

Operations Performance Metrics Monthly Report



May 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 June 8, 2017.

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May 2017 Operations Performance Highlights

- Peak load of 25,578 MW occurred on 05/18/2017 HB 16
- All-time summer capability period peak load of 33,956 MW occurred on 7/19/2013 HB 16
- 9:35 hours of Thunder Storm Alerts were declared
- 0 hours of NERC TLR level 3 curtailment
- A Major Emergency was declared on 05/21/2017 in HB17 for the loss of 1,000MW of generation in ISONE causing the Central East interface flow to exceed its voltage collapse limit.
- Energy Market and M2M changes were implemented on 05/01/2017 following the expiration of the Con Ed/PSEG wheel. These changes, detailed in the *NY-NJ PAR Interchange & OBF* web posting, include: modification to the NY-PJM AC interchange distribution, introducing the Operational Base Flow (OBF), and adding the PARs at the ABC and JK interfaces to the M2M PAR coordination program.
- The following table identifies the estimated production cost savings associated with the Broader Regional Market initiatives.

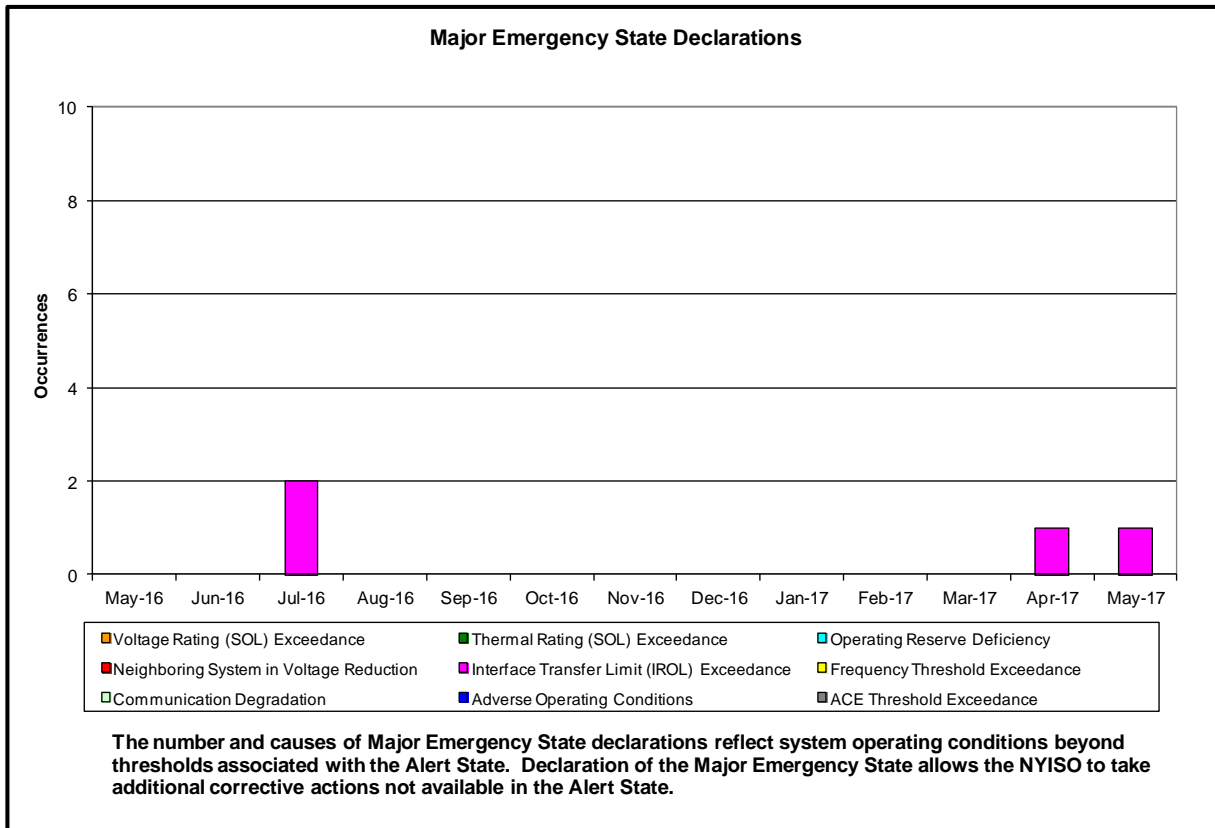
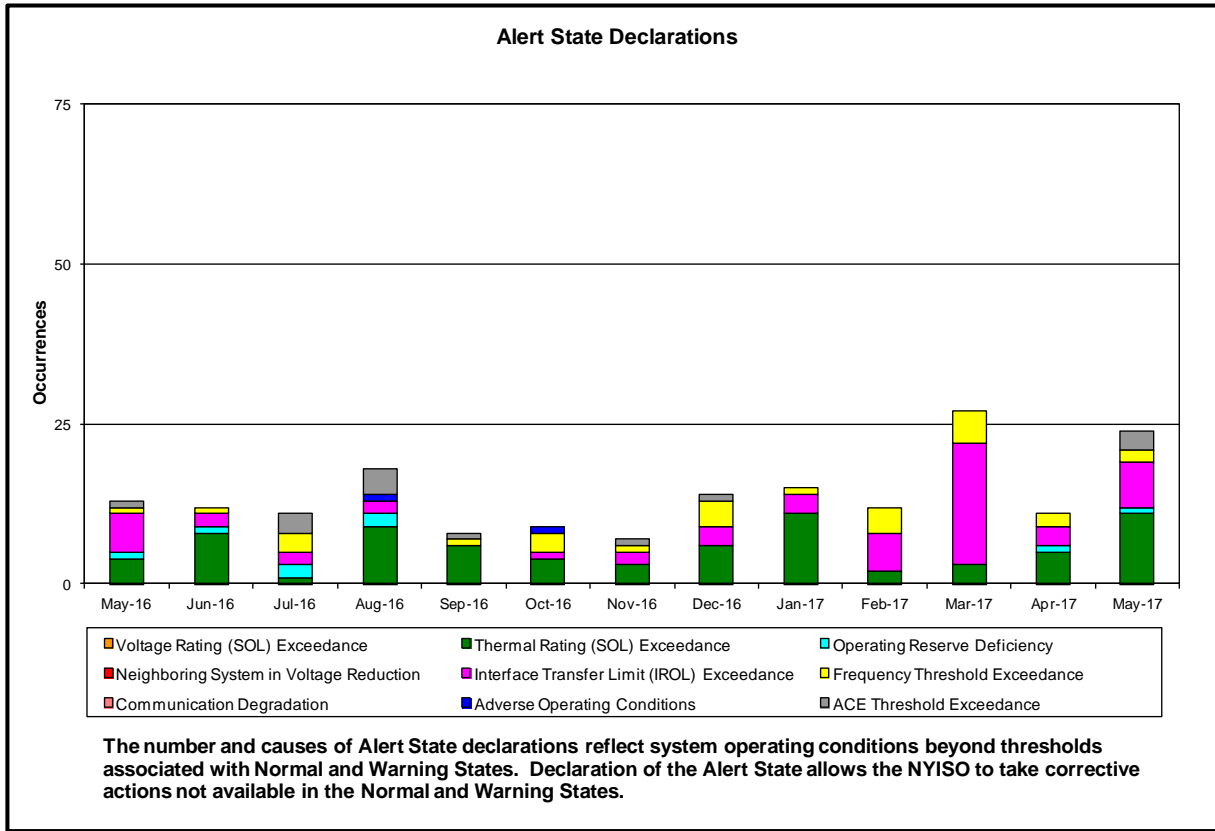
	Current Month Value (\$M)	Year-to-Date Value (\$M)
NY Savings from PJM-NY Congestion Coordination	\$1.89	\$8.64
NY Savings from PJM-NY Coordinated Transaction Scheduling	\$0.03	(\$0.25)
NY Savings from NE-NY Coordinated Transaction Scheduling	\$0.00	(\$0.24)
Total NY Savings	\$1.92	\$8.15
Regional Savings from PJM-NY Coordinated Transaction Scheduling	\$0.59	\$1.31
Regional Savings from NE-NY Coordinated Transaction Scheduling	\$0.10	\$0.48
Total Regional Savings	\$0.69	\$1.79

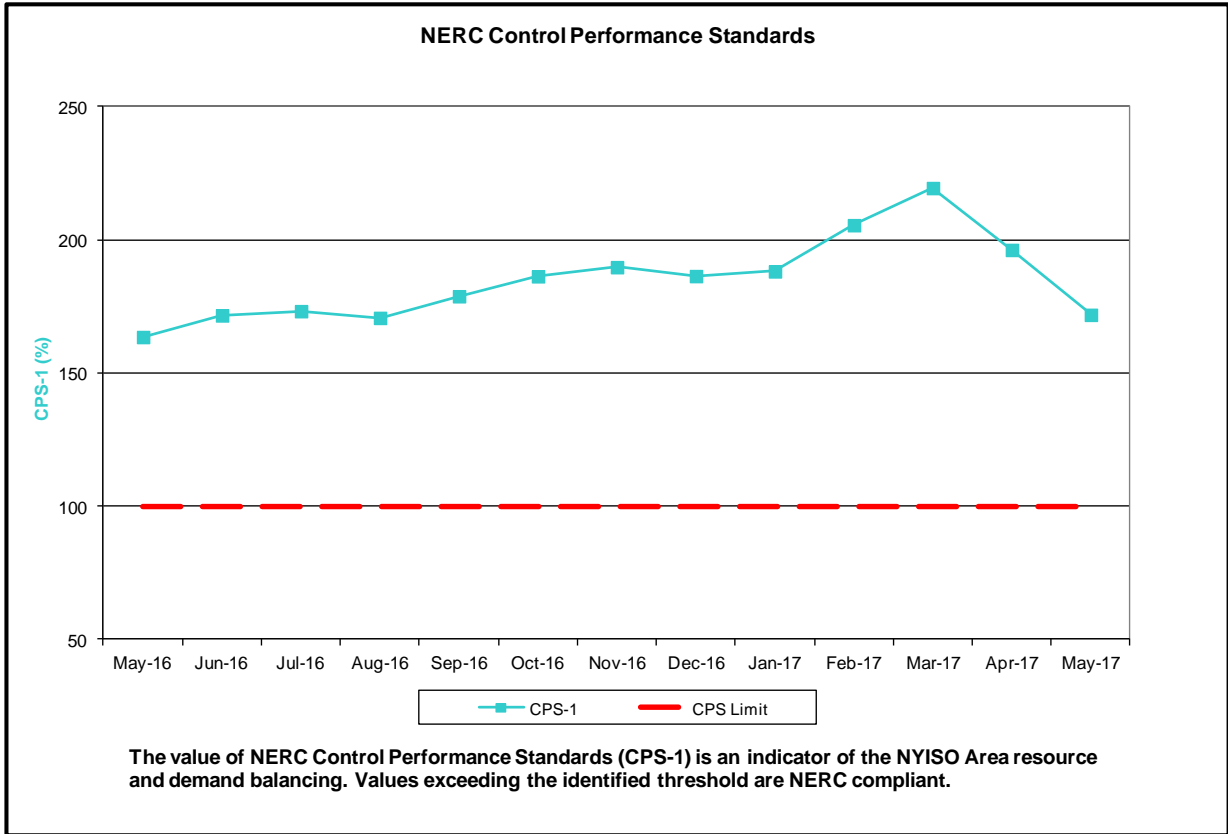
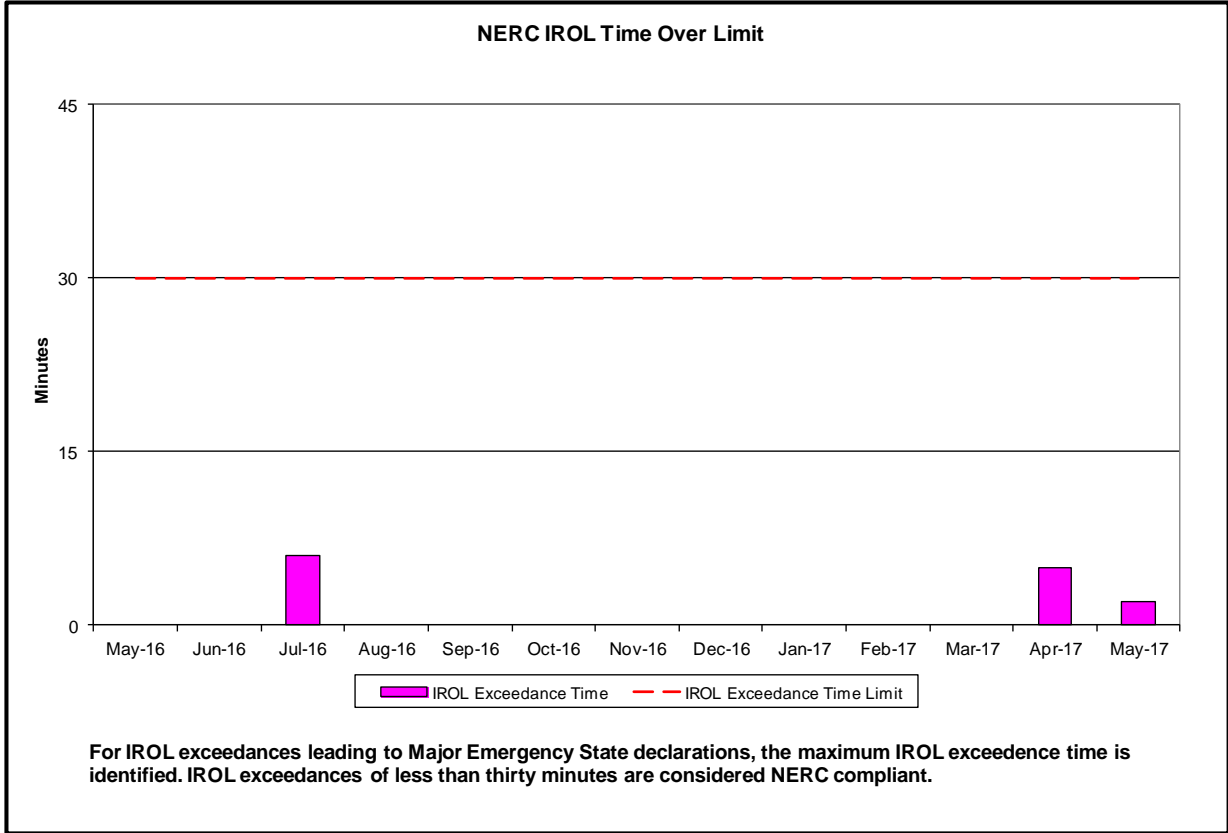
- Statewide uplift cost monthly average was (\$0.13)/MWh
- The following table identifies the Monthly ICAP spot market prices by locality and price delta.

Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
June 2017 Spot Price	\$3.89	\$10.01	\$10.24	\$6.69
May 2017 Spot Price	\$1.72	\$10.28	\$10.57	\$6.71
Delta	\$2.17	(\$0.27)	(\$0.33)	(\$0.02)

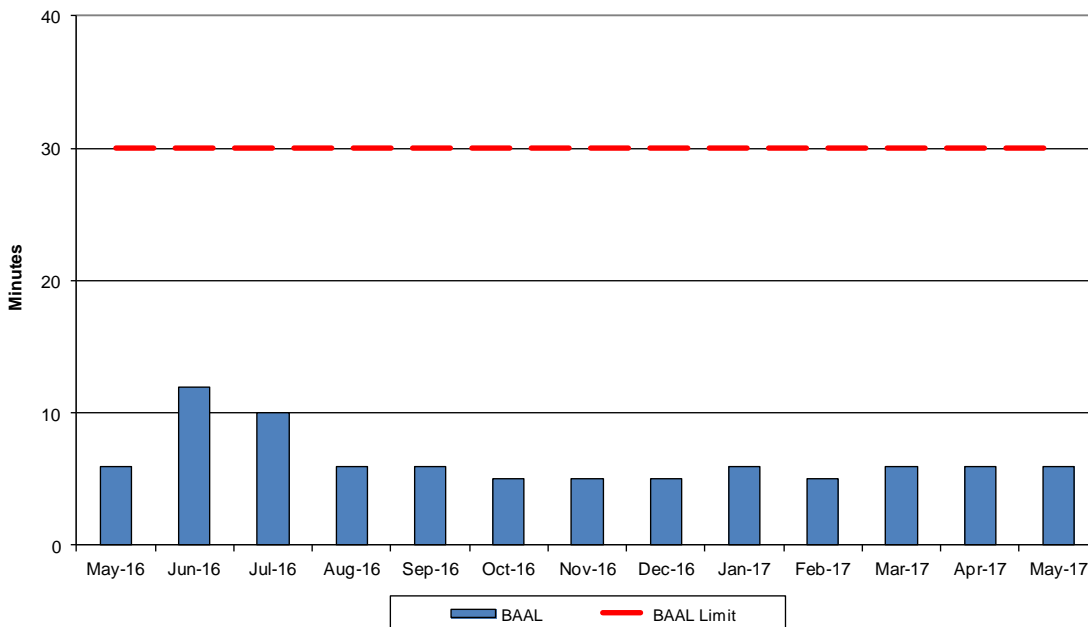
- LHV - Price decreases by \$0.27 due to increases in generator UCAP available and decrease in unoffered MW
- NYC - Price decreases by \$0.33 due to increases in generator UCAP available and decrease in unoffered MW
- NYCA - Price increase by \$2.17 due primarily to reduced Imports and increased Exports, and also an increase in UCAP available.

