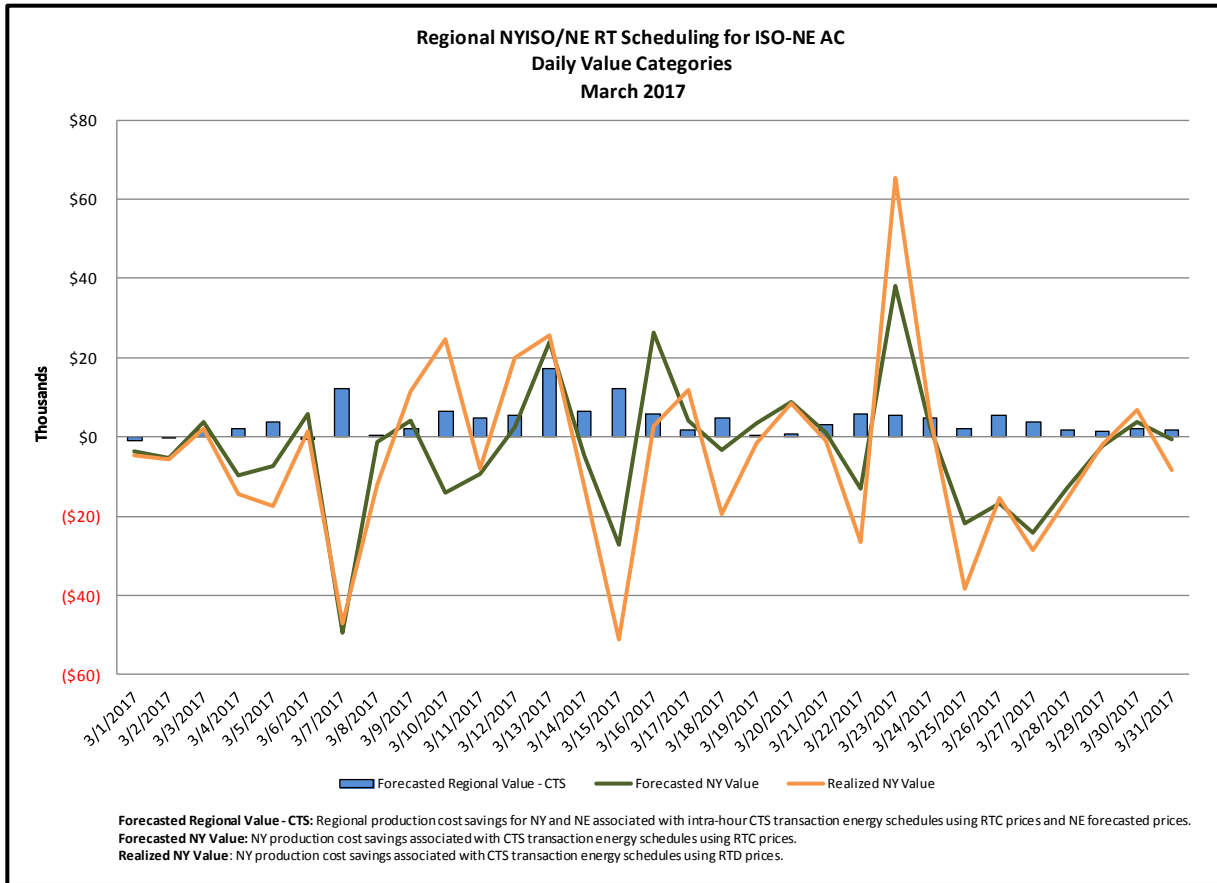
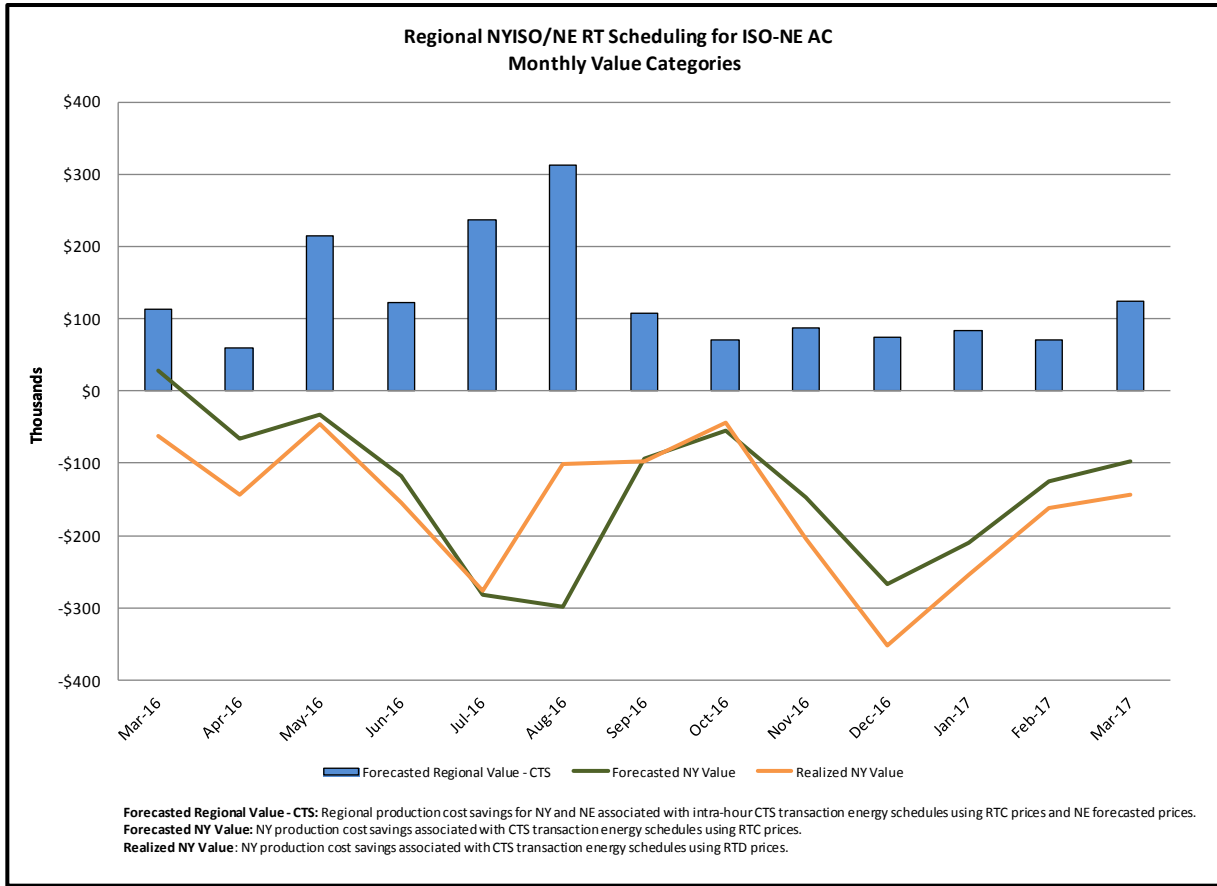
Category

NY

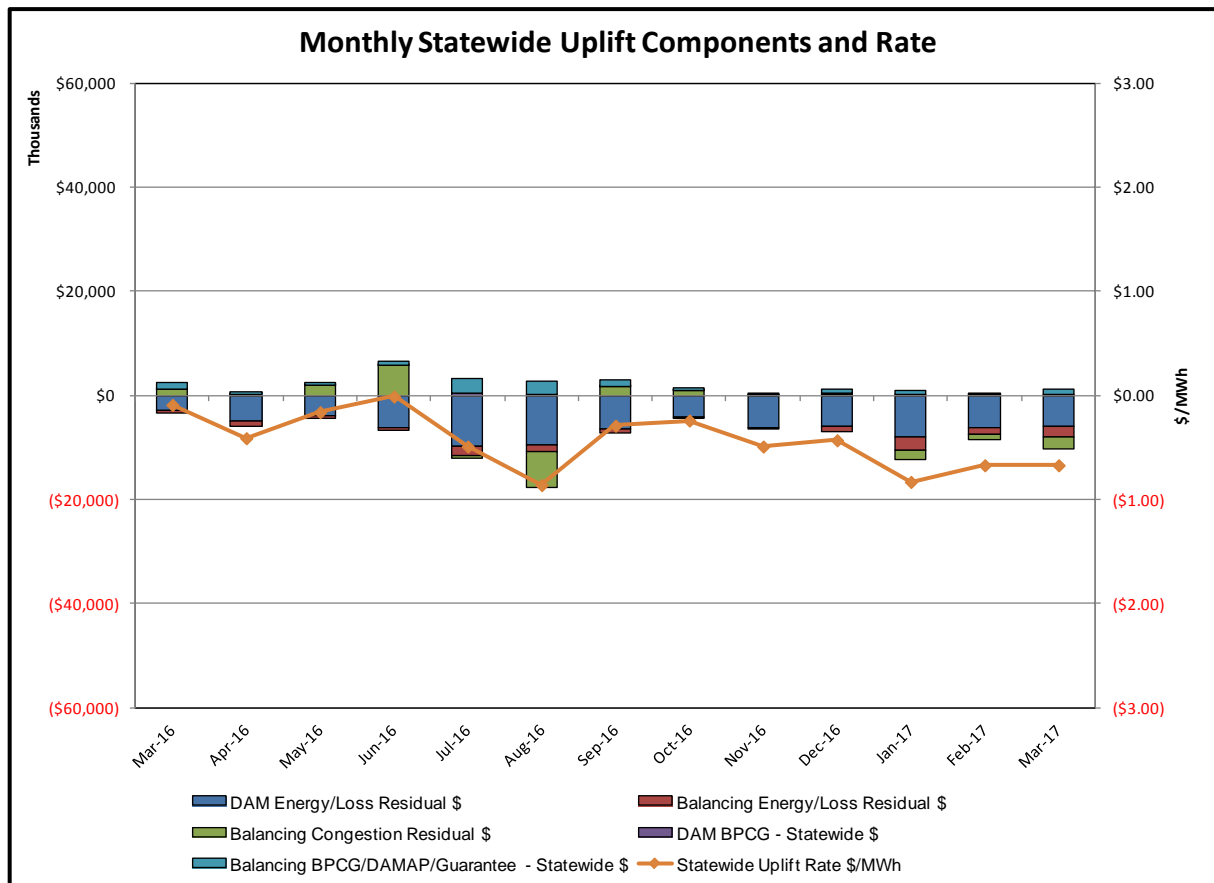
Description

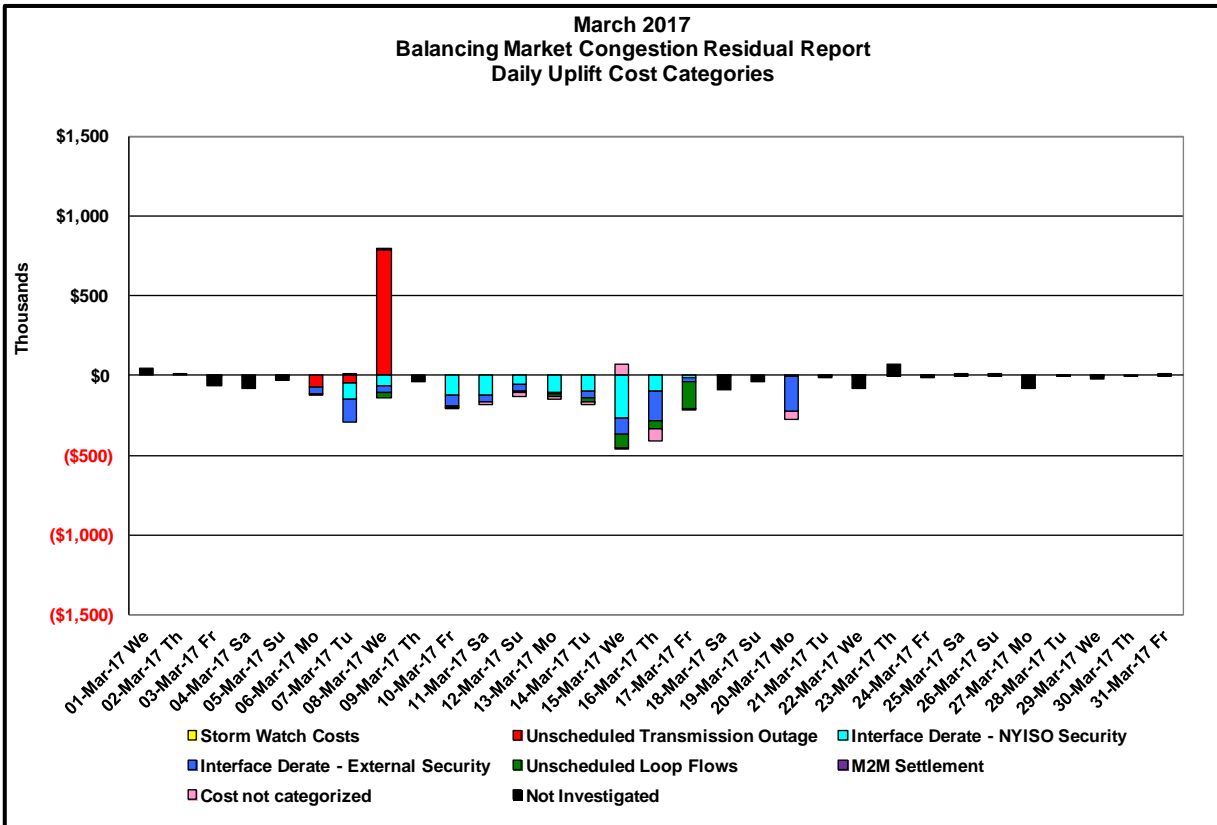
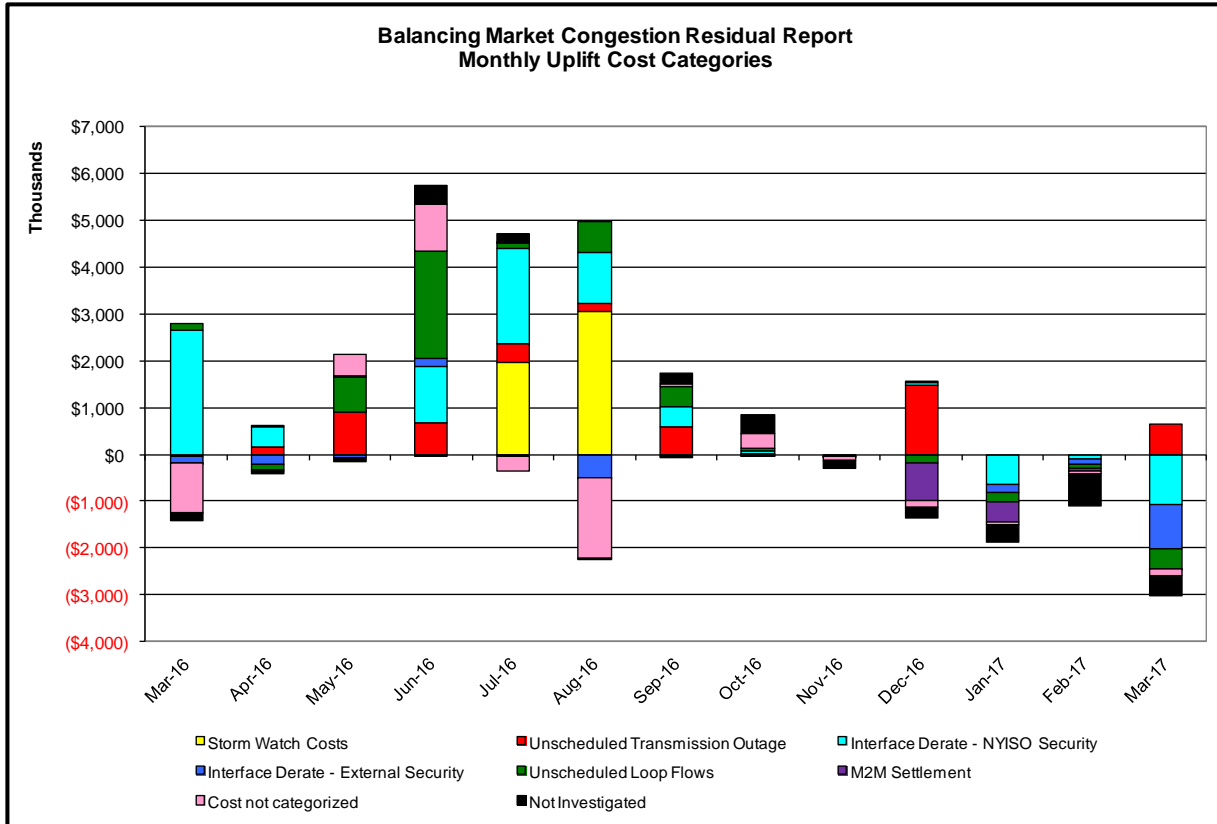
NYISO savings that result from PJM payments to NYISO when PJM's transmission use (PJM's market flow) is greater than PJM's entitlement of the NY transmission system and NYISO is incurring Western or Central NY congestion. Additionally, NYISO savings may result from the more efficient regional utilization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





