

Operations Performance Metrics Monthly Report



January 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 February 8, 2017.

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 Curtailment Performance*
 - *Lake Erie Circulation and ISO Schedules*

- ◆ **Broader Regional Market Performance Metrics**
 - *Ramapo Interconnection Congestion Coordination Monthly Value*
 - *Ramapo 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*

January 2017 Operations Performance Highlights

- Peak load of 23,526 MW occurred on 01/09/2017 HB 17
- All-time winter capability period peak load of 25,738 MW occurred on 1/7/2014 HB 18
- 0 hours of Thunder Storm Alerts were declared
- 0 hours of NERC TLR level 3 curtailment
- The following table identifies the estimated production cost savings associated with the Broader Regional Market initiatives.

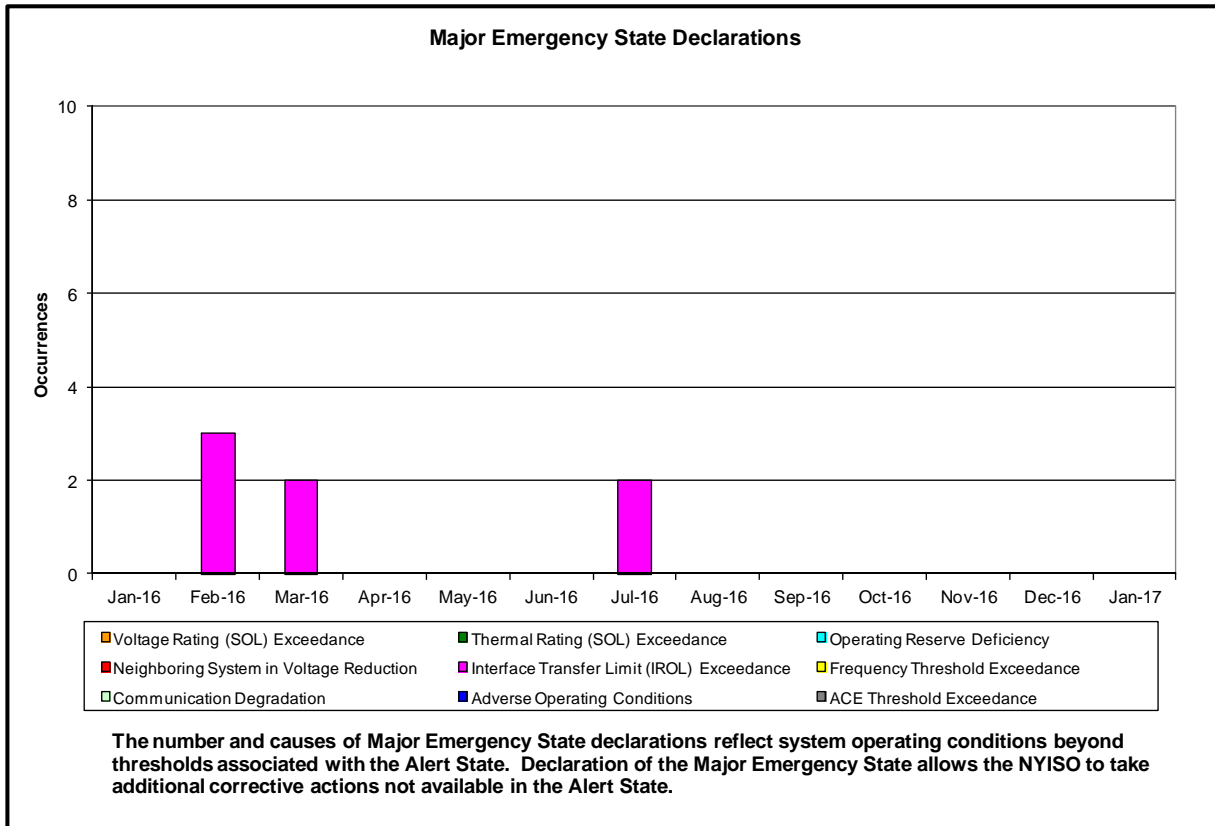