- Reliability Performance Metrics



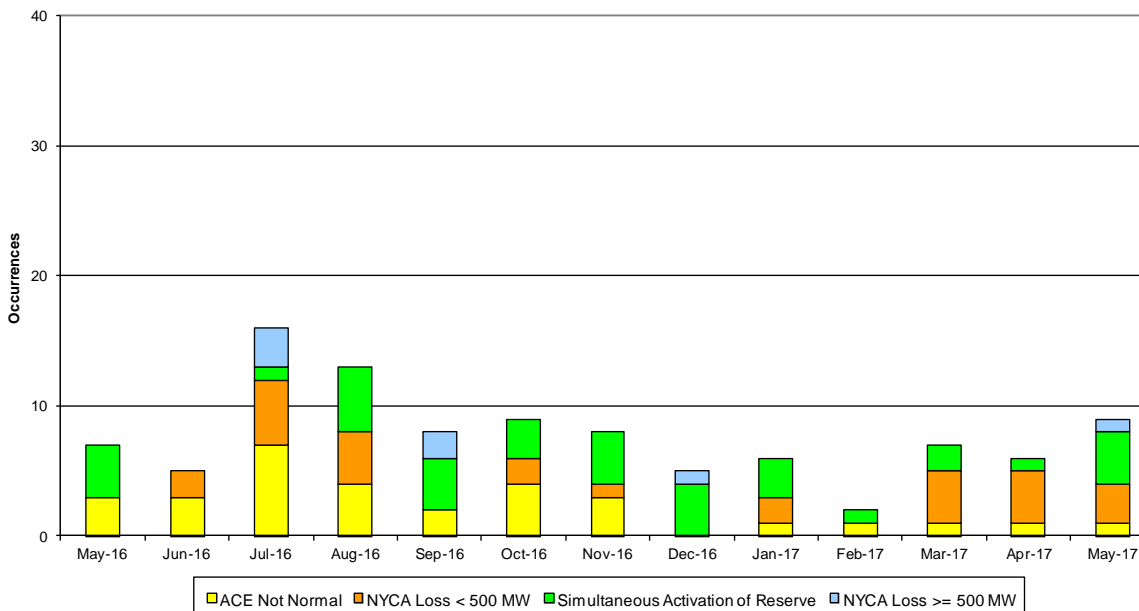


NERC Balancing Authority ACE Limit Standard



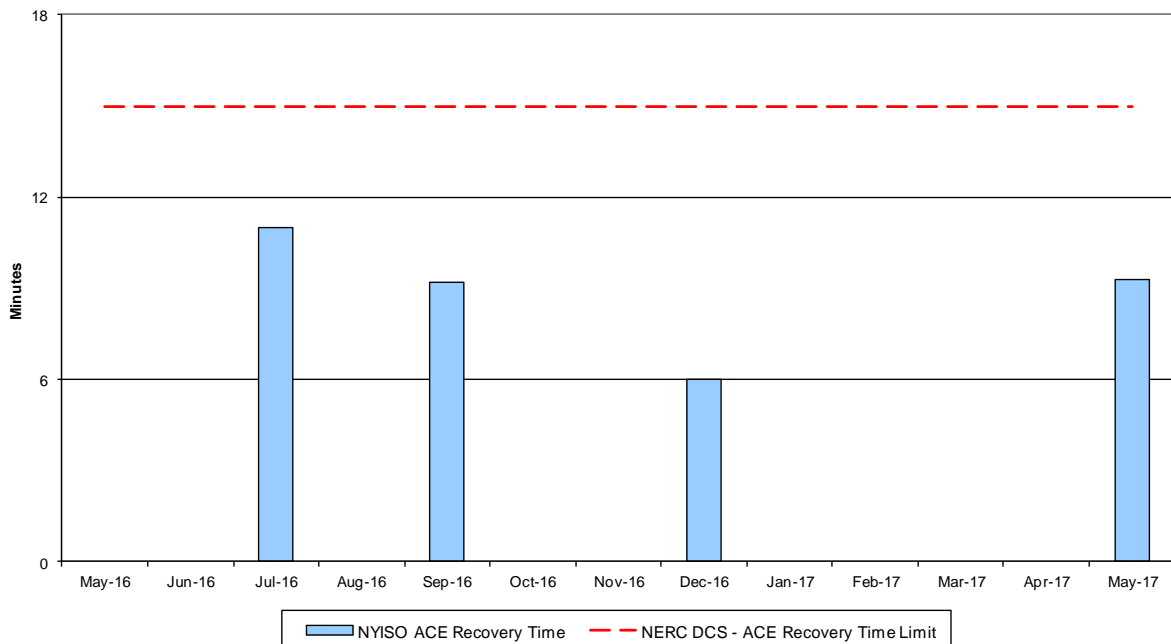
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



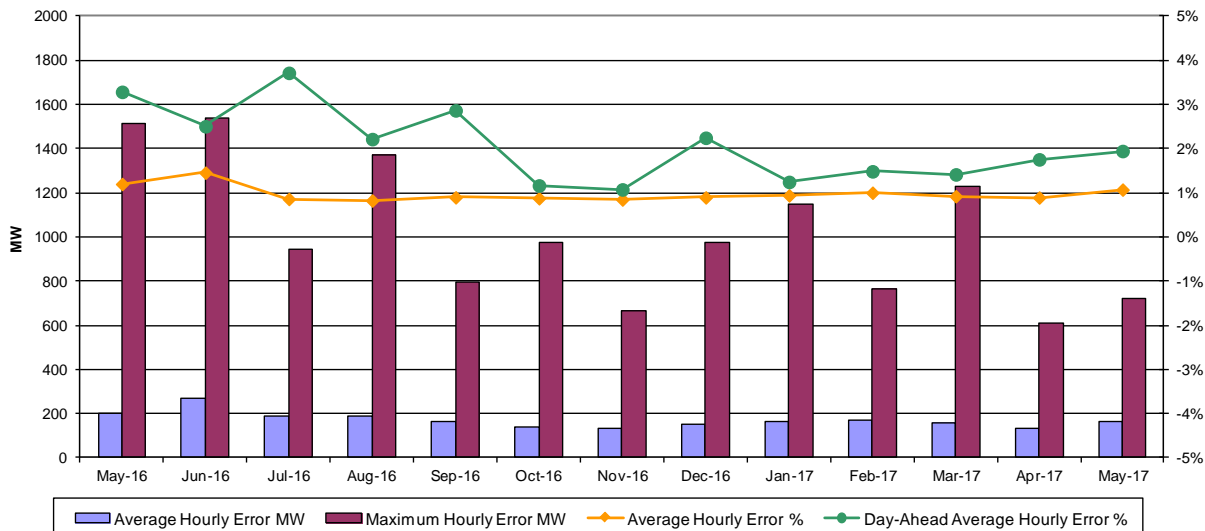
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

DCS Event Time to ACE Recovery

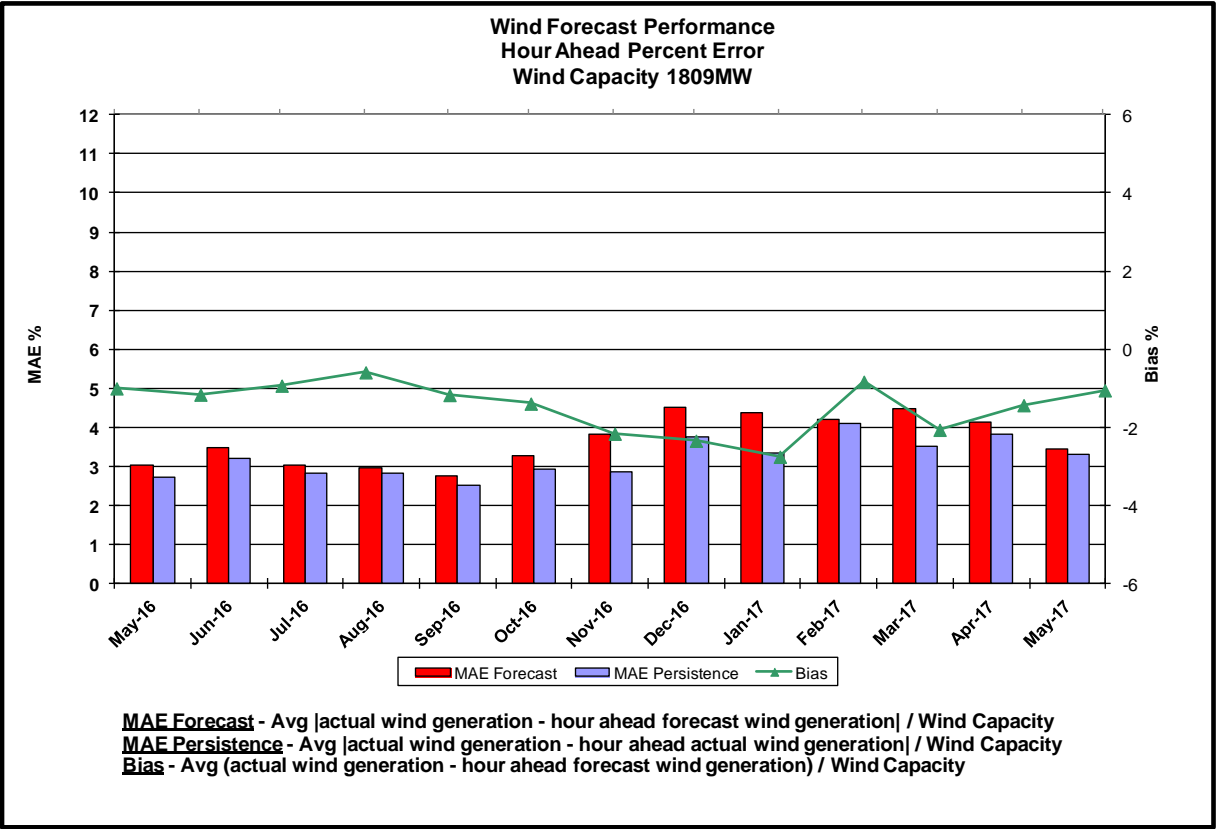
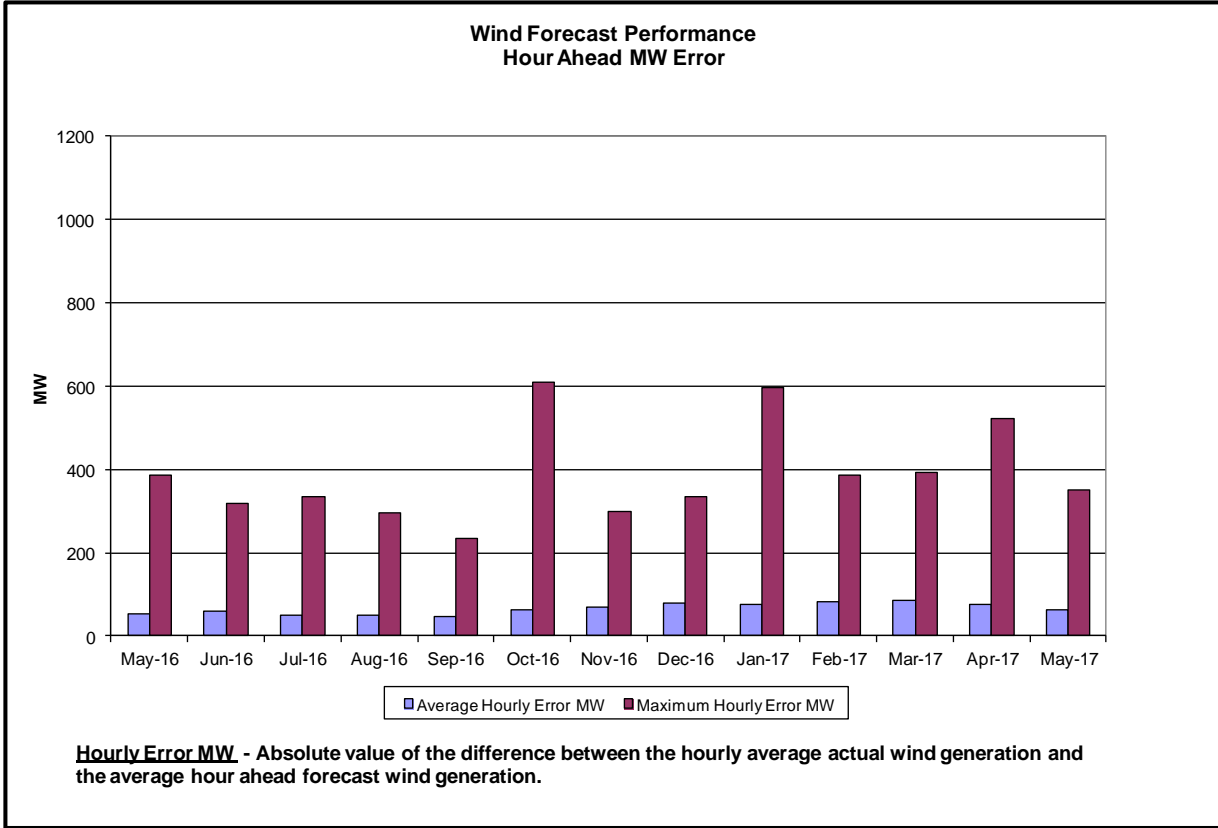