Market Performance Metrics





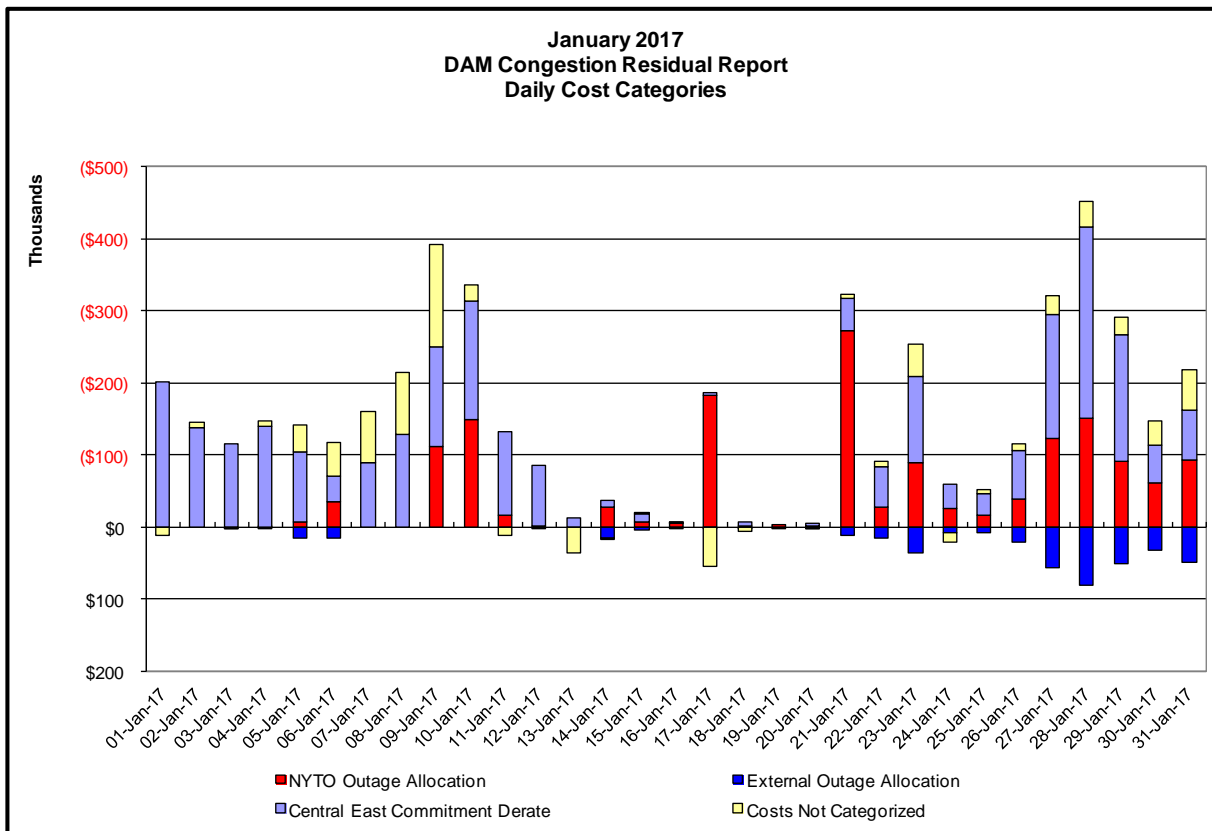
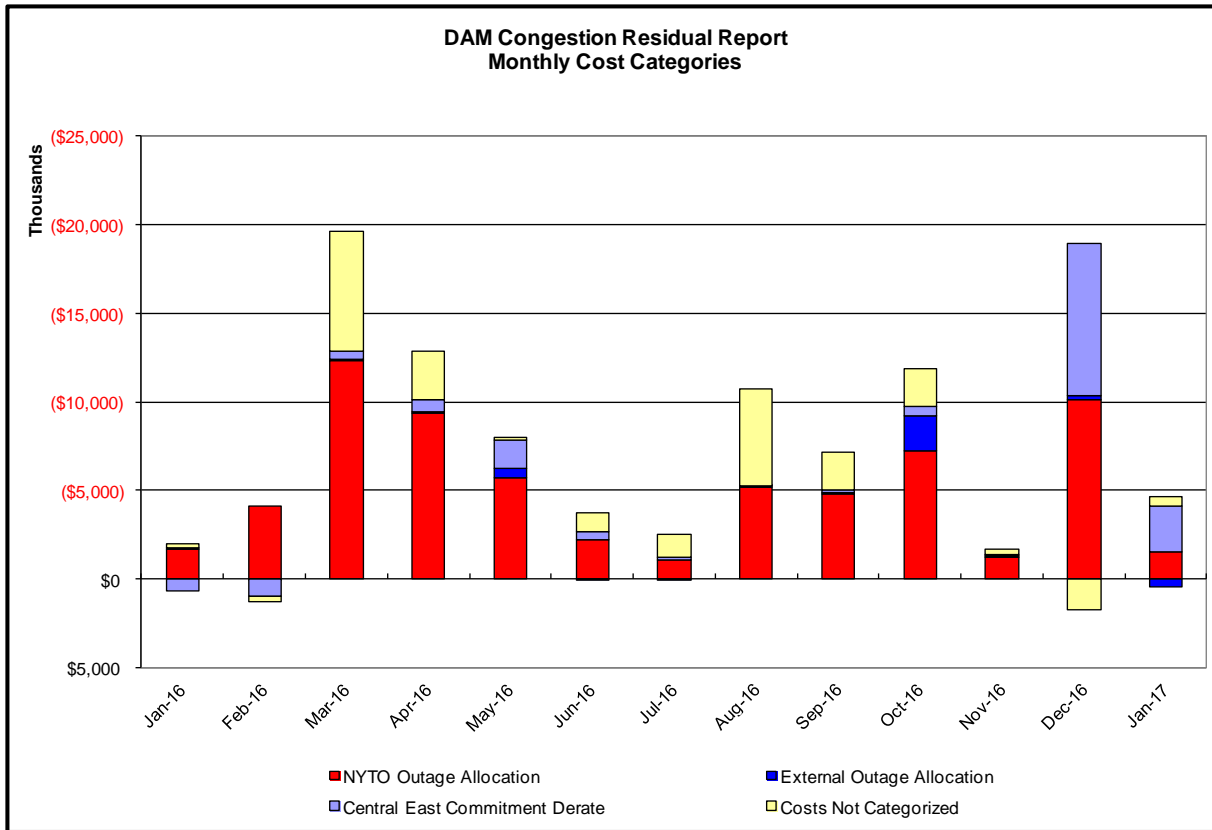
Day's investigated in March: 6,7,8,10,11,12,13,14,15,16,17,20			
Event	Date (yyyymmdd)	Hours	Description
	3/6/2017	20-23	Early return to service Edic - Fraser 345kV (#EF24-40)
	3/6/2017	20,21,23	NE_AC DNI Ramp Limit
	3/7/2017	0,1,5,7,8	Early return to service Edic - Fraser 345kV (#EF24-40)
	3/7/2017	7,12,14-20,23	Uprate Central East
	3/7/2017	19,20	NYCA DNI Ramp Limit