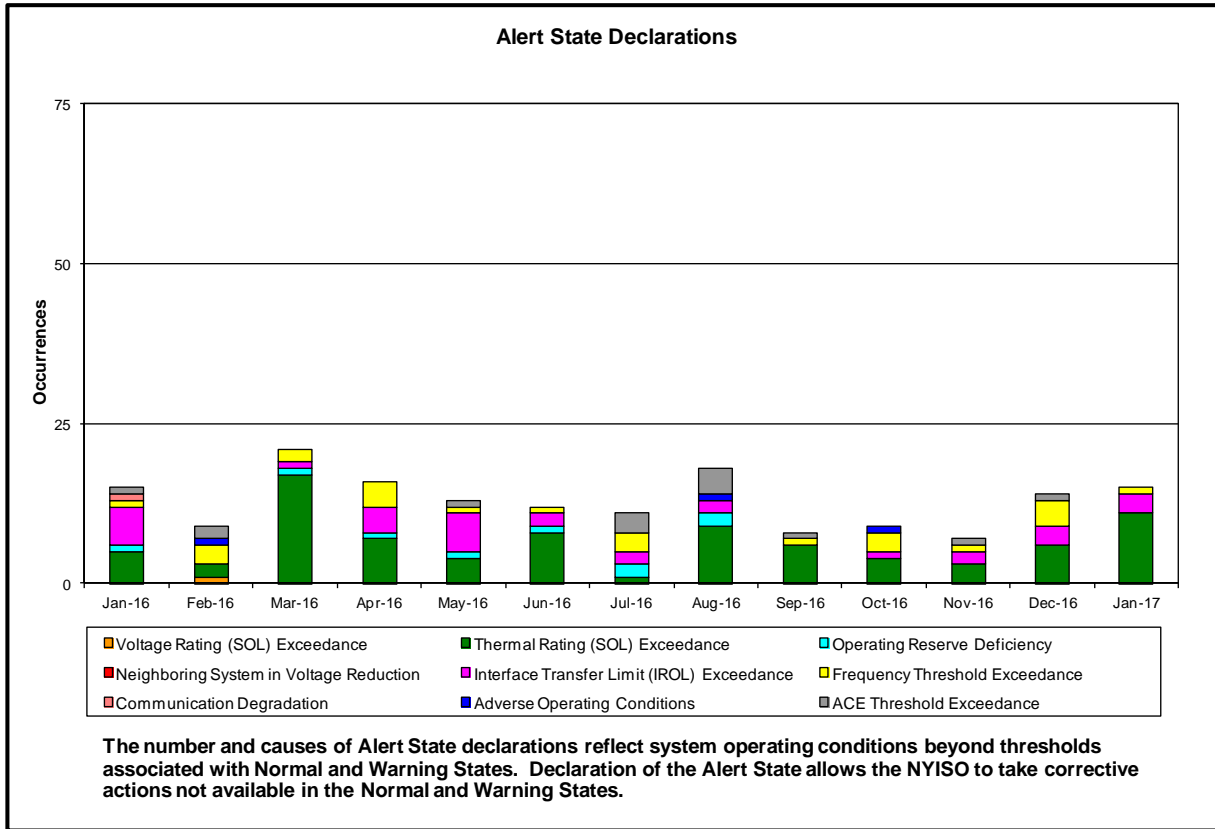
| | Current Month Value (\$M) | Year-to-Date Value (\$M) |
|------------------------------------------------------------------------|---------------------------|--------------------------|
| NY Savings from PJM-NY Congestion Coordination | \$1.68 | \$1.68 |
| NY Savings from PJM-NY Coordinated Transaction Scheduling | \$0.01 | \$0.01 |
| NY Savings from NE-NY Coordinated Transaction Scheduling | (\$0.25) | (\$0.25) |
| Total NY Savings | \$1.44 | \$1.44 |
| Regional Savings from PJM-NY Coordinated Transaction Scheduling | \$0.13 | \$0.13 |
| Regional Savings from NE-NY Coordinated Transaction Scheduling | \$0.08 | \$0.08 |
| Total Regional Savings | \$0.21 | \$0.21 |

- Statewide uplift cost monthly average was (\$0.83)/MWh
- The following table identifies the Monthly ICAP spot market prices by locality and price delta