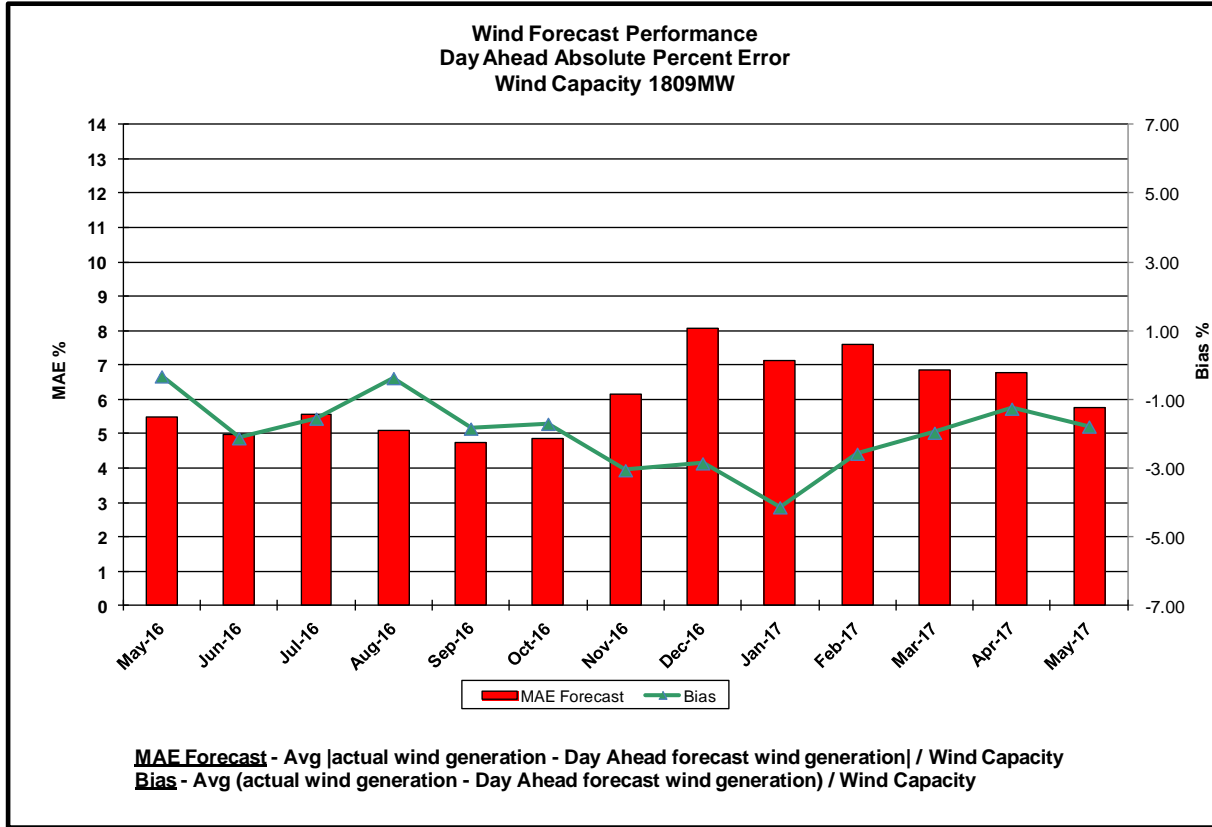
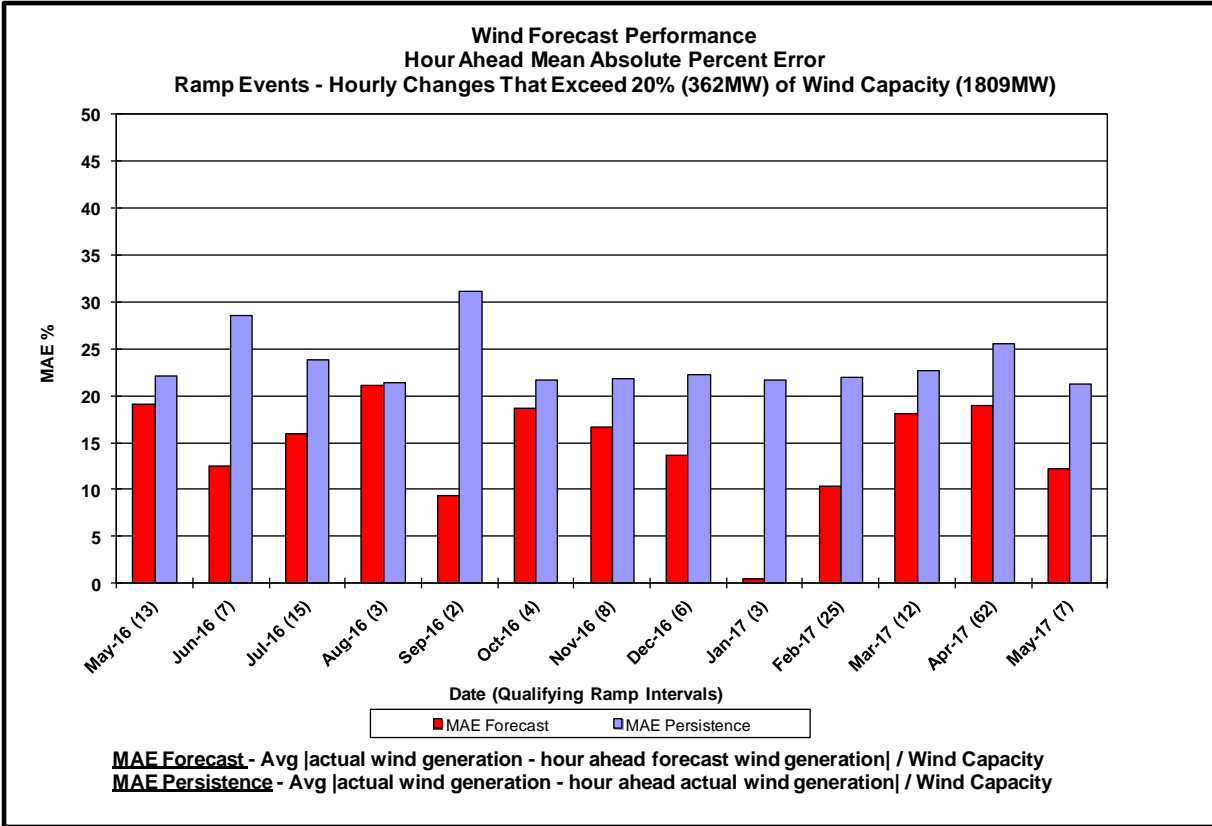
For NYISO initiated Reportable Disturbances, the maximum ACE recovery time is identified. Recovery times of less than 15 minutes are considered NERC compliant.

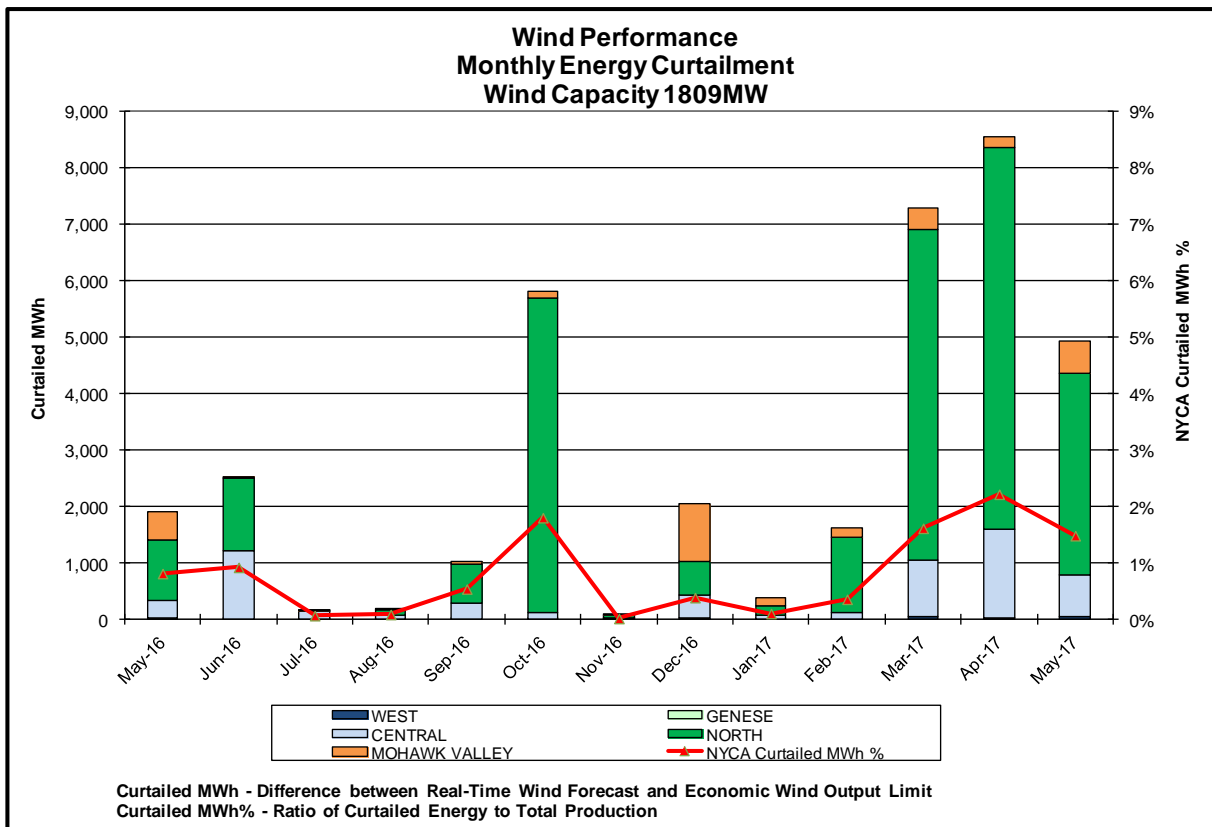
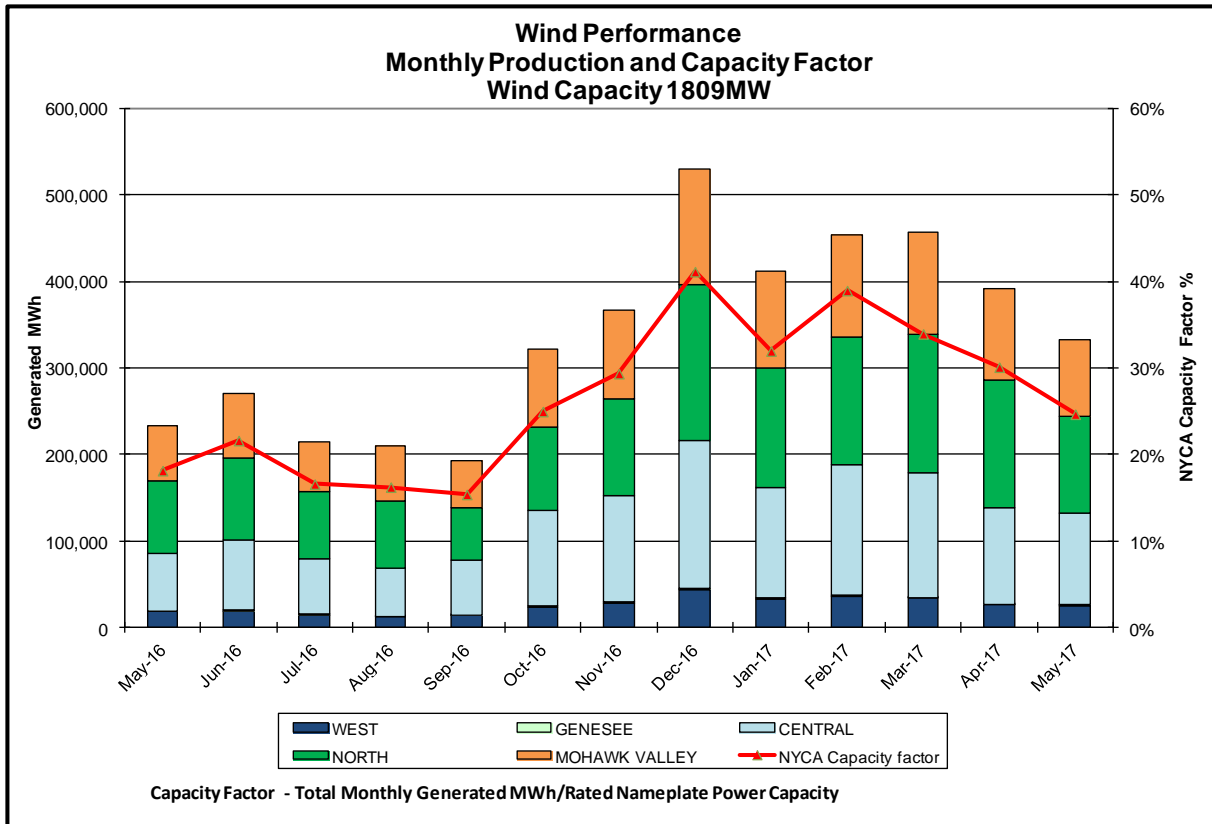
Load Forecast Performance