	3/7/2017	0,2,16-19,21-23	NE_AC DNI Ramp Limit
	3/8/2017	23	Early return to service Edic - Fraser 345kV (#EF24-40)
	3/8/2017	16,17	Forced outage West Wind Event for multiple line outages
	3/8/2017	0-4,8-11,13,23	Uprate Central East
	3/8/2017	14,16	Derate MottHaven-Dunwoodie 345kV (#71) for l/o MottHaven-Dunwoodie 345kV (#72)
	3/8/2017		IESO_AC-NY Scheduling Limit HB16:\$5k, HB17:\$774k]
	3/8/2017	0,3,4,9-11,23	NE_AC DNI Ramp Limit
	3/8/2017	0,1,9-11	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/8/2017	14	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Packard-Sawyer 230kV (#77)
	3/10/2017	13	NYCA DNI Ramp Limit
	3/10/2017	12-20,23	Uprate Central East
	3/10/2017	13,14,16-18,23	NE_AC DNI Ramp Limit
	3/10/2017	12,14	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/11/2017	23	NYCA DNI Ramp Limit
	3/11/2017	11-17,23	Uprate Central East
	3/11/2017	12,16,17,23	NE_AC DNI Ramp Limit
	3/11/2017	17	NE_AC-NY Scheduling Limit
	3/12/2017	23	NYCA DNI Ramp Limit
	3/12/2017	0,1,3,4,13-15	Uprate Central East
	3/12/2017	12-15	NE_AC-NY Scheduling Limit
	3/12/2017	4	HQ_CHAT-NY Scheduling Limit
	3/12/2017	0	PJM_AC DNI Ramp Limit