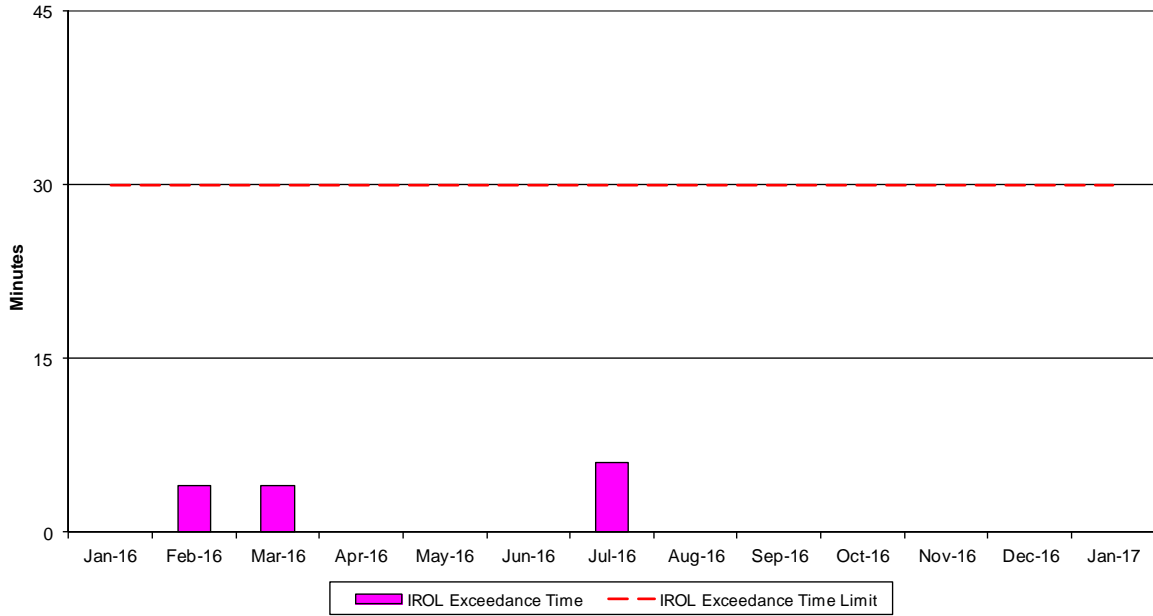
| Spot Auction Price Results | NYCA | Lower Hudson Valley Zones | New York City Zone | Long Island Zone |
|----------------------------|--------|---------------------------|--------------------|------------------|
| February 2017 Spot Price | \$0.54 | \$3.47 | \$3.47 | \$0.54 |
| January 2017 Spot Price | \$0.32 | \$3.53 | \$3.53 | \$0.32 |
| Delta | \$0.22 | (\$0.06) | (\$0.06) | \$0.22 |

- NYCA - Price increased by \$0.22 because there was a decrease in imports from January by 305.7MW.
- LI - Price increased by \$0.22 due to locality clearing at NYCA.