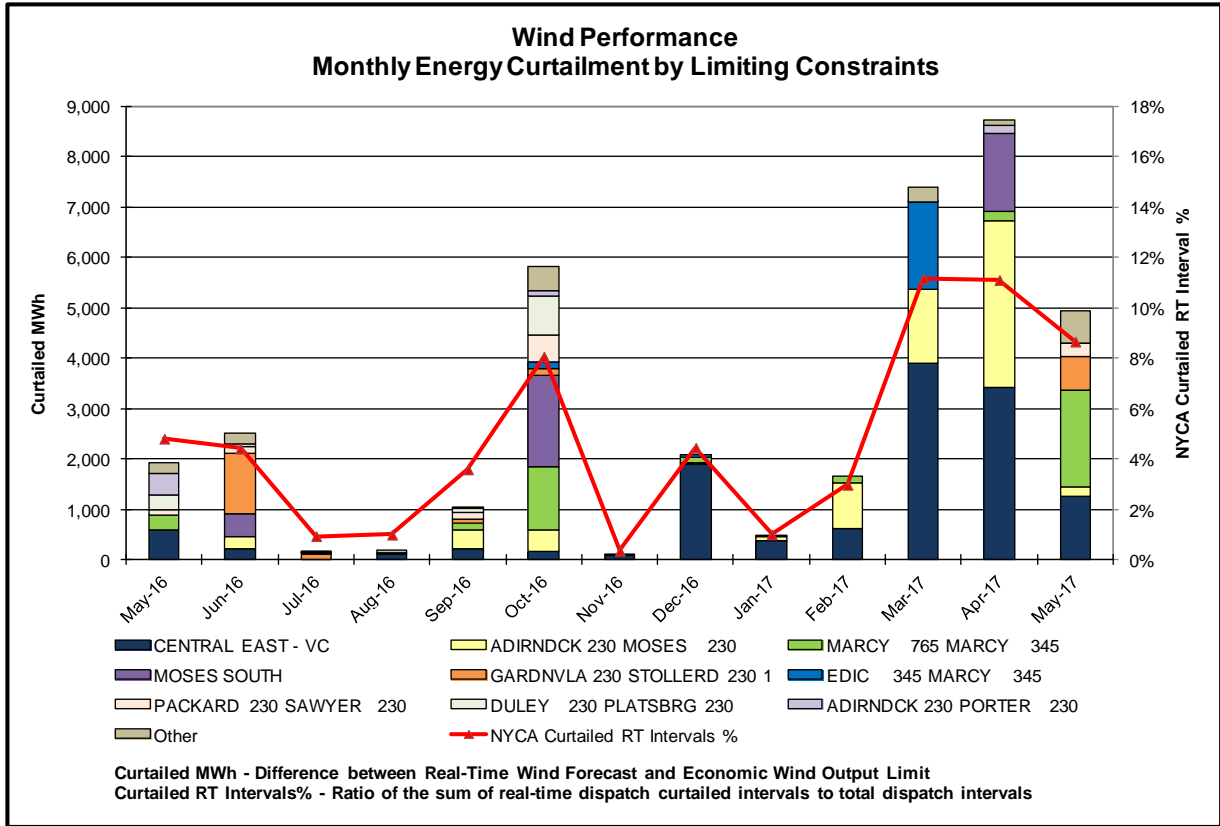


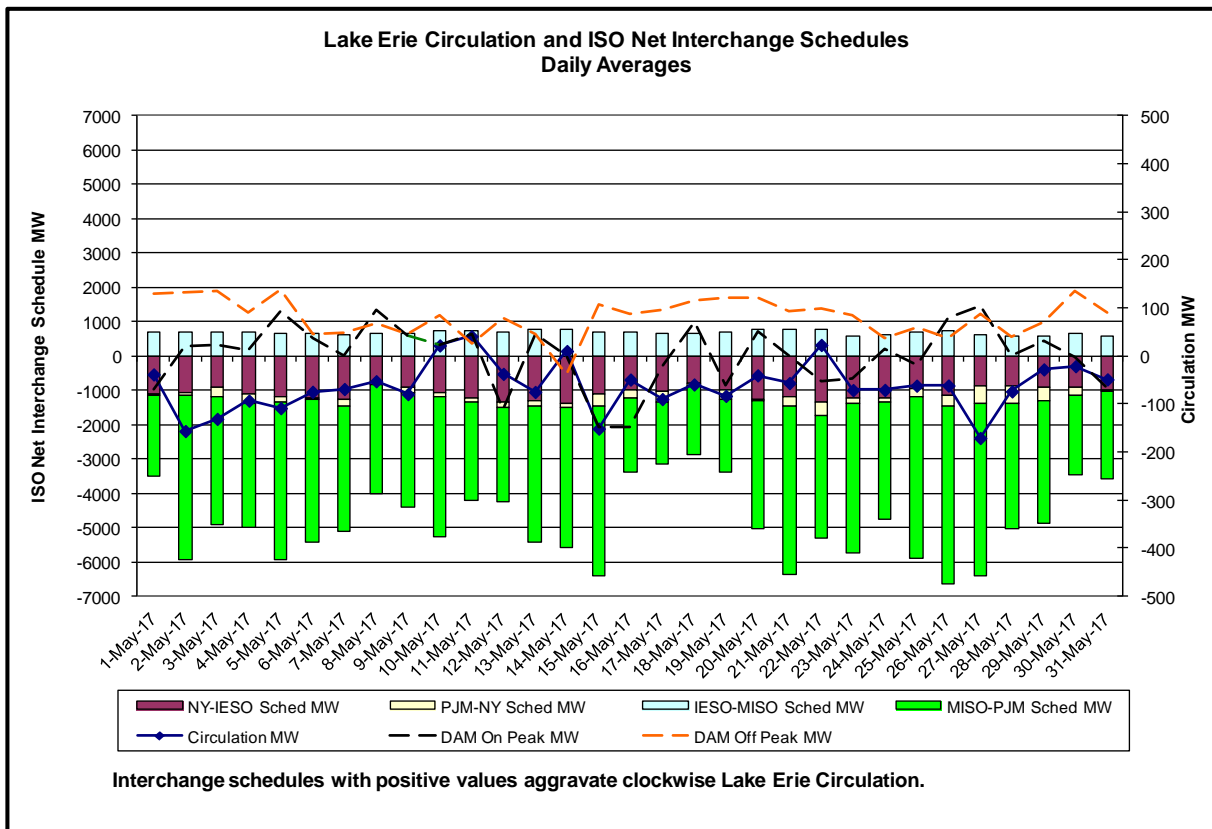
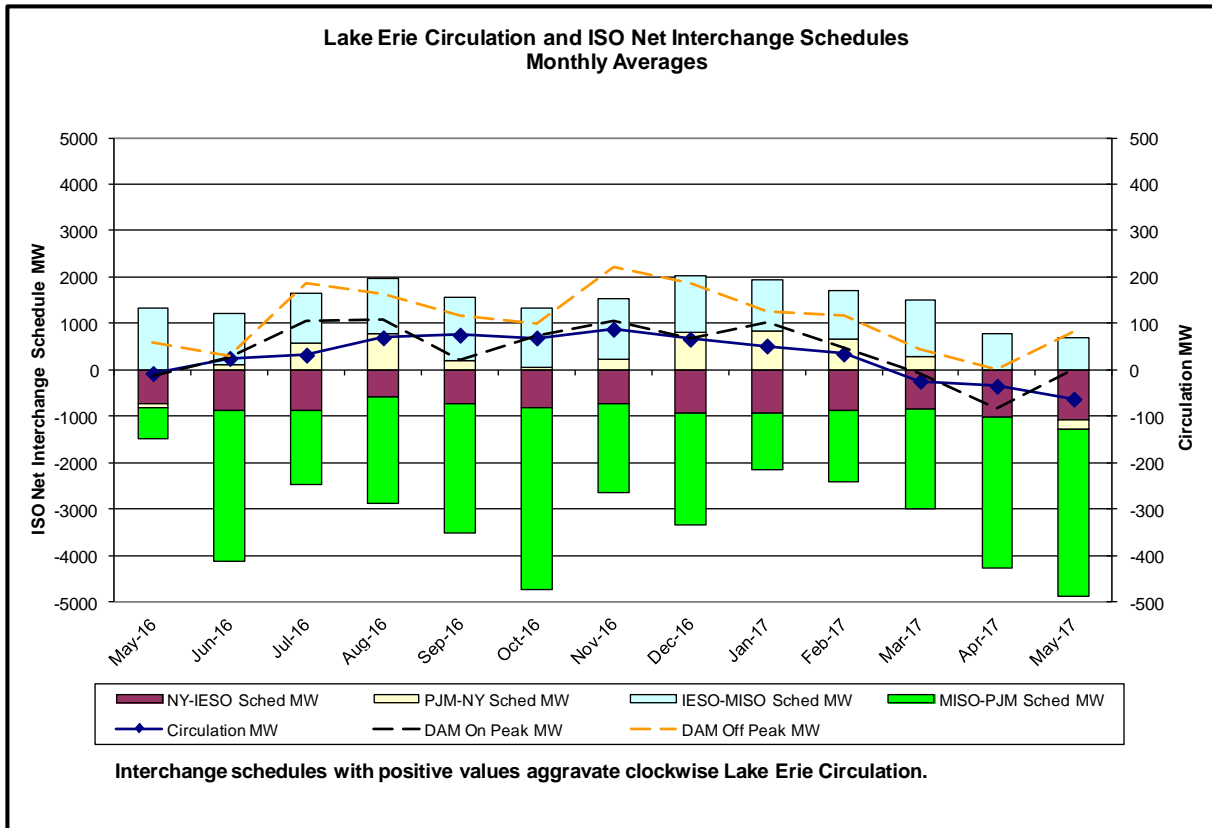
Hourly Error MW - Absolute value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.
Average Hourly Error % - Average value of the ratio of hourly average error magnitude to hourly average actual load demand.
Day-Ahead Average Hourly Error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



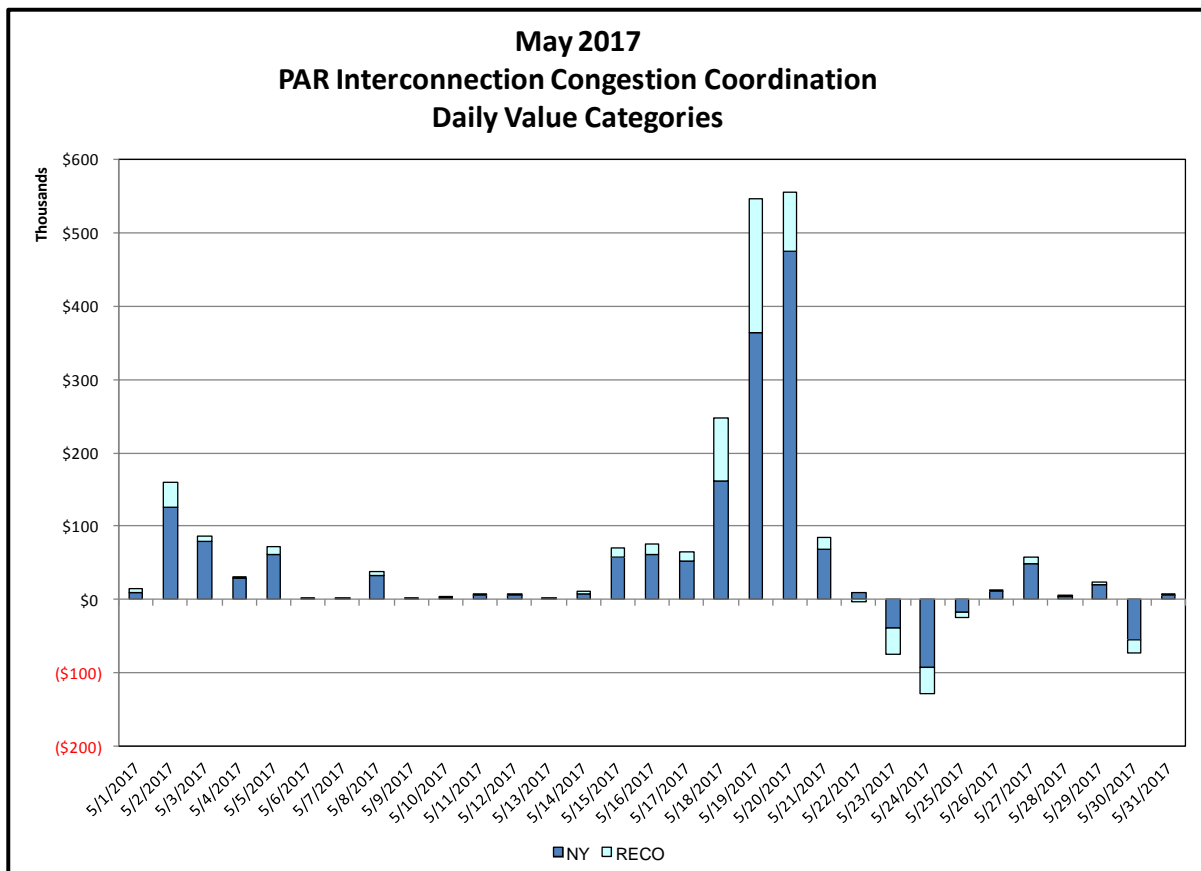
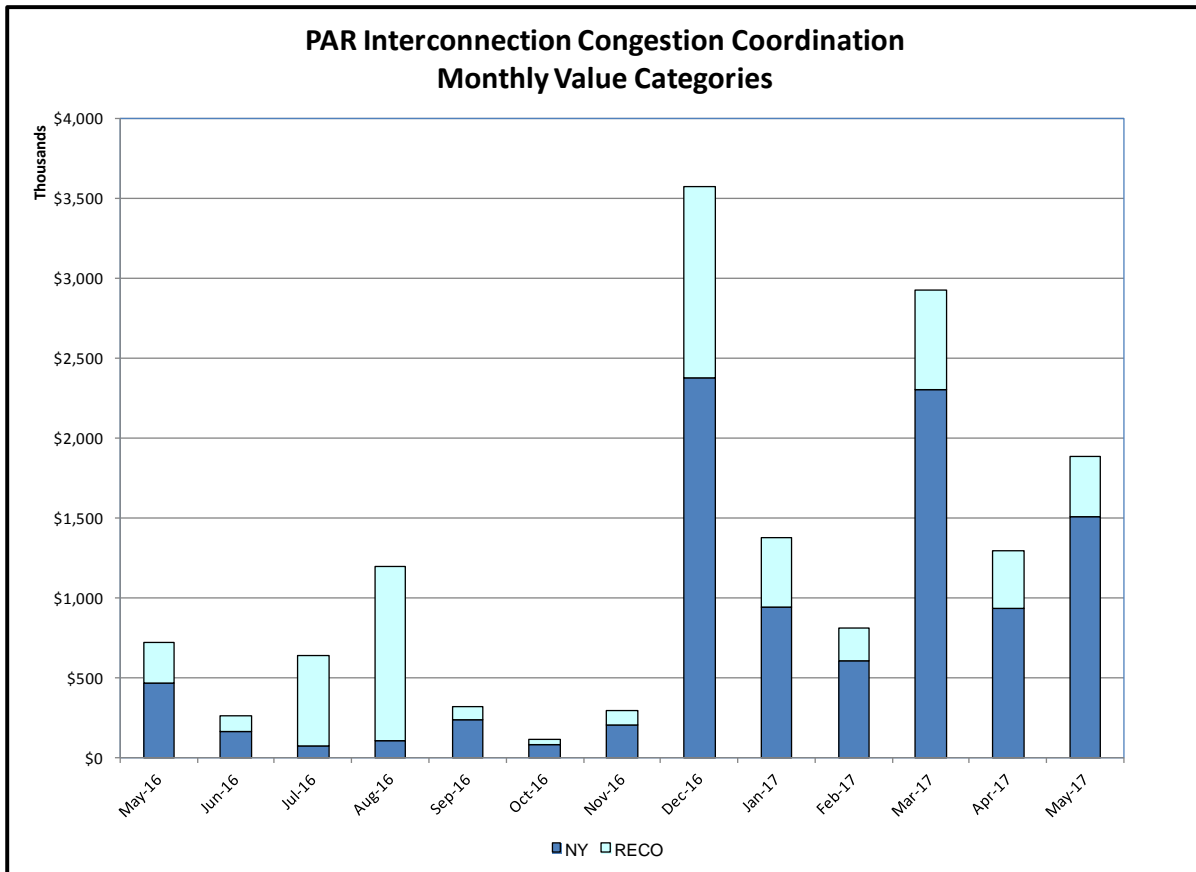






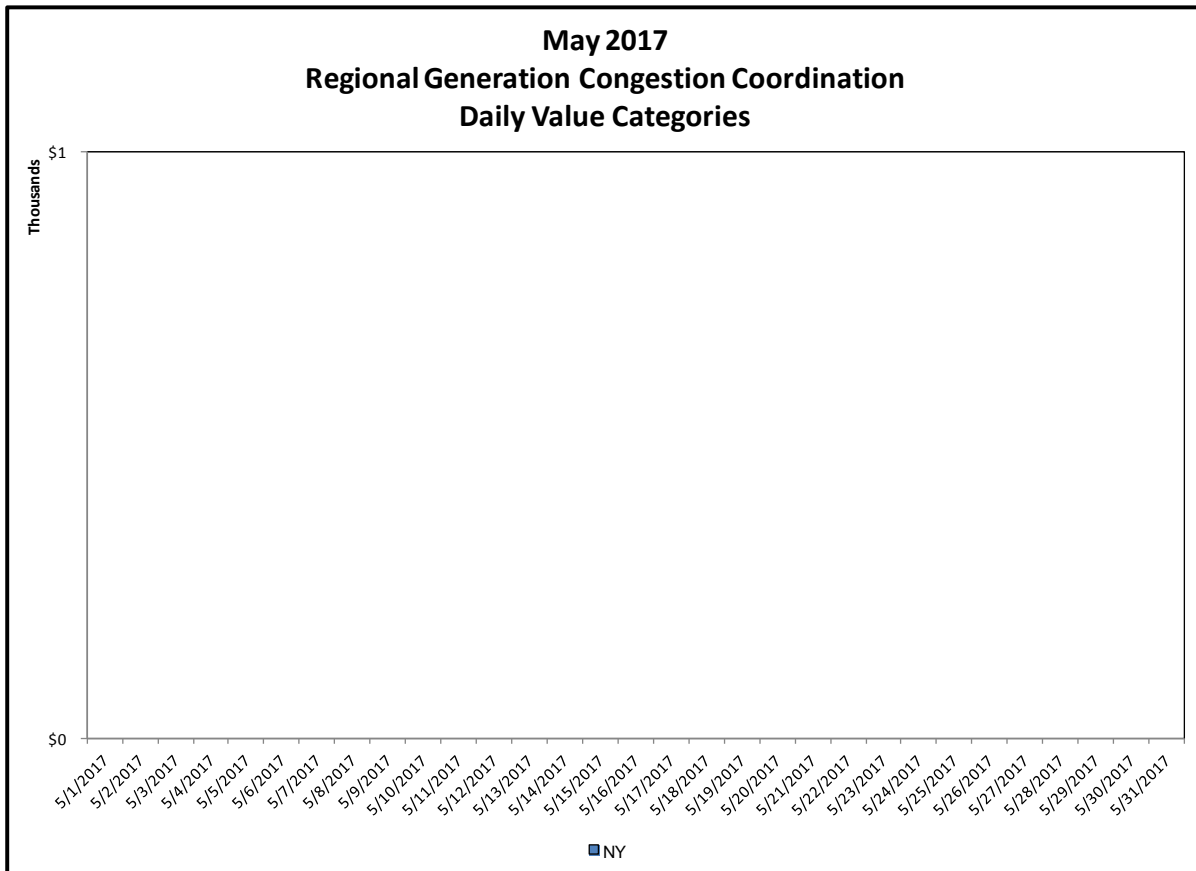
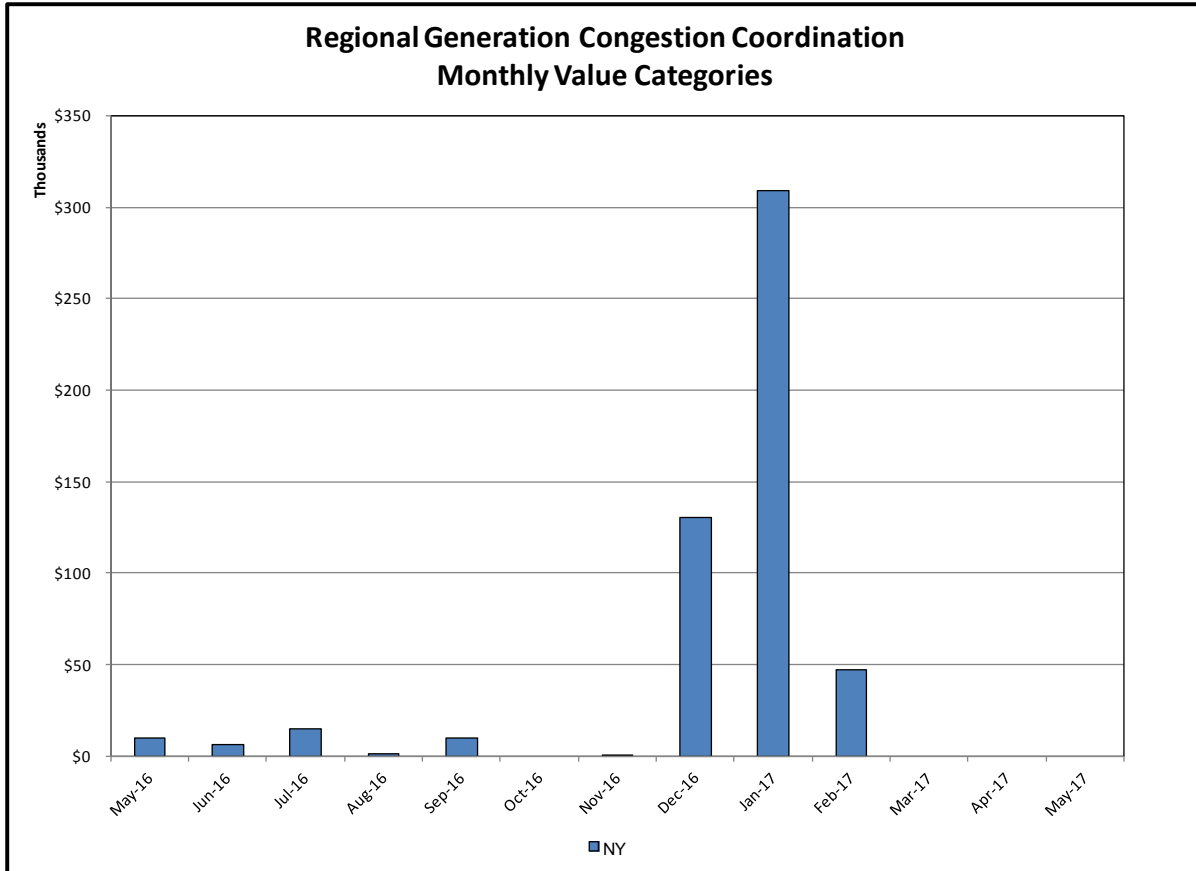