	3/12/2017	13,14	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/13/2017	1,22,23	Uprate Central East
	3/13/2017	6,7,23	NYCA DNI Ramp Limit
	3/13/2017	6,7,9,10	HQ_CHAT-NY Scheduling Limit
	3/13/2017	9,10	HQ_CEDARS-NY Scheduling Limit
	3/13/2017	1	NE_AC-NY Scheduling Limit
	3/13/2017	7,22,23	NE_AC DNI Ramp Limit
	3/13/2017	23	PJM_AC DNI Ramp Limit
	3/13/2017	1,23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/14/2017	1,11,12,14,21,22	NYCA DNI Ramp Limit
	3/14/2017	0,1,3,11-16,19,21-23	Uprate Central East
	3/14/2017	0,1,11,14	NE_AC DNI Ramp Limit
	3/14/2017	22	PJM_AC DNI Ramp Limit
	3/14/2017	3,11-12,15,21	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/15/2017	0-4,9-23	Uprate Central East
	3/15/2017	9,10	NYCA DNI Ramp Limit
	3/15/2017	4,15-23	NE_AC DNI Ramp Limit
	3/15/2017	9	PJM_AC Scheduling Limit
	3/15/2017	8,16	PJM_AC DNI Ramp Limit
	3/15/2017	4,9,10,14,17,18,21,23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/16/2017	0,1,4,6,7,15-17,23	Uprate Central East
	3/16/2017	8	NYCA DNI Ramp Limit
	3/16/2017	0-2,6-9,18-20,22	NE_AC DNI Ramp Limit