- Reliability Performance Metrics

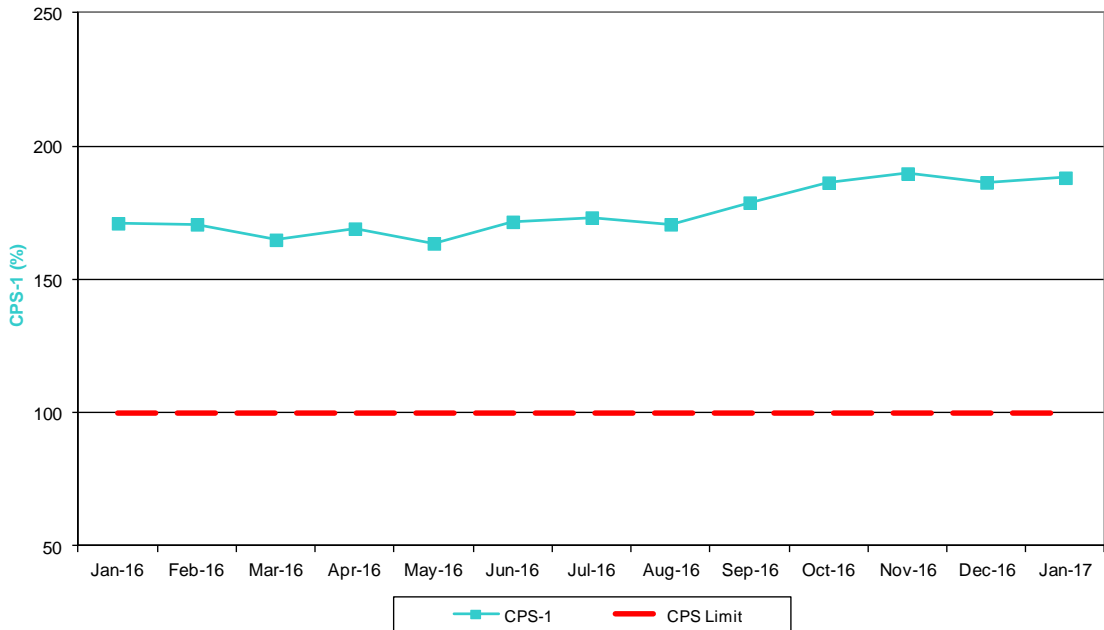


NERC IROL Time Over Limit



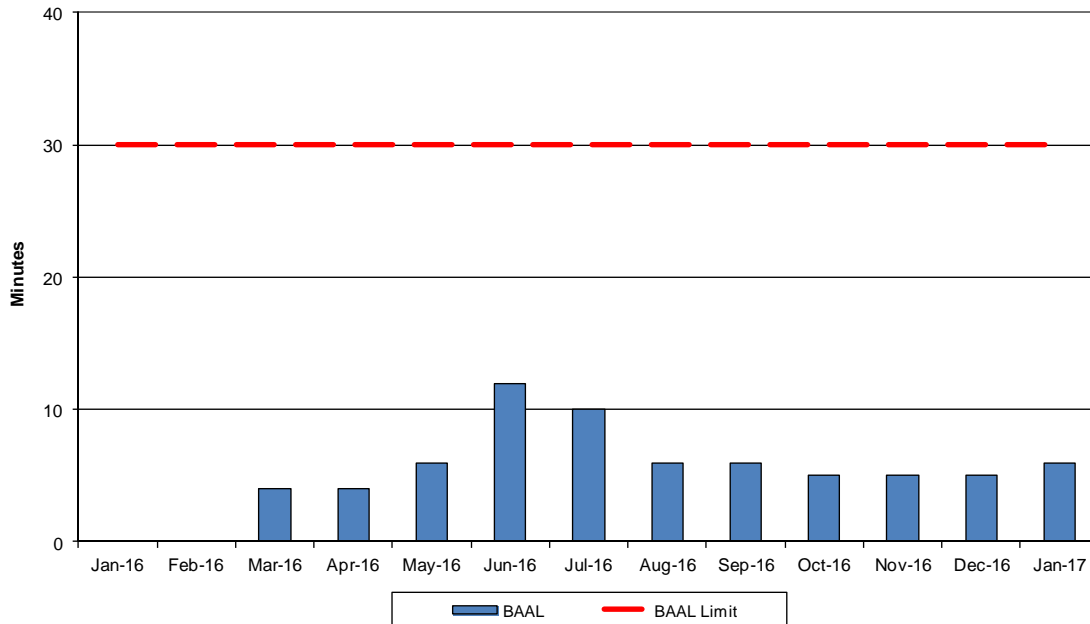
For IROL exceedances leading to Major Emergency State declarations, the maximum IROL exceedance time is identified. IROL exceedances of less than thirty minutes are considered NERC compliant.