Broader Regional Market Performance Metrics



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.



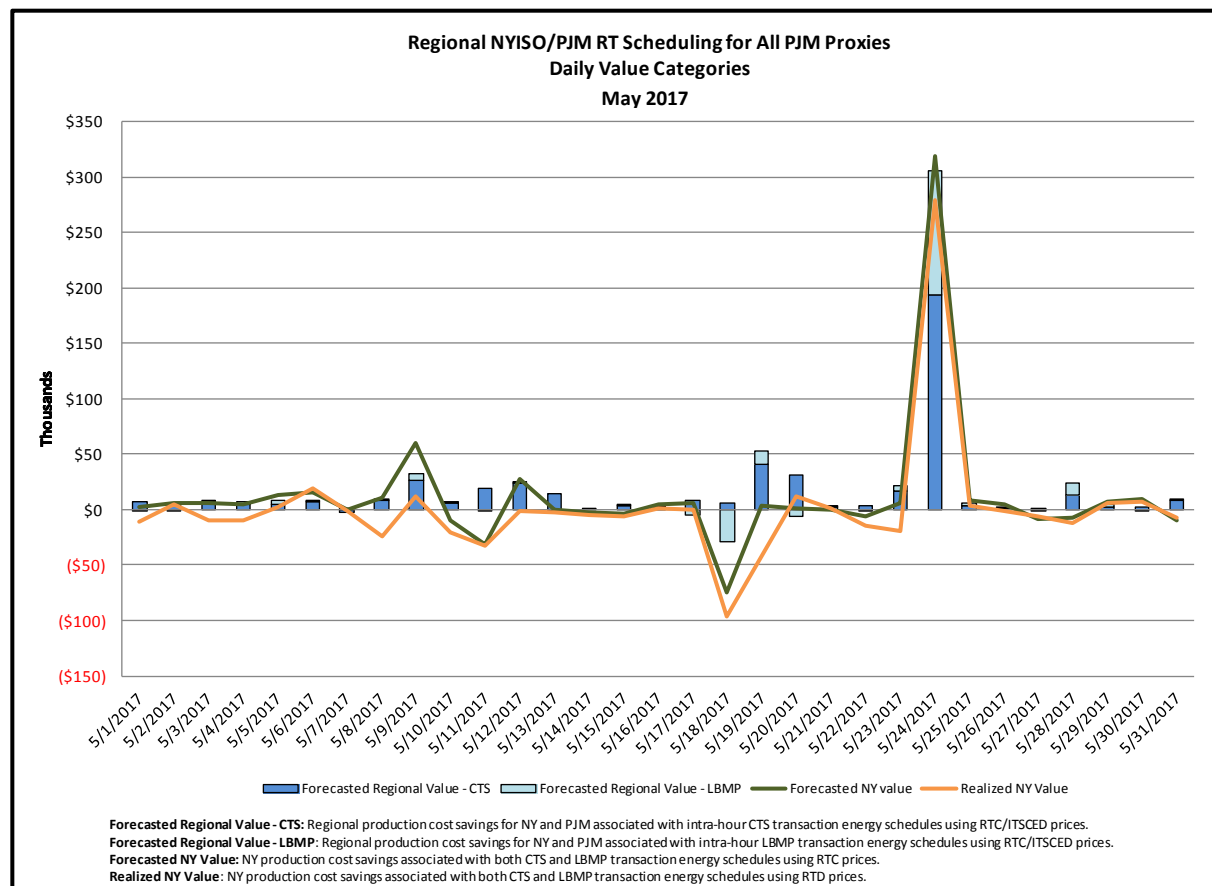
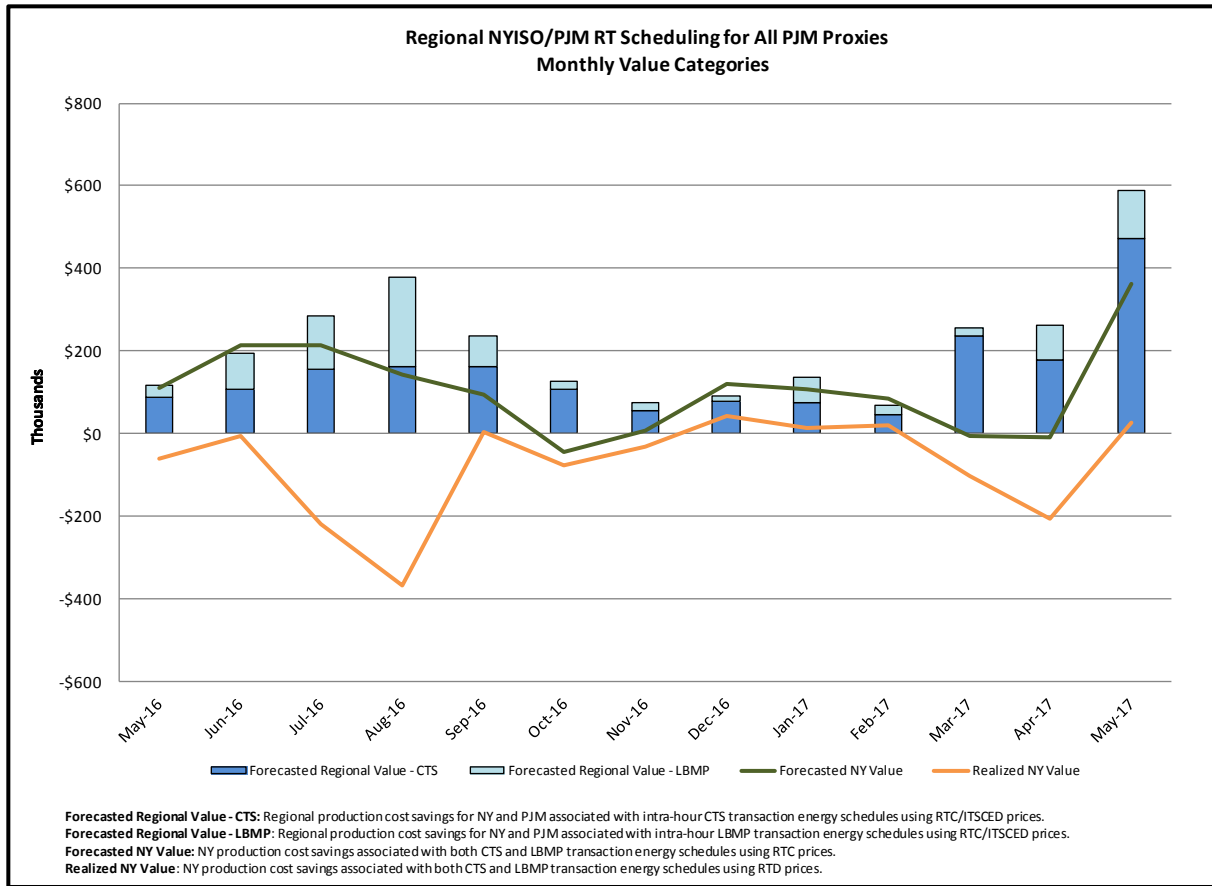
Regional Generation Congestion Coordination

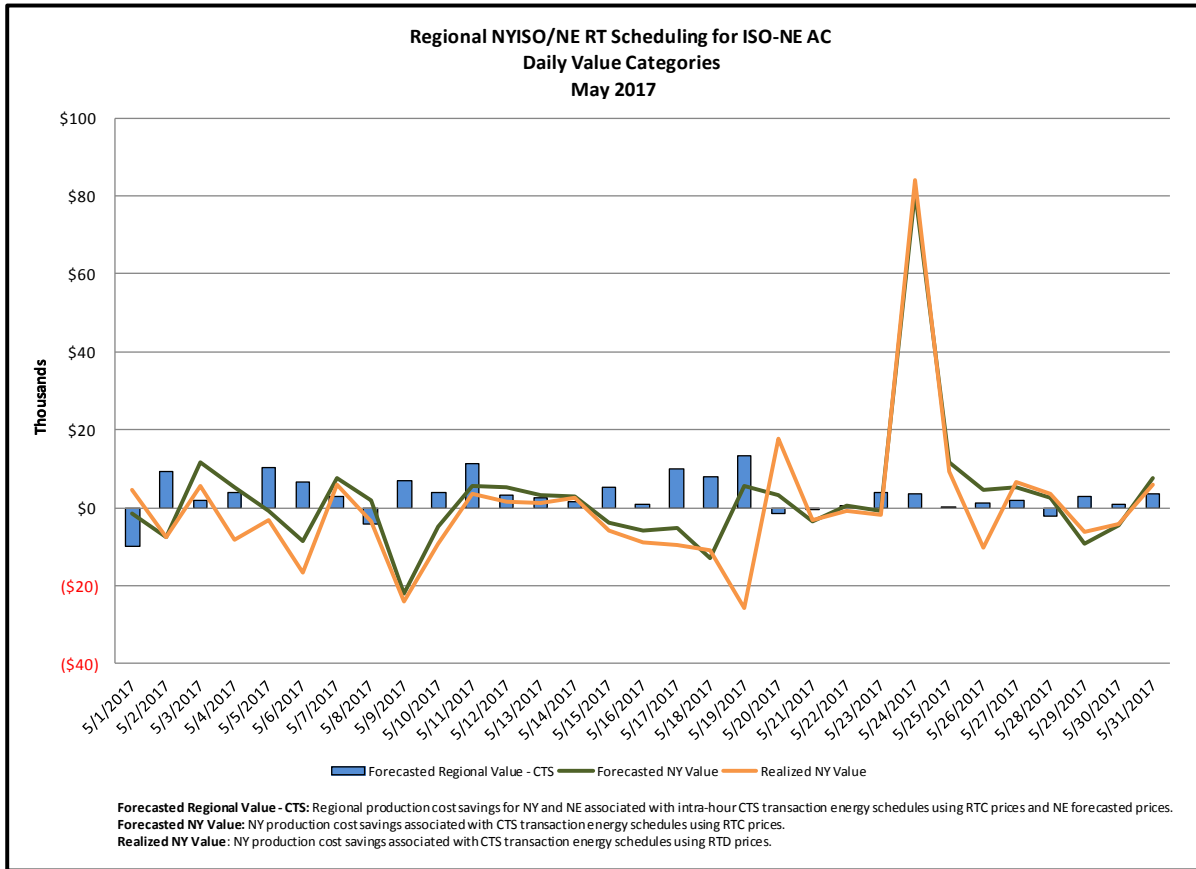
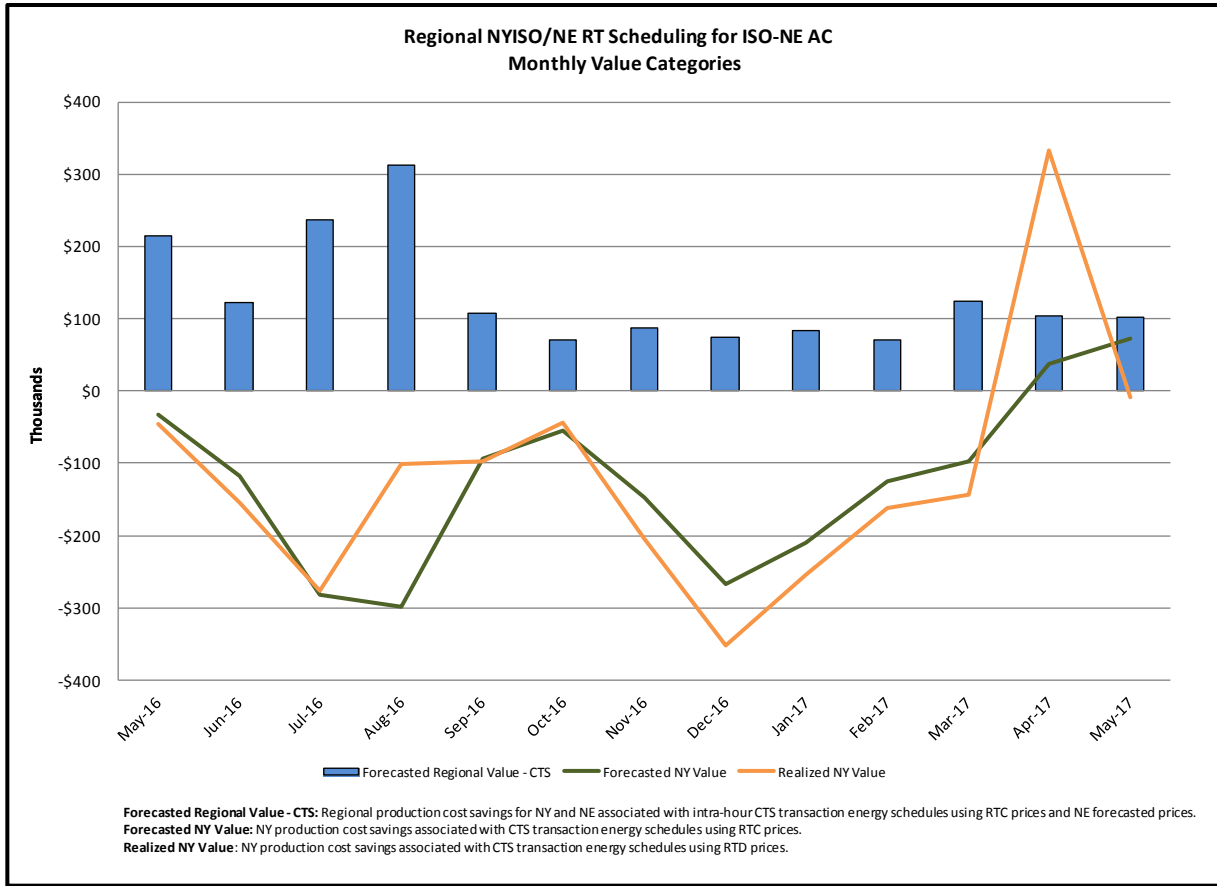
Category