	3/16/2017	17,23	PJM_AC DNI Ramp Limit
	3/16/2017	1-3,6,11,16	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/17/2017	23	NYCA DNI Ramp Limit
	3/17/2017	4-6,23	Uprate Central East
	3/17/2017	0,1,5,6,19,21-23	NE_AC DNI Ramp Limit
	3/17/2017	0,23	PJM_AC DNI Ramp Limit
	3/17/2017	1-6,11-19,21-23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	3/20/2017	23	NYCA DNI Ramp Limit
	3/20/2017	13-15,23	NE_AC-NY Scheduling Limit
	3/20/2017	15	PJM_AC 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	

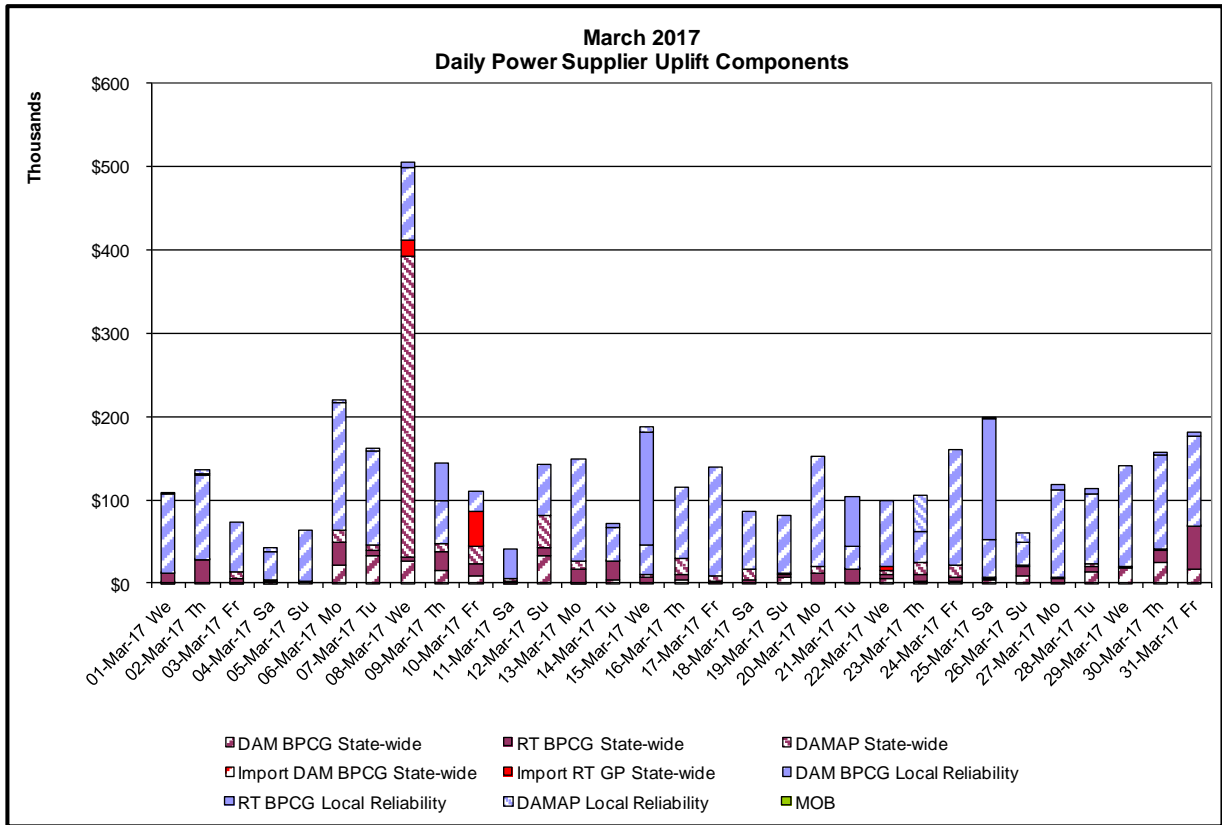