NERC Control Performance Standards



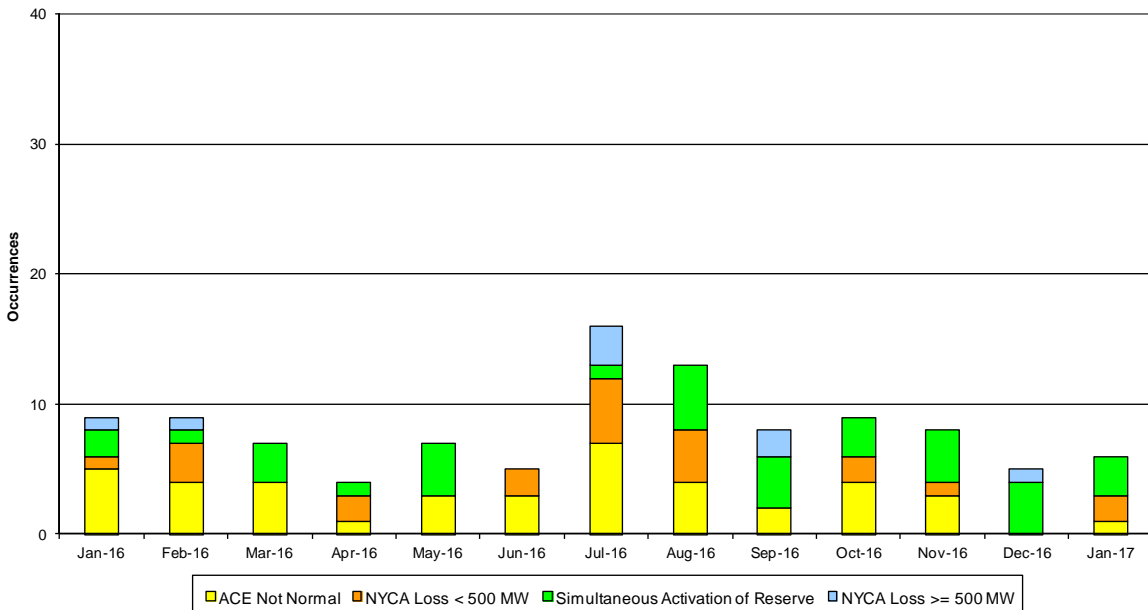
The value of NERC Control Performance Standards (CPS-1) is an indicator of the NYISO Area resource and demand balancing. Values exceeding the identified threshold are NERC compliant.