NY

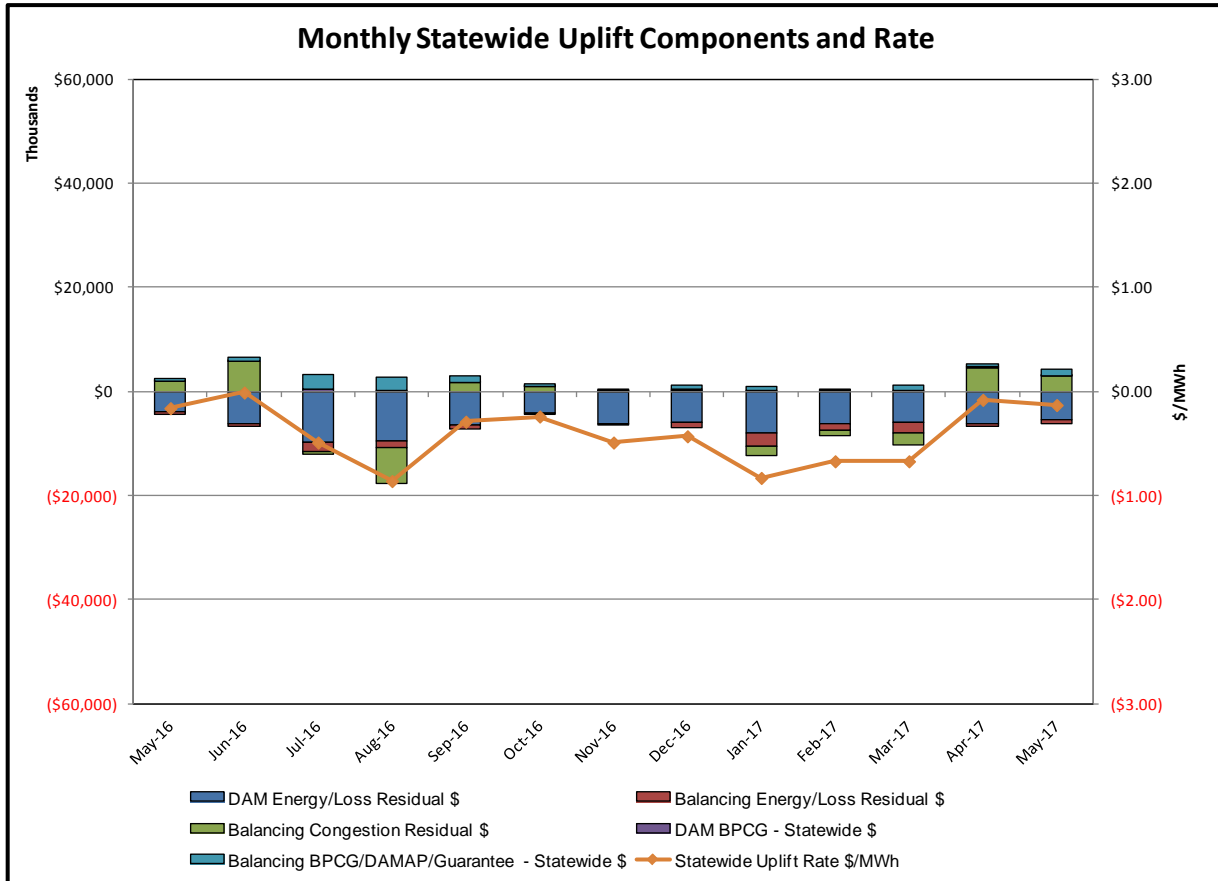
Description

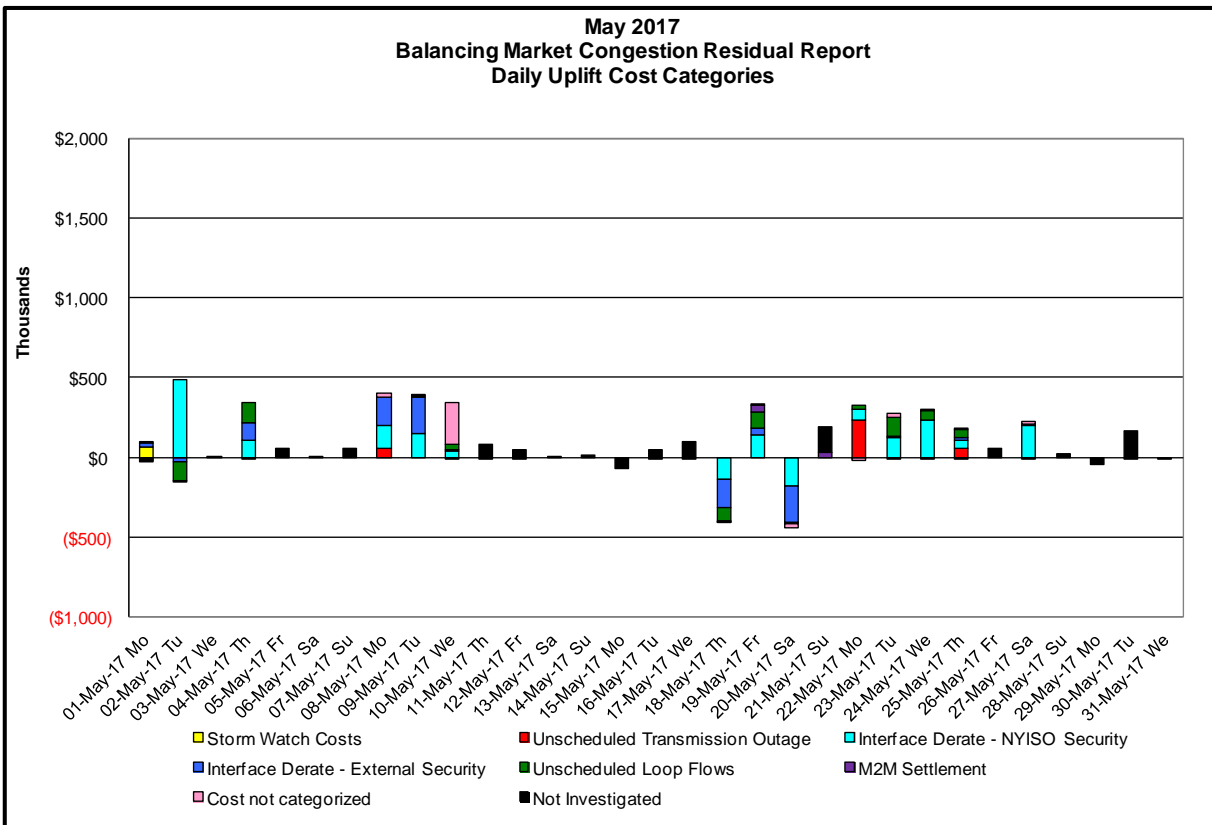
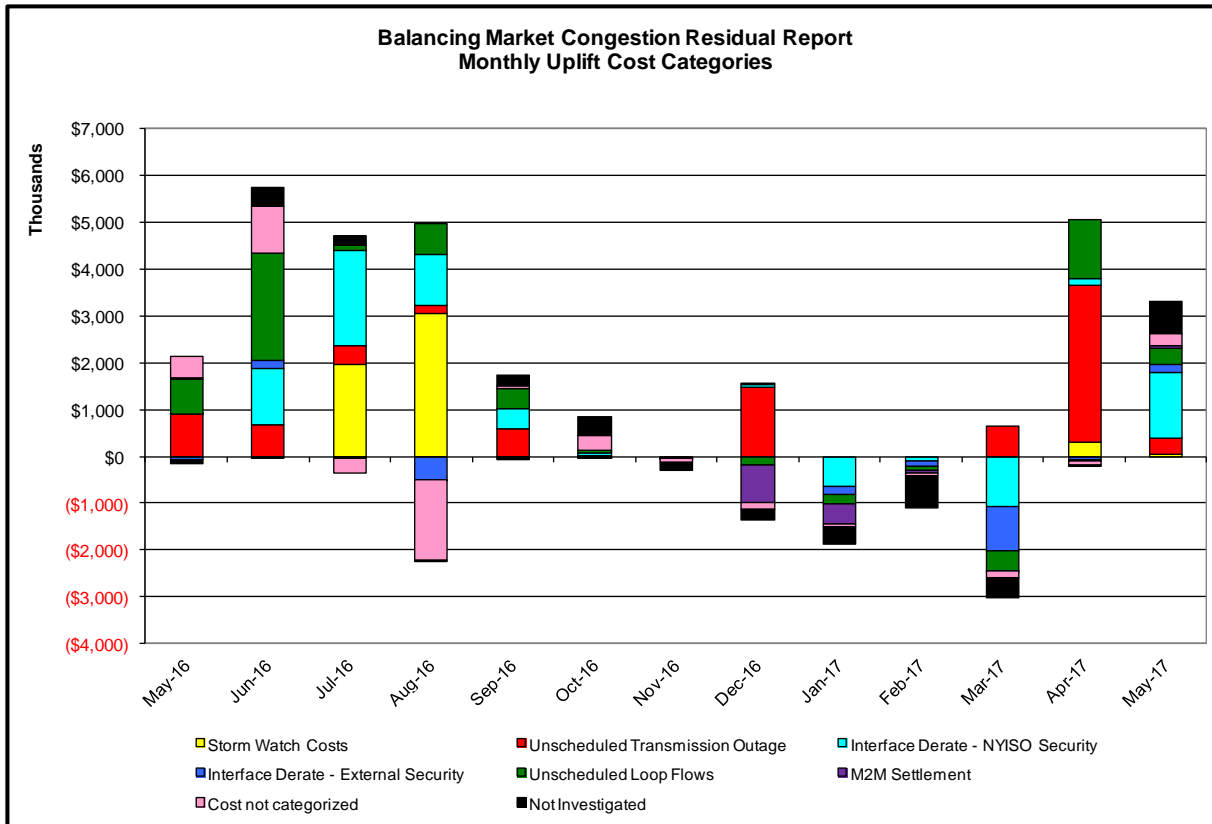
NYISO savings that result from PJM payments to NYISO when PJM's transmission use (PJM's market flow) is greater than PJM's entitlement of the NY transmission system and NYISO is incurring Western or Central NY congestion. Additionally, NYISO savings may result from the more efficient regional utilization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





Market Performance Metrics





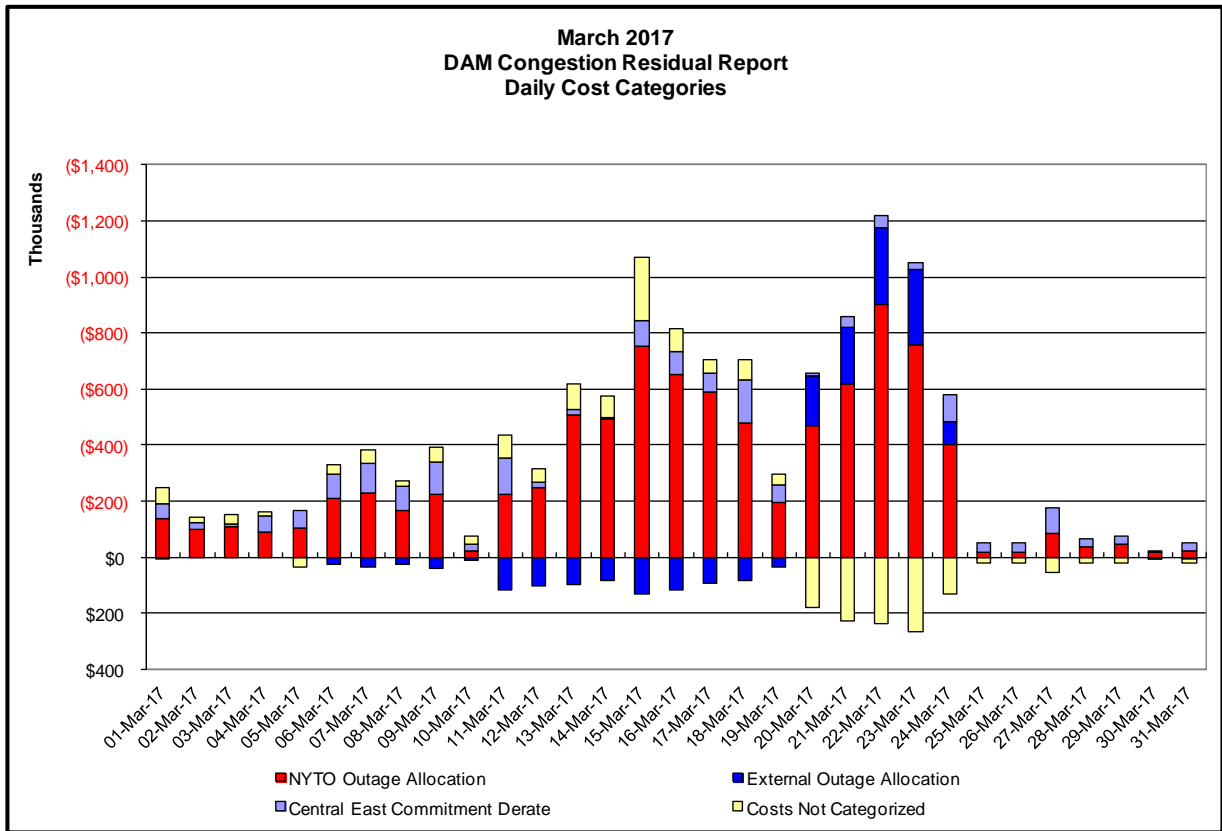
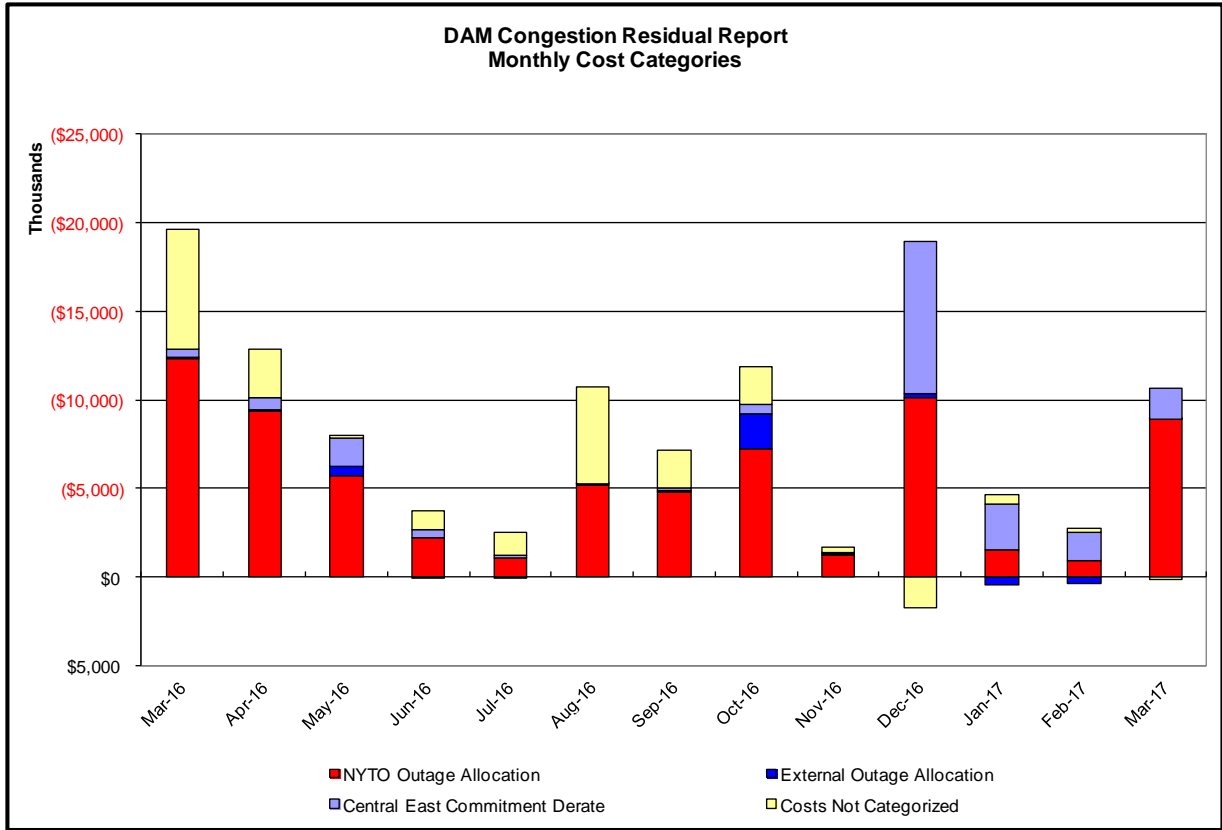
Event	Description	May Dates
	Thunder Storm Alert	1
	Extended outage Leeds-Hurly Ave 345kV (#301) and Hurly Ave-Roseton 345kV (#303)	8
	Forced outage Motthaven-Dunwoodie 345kV (#72)	22
	Forced outage Beck-Packard 230kV (#BP76)	25
	Forced outage Sprainbrook-Tremont 345kV (#X28)	25
	Forced outage Foxhills-Willowbrook 138kV (#29212)	30
	Derate Central East	19,24,27
	Derate East 179th Street - Dunwoodie 138kV (#99153)	23
	Derate East Garden City-Newbridge 138kV (#462) for I/o NEPTUNE HVDC TIE LINE	24
	Derate East Garden City-Valley Stream 138kV (#262)	8-10,18,19,22,24,25,27
	Derate East Garden City-Valley Stream 138kV (#262) for BUS:BARRETT 291 & G1 & R1	18
	Derate Farragut-Gowanus 345kV (#41)	24
	Derate Gowanus-Greenwood 138kV (#42231)	4,8,10,18,19
	Derate Gowanus-Greenwood 138kV (#42231) for TWR:GOETHALS 22 & 21	19
	Derate Leeds-New Scotland 345kV (#93) for I/o BUS:N.SCTLD #99&18&1&94&BK1&C2	18
	Derate Leeds-New Scotland 345kV (#93) for I/o Leeds New Scotland 345kV (#94)	19
	Derate Leeds-New Scotland 345kV (#94) for I/o Leeds-New Scotland 345kV (#93)	18
	Derate Leeds-Pleasant Valley 345kV (#92) for I/o Athen-Pleasant Valley 345kV (#91)	19
	Derate Marcy 765/345kV Bk (#AT2)	25
	Derate Marcy 765/345kV Bk (#AT2) for I/o TWR:MOSES MA1&MA2	22,23
	Derate Marcy-Edic 345kV (#UE1-7) for \$SCB MARCY 3202 W/18 LN O/S	1
	Derate Marcy-Edic 345kV (#UE1-7) for I/o TWR:11 & UCC2-41	1,2,4,5
	Derate Niagara-Robinson-Road 345kV (#64)	5
	NYCA DNI Ramp Limit	1,2,4,5,8,9,18-20,22-24
	Uprate Central East	1,2,4,5,18-20,25,27
	Uprate Dunwoodie-Shore Road 345kV (#Y50)	18-20,24,25,27
	Uprate Dunwoodie-Shore Road 345kV (#Y50) for SCB:SPBK(RNS2):Y49&M29&Y49_ST	18,19
	Uprate East 179th Street-HellGate West 138kV (#15055)	2,18,20,25,27
	Uprate East 179th Street-Sherman Creek 138kV (#15031)	18
	Uprate Gowanus-Greenwood 138kV (#42232) for I/o TWR:GOETHALS 22 & 21	18-20
	Uprate Greenwood-Fox Hills 138kV (#29232) for I/o FOXHILLS-WILLWBRK_138_29211&BK2	18
	Uprate Greenwood-Vernon 138kV (#31231) for I/o TWR:GOETHALS 22 & 21	18-20
	Uprate Leeds-New Scotland 345kV (#93) for I/o BUS:N.SCTLD #99&18&1&94&BK1&C2	18
	Uprate Leeds-Pleasant Valley 345kV (#92) for I/o Athens-Pleasant Valley 345kV (#91)	18
	Uprate Mott Haven-Dunwoodie 345kV (#72)	2,18-20,25
	Uprate Mott Haven-Dunwoodie 345kV (#72) for I/o \$SCB SPRNBK RS4 W/W64 SW	26
	Uprate Packard-Sawyer 230kV (#77) for I/o BUS:PACKARD BK3 & 61 & 78	19,23
	Uprate Rainey-Vernon 138kV (#36311)	19
	HQ_Chat-NY Scheduling Limit	8-10,18,19
	IESO_AC Scheduling Limit	25
	NE_AC DNI Ramp Limit	1,2,4,5,8,9,18-20,23,27
	NE_AC-NY Scheduling Limit	1,18,19,25
	NE_NNC1385-NY Scheduling Limit	16
	PJM_AC DNI Ramp Limit	8,18,19
	PJM_AC-NY Scheduling Limit	1,2
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East	1,2,4,5,18-20,27
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Niagara-Packard	10,25
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Niagara-Packard, Niagara-Robinson Road	19
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Niagara-Packard, Niagara-Robinson Road, Packard-Sawyer	24
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Niagara-Packard, Packard-Sawyer	9
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Packard-Sawyer	1,4,19,22,23