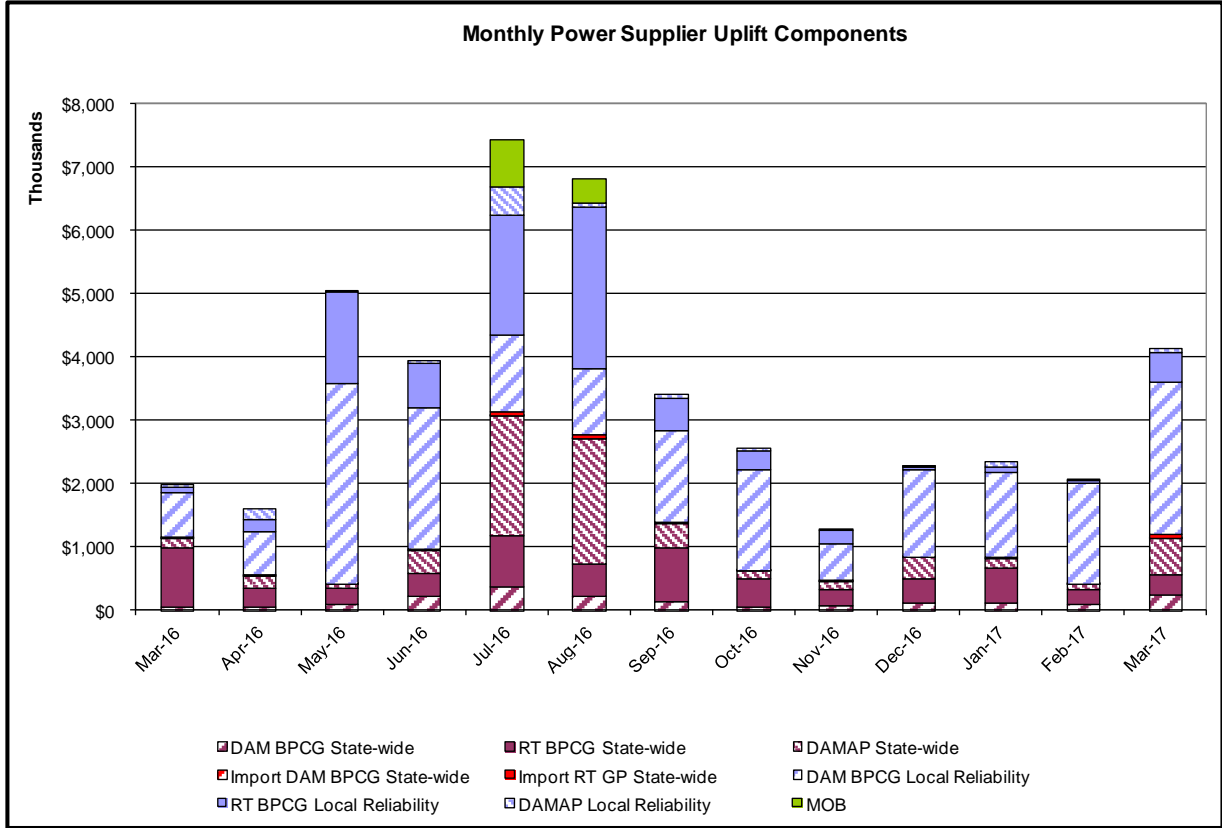
Monthly Balancing Market Congestion Report Assumptions/Notes

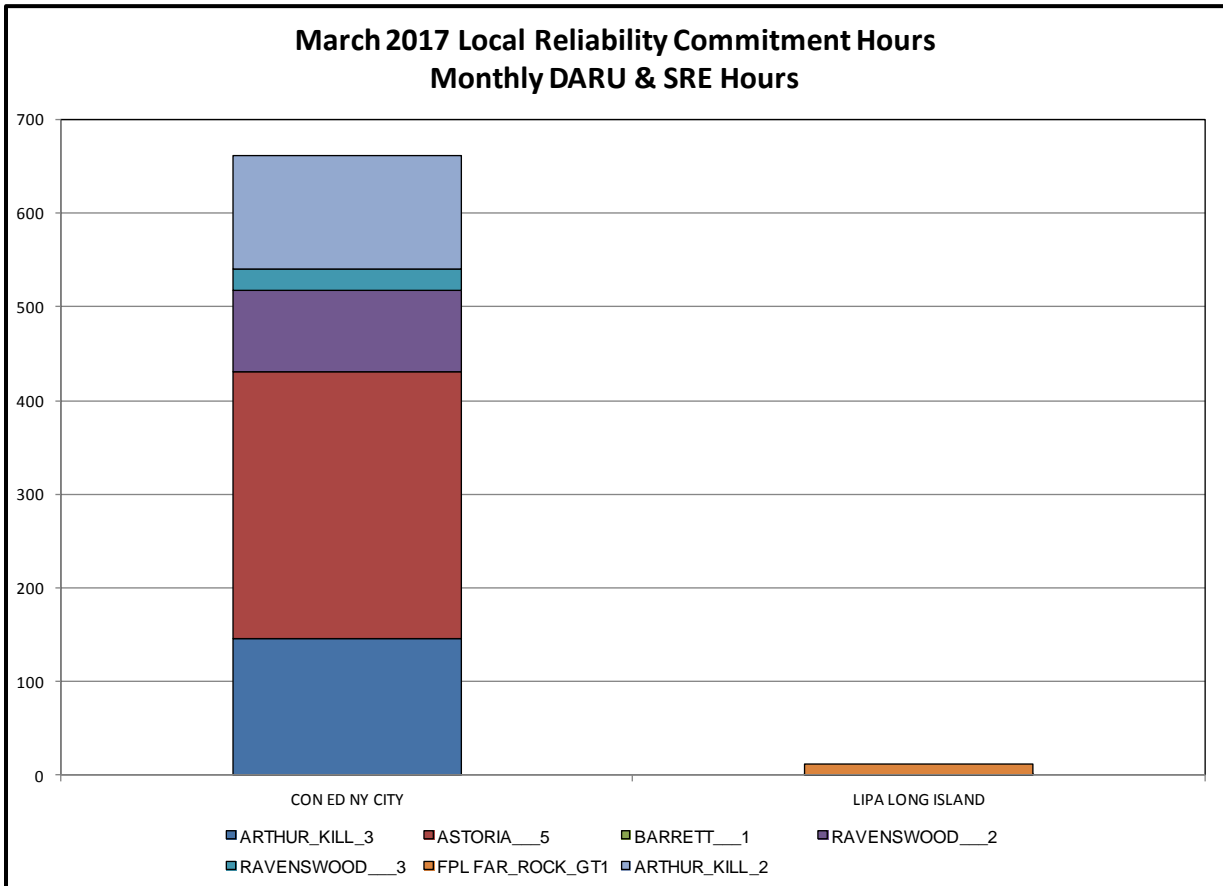
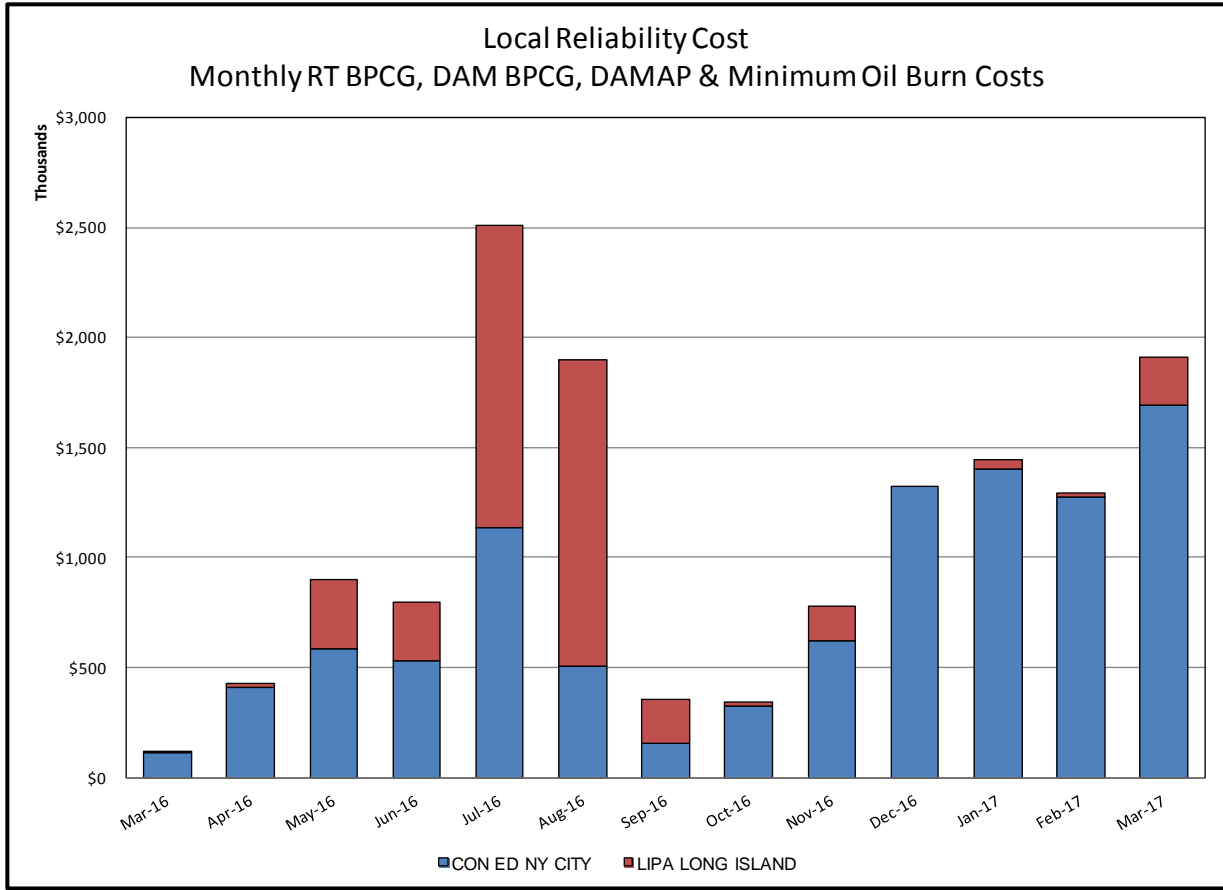
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

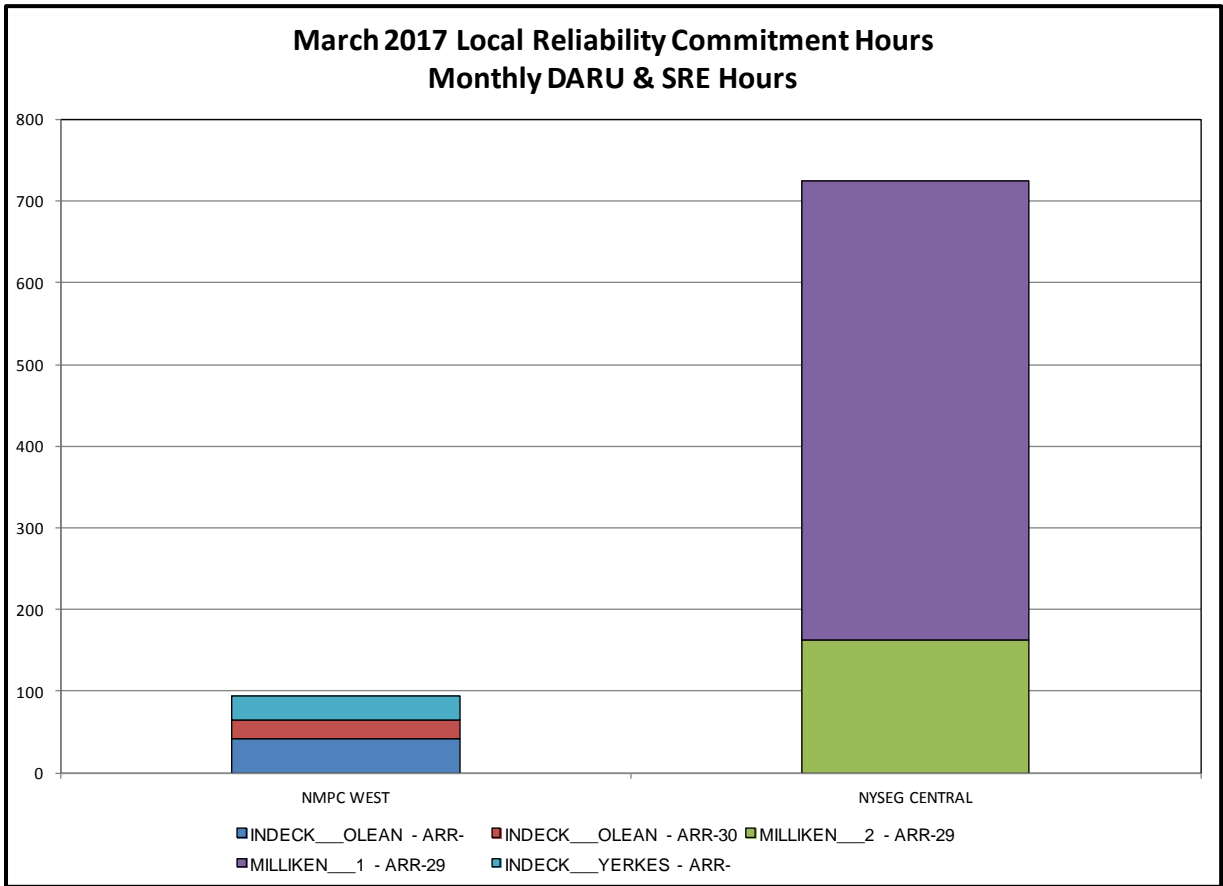
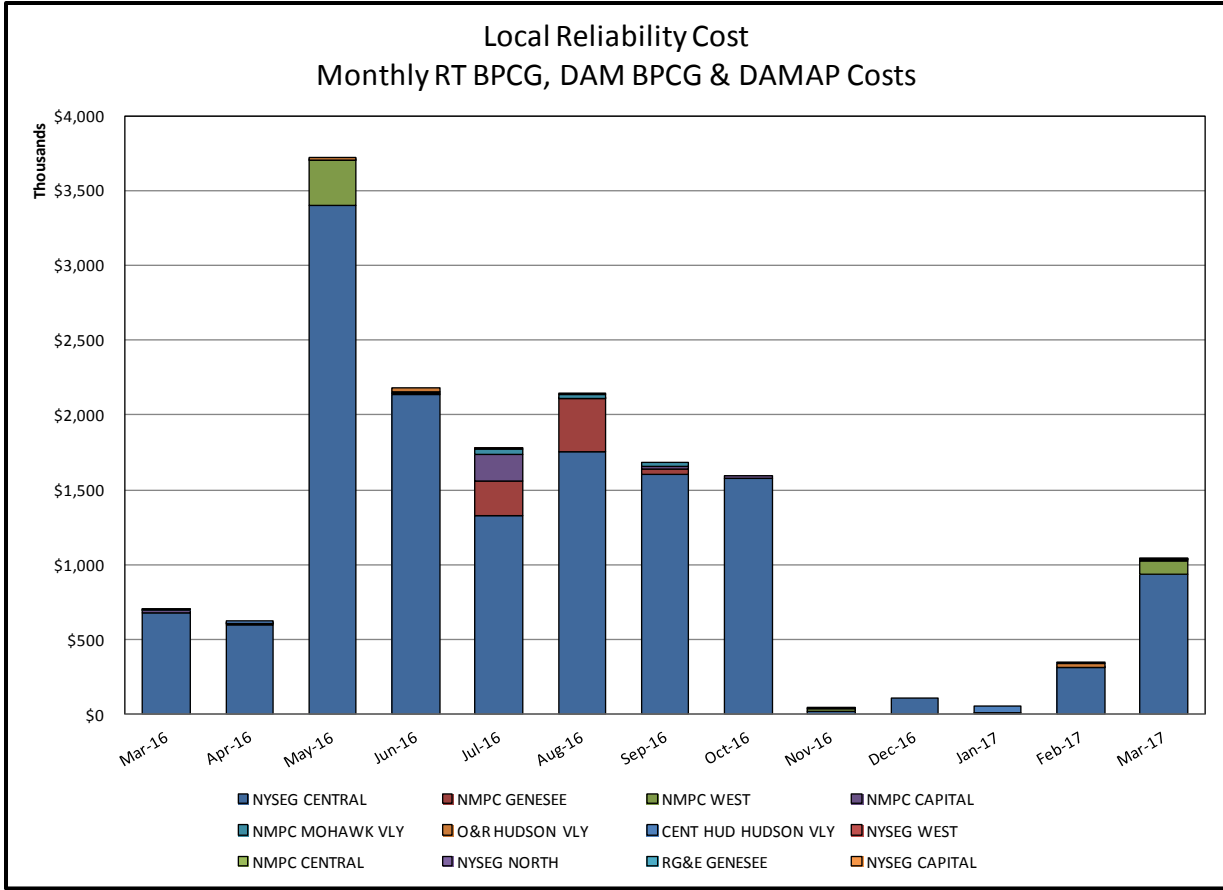


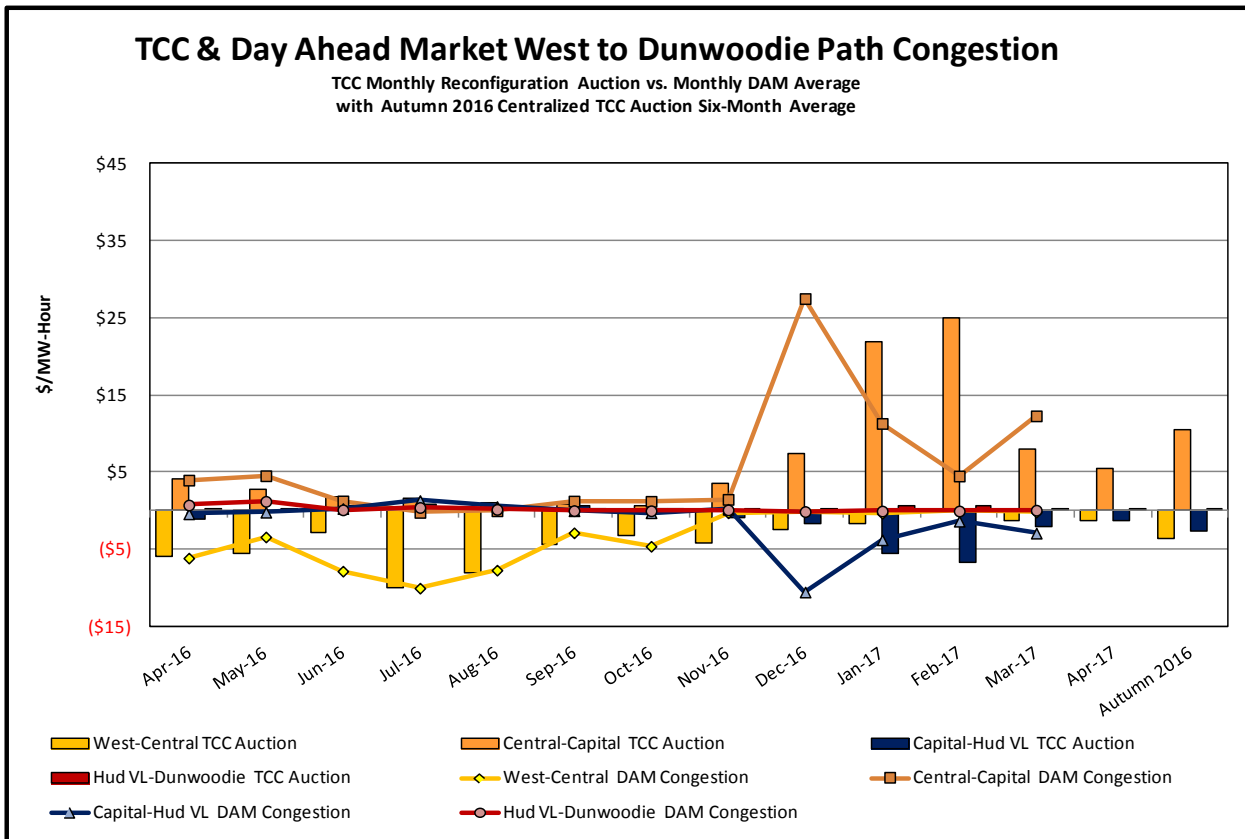
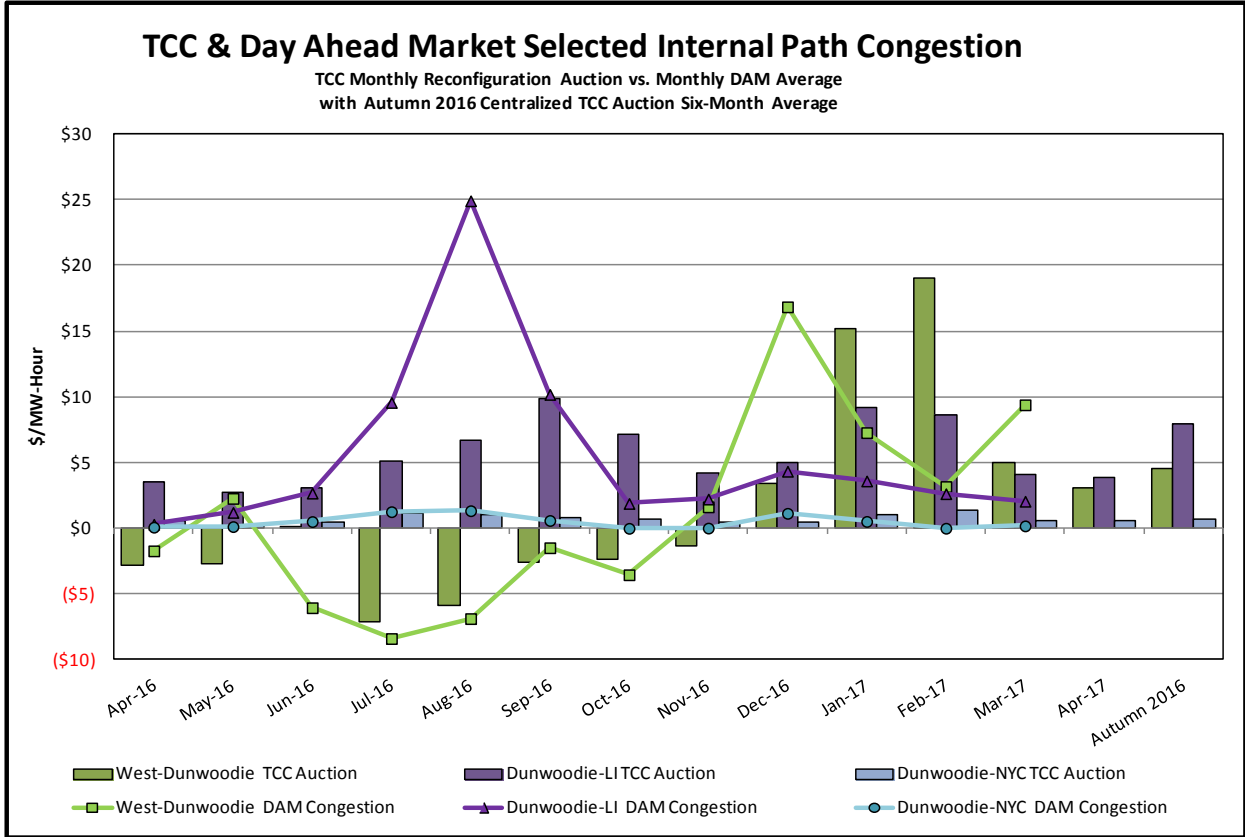
Day-Ahead Market Congestion Residual Categories

<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 Autumn 2016 Centralized TCC Auction Six-Month Average