NERC Balancing Authority ACE Limit Standard

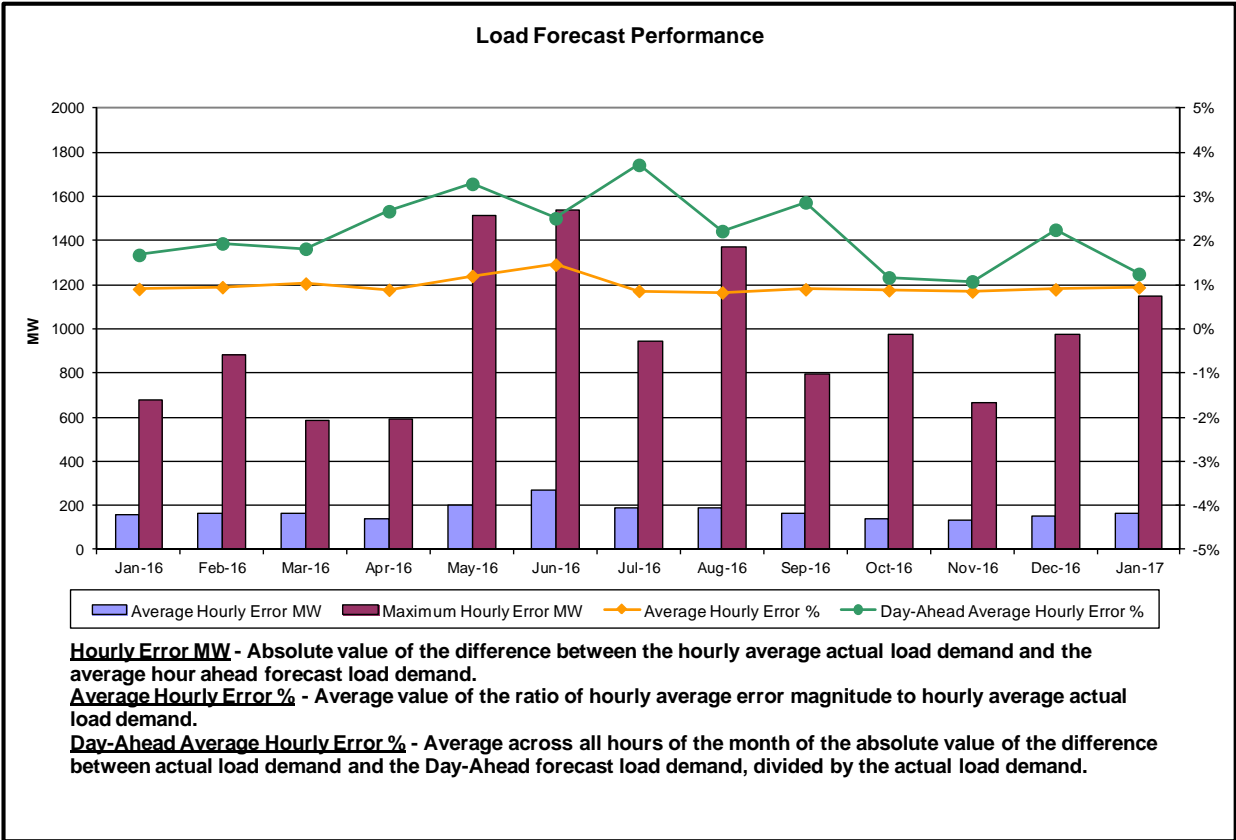
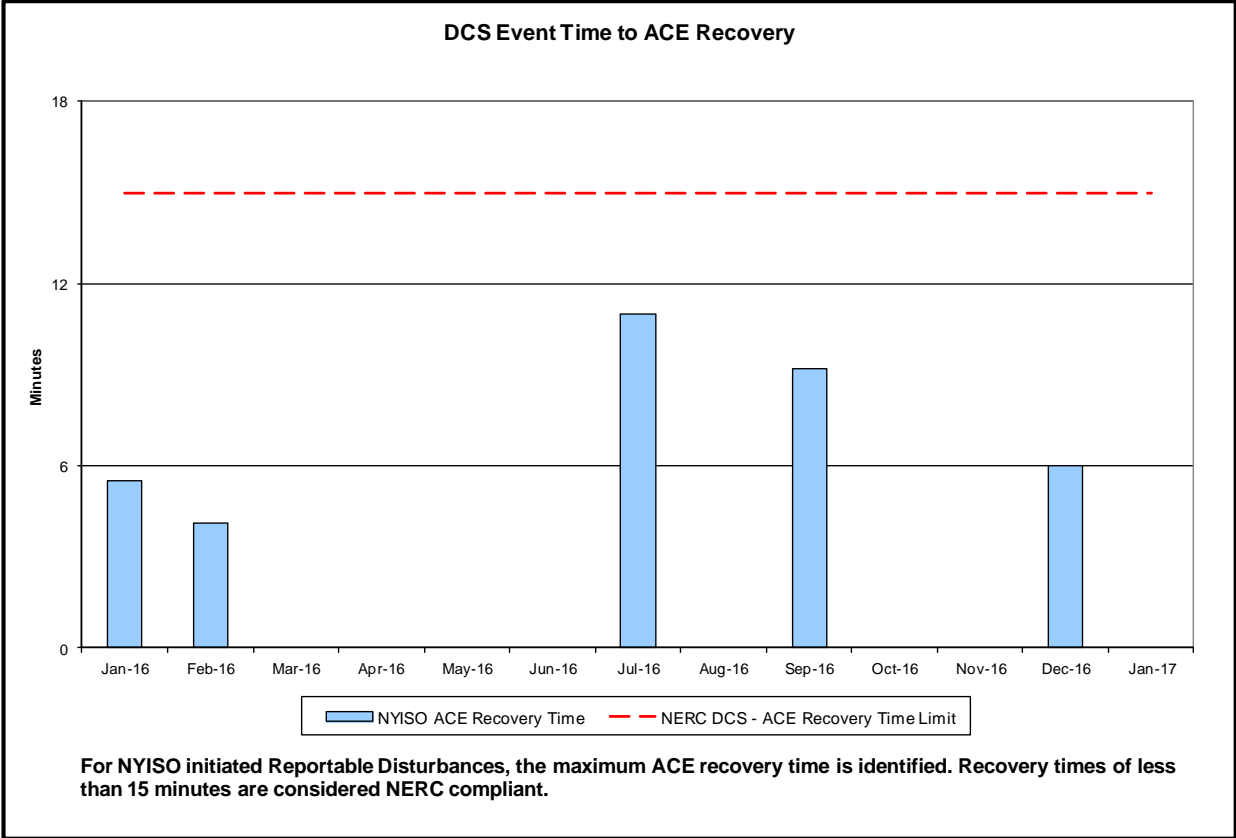