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	

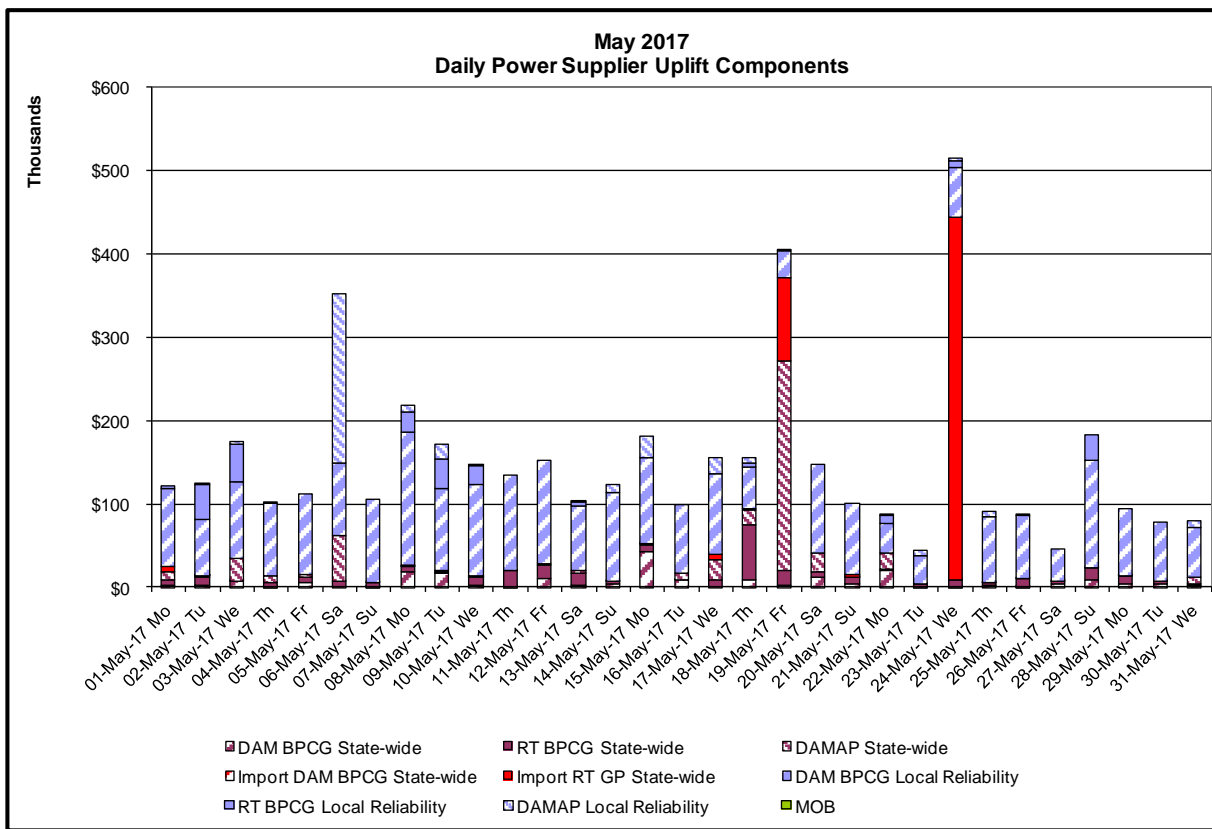
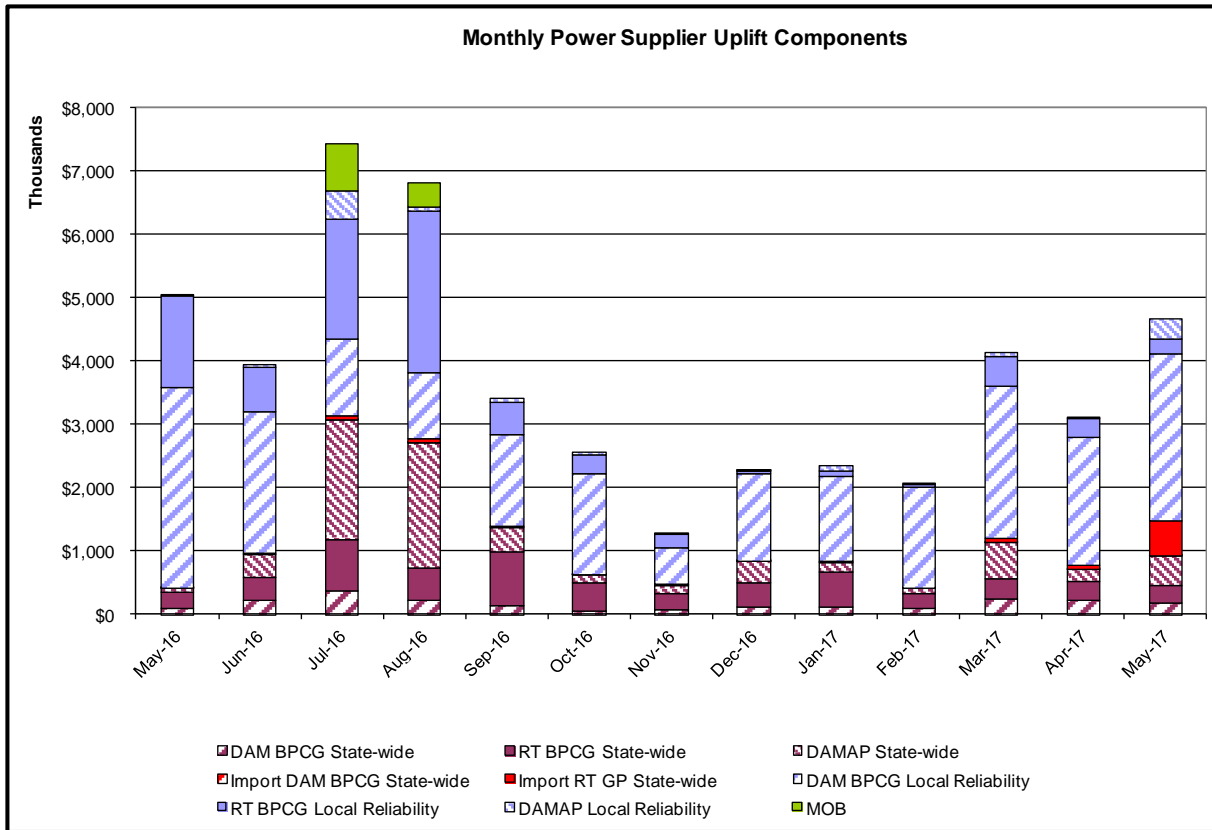
Monthly Balancing Market Congestion Report Assumptions/Notes

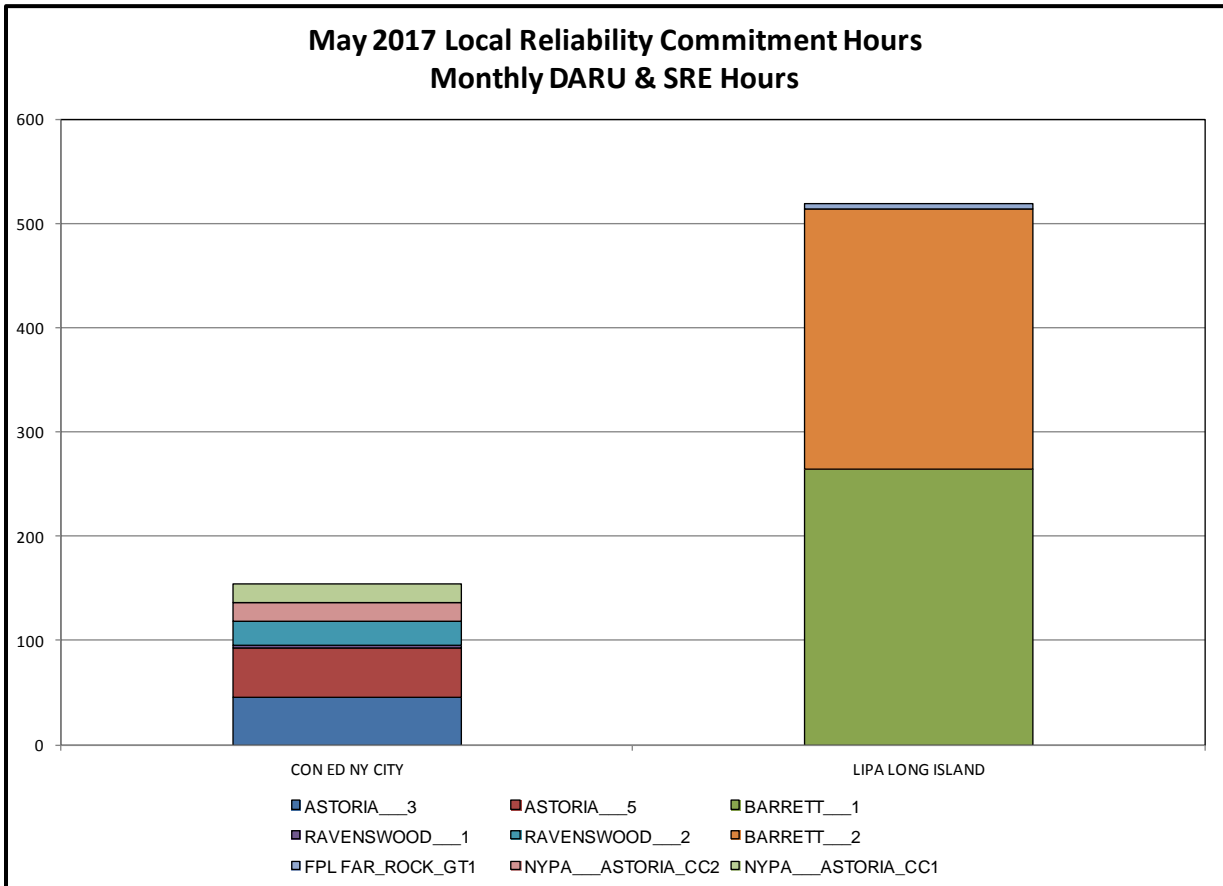
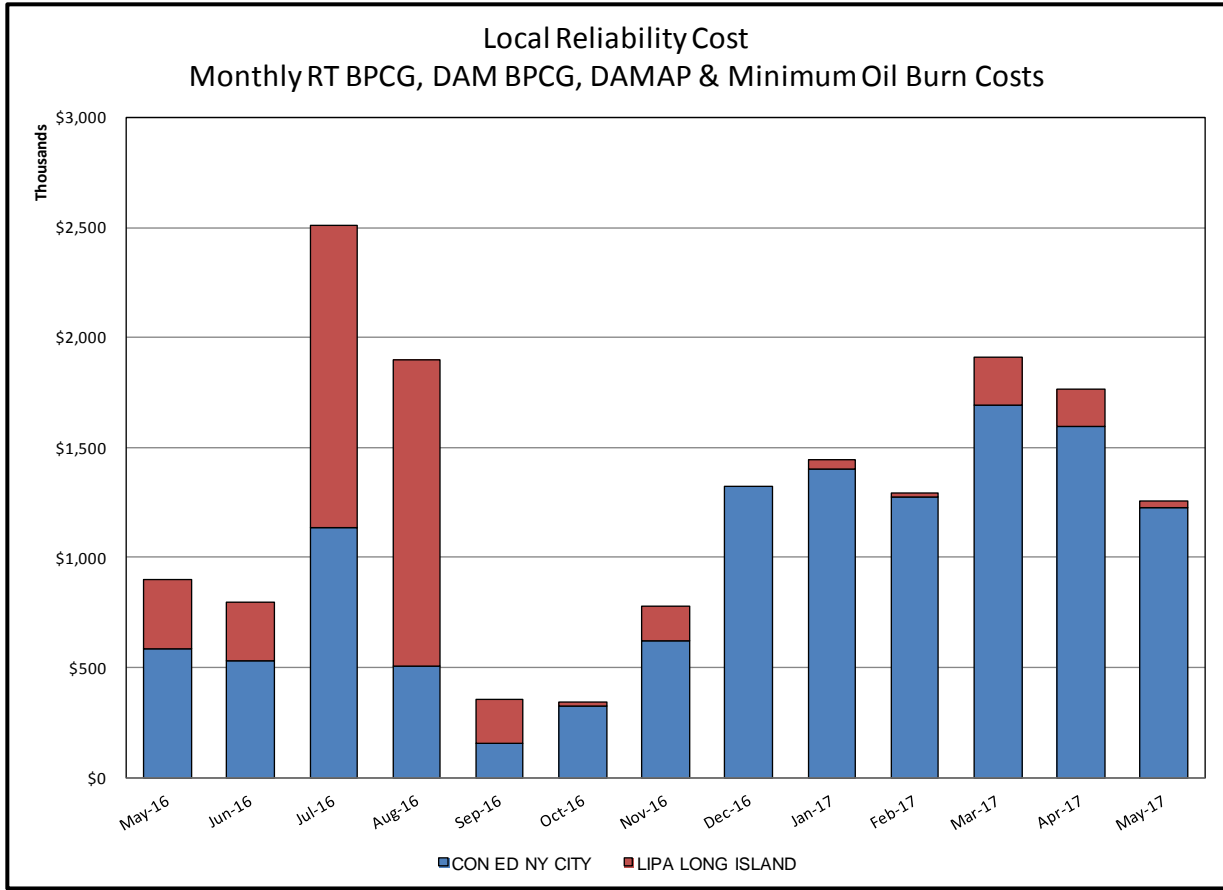
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