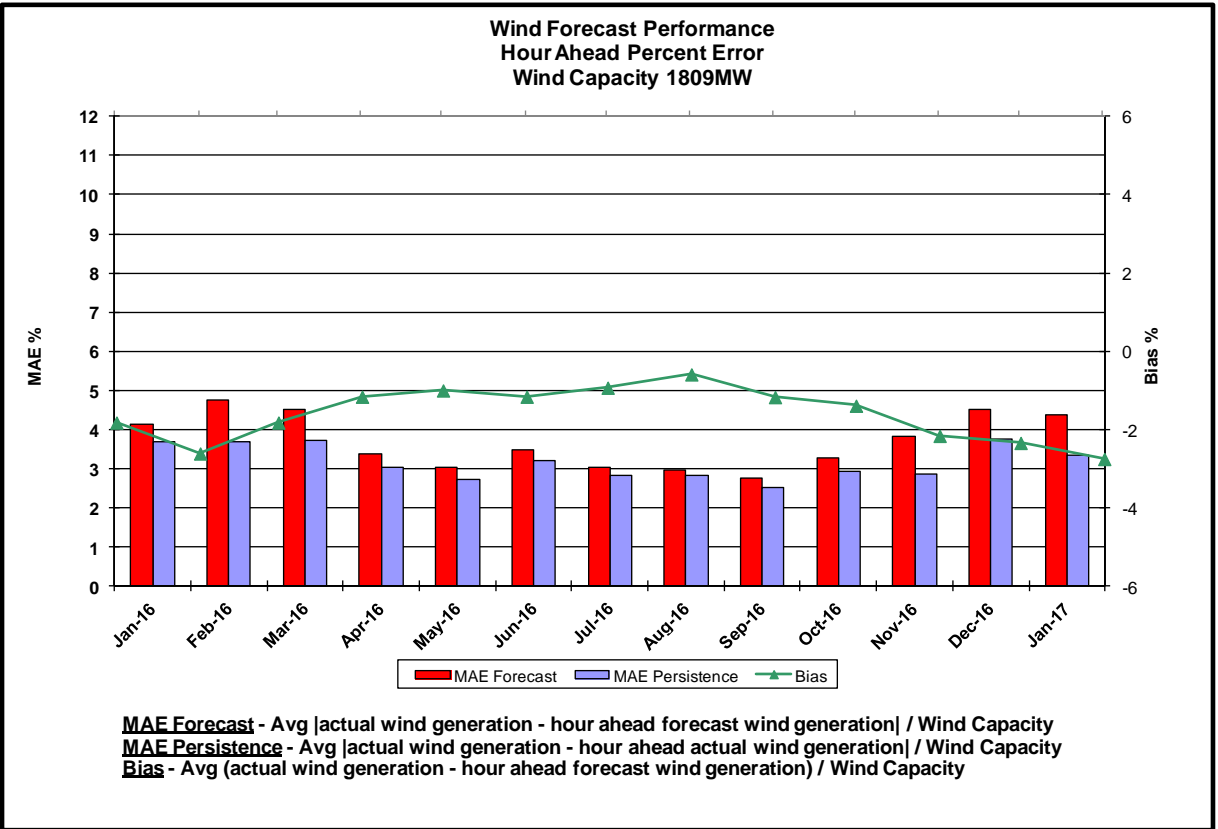
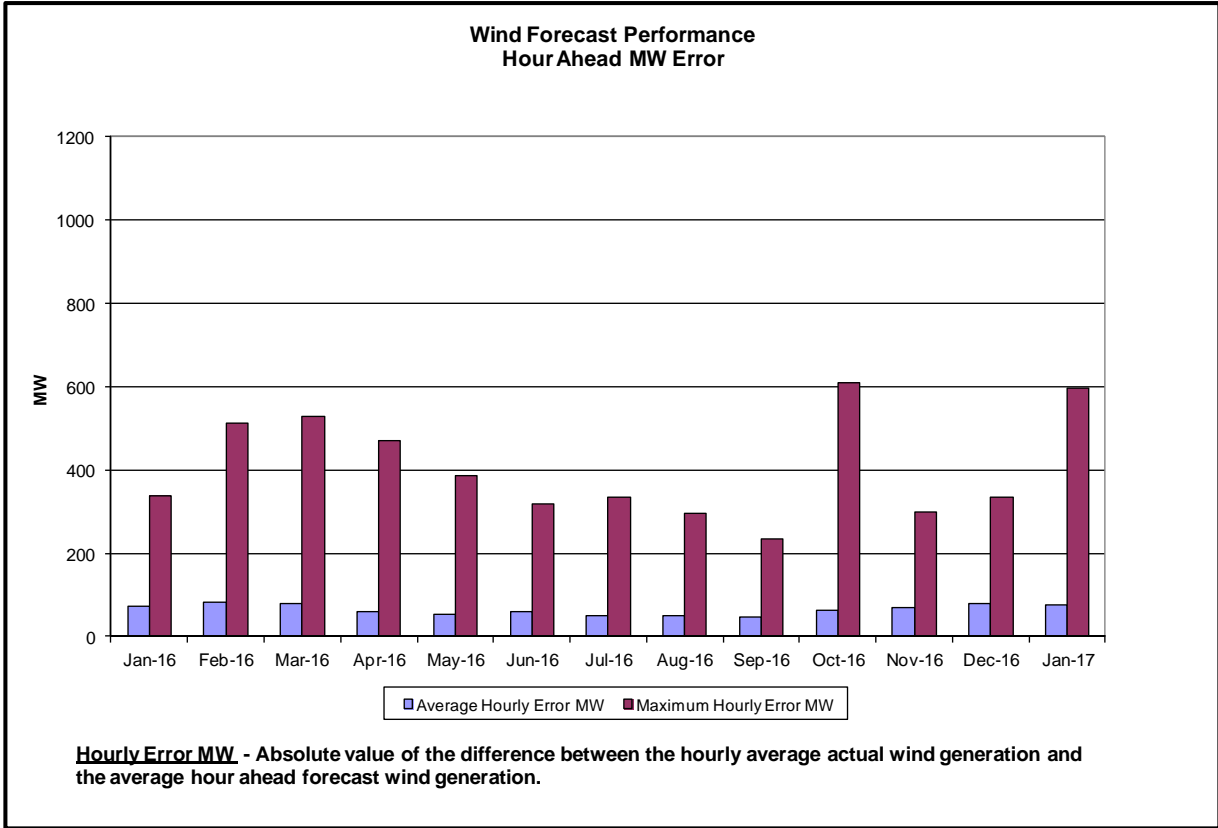
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