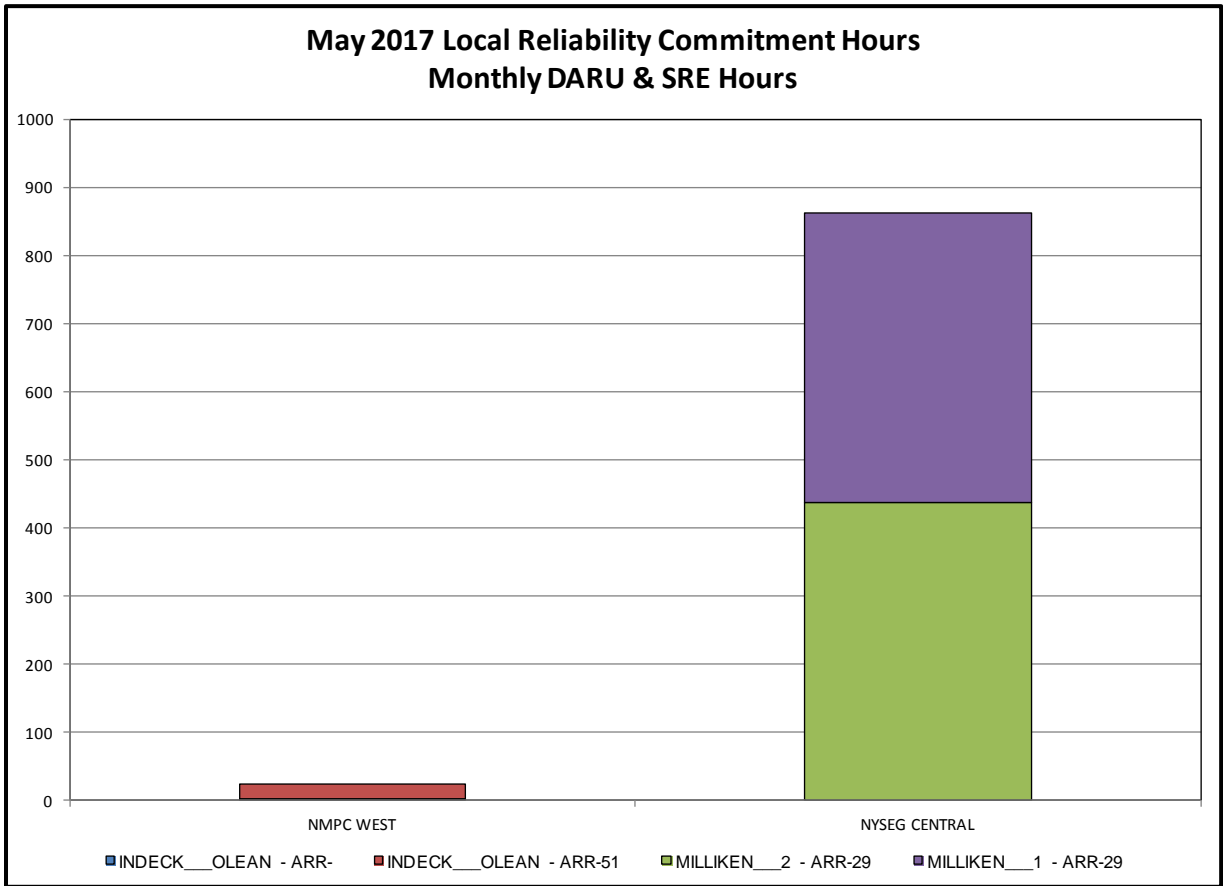
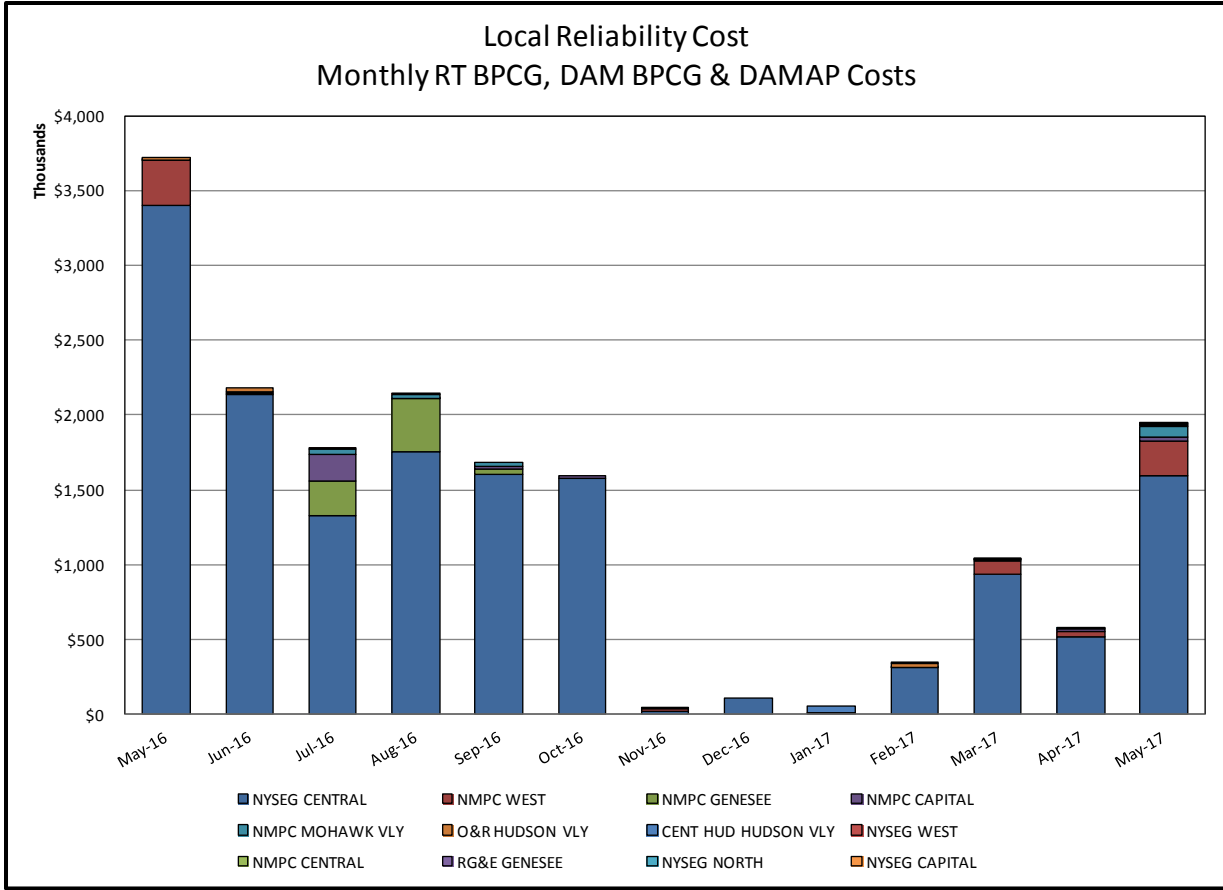


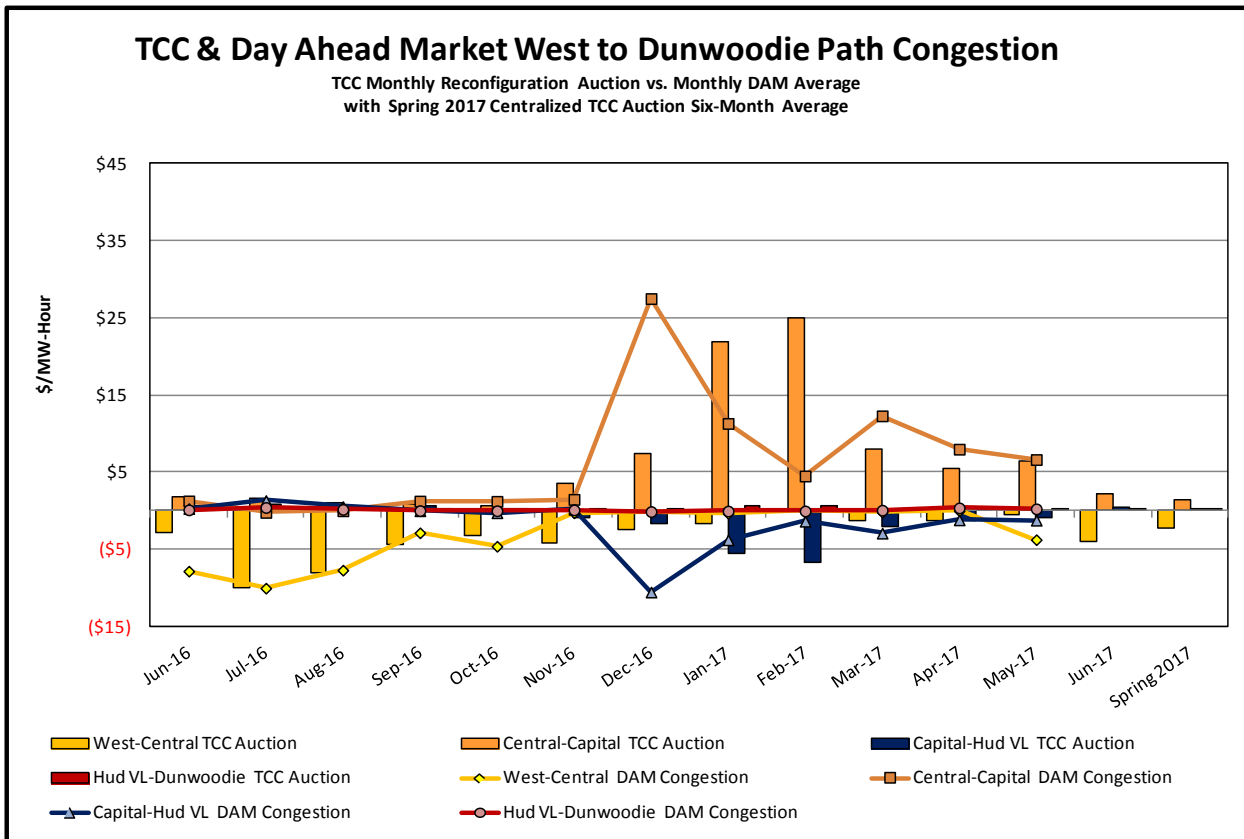
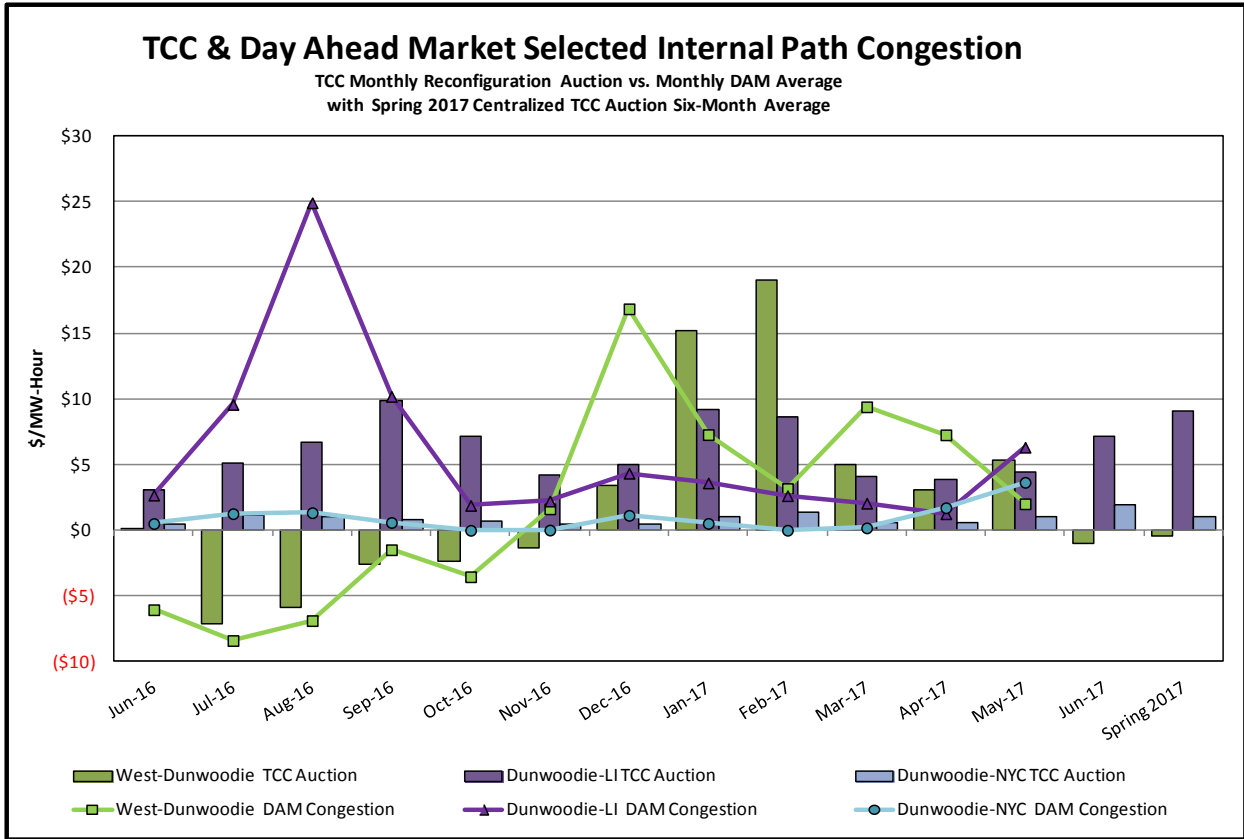
Day-Ahead Market Congestion Residual Categories

<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 2017 Centralized TCC Auction Six-Month Average