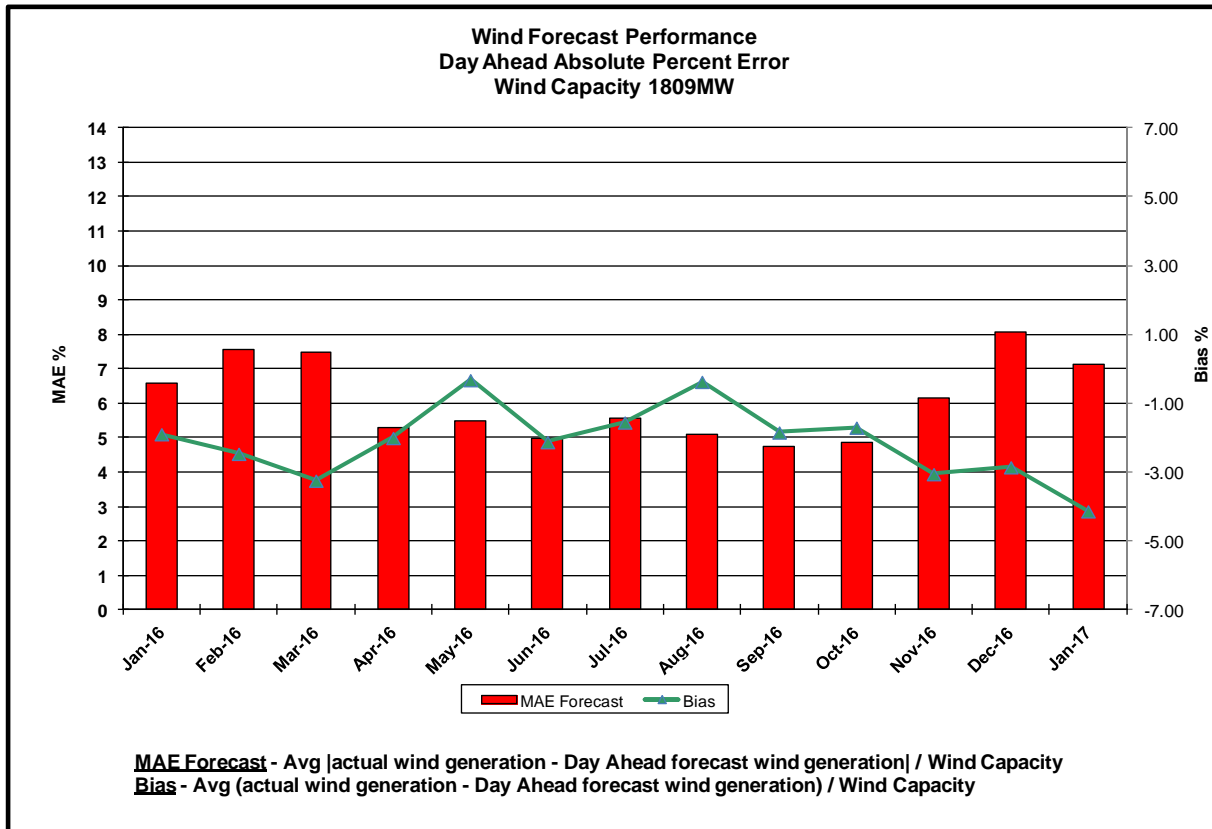
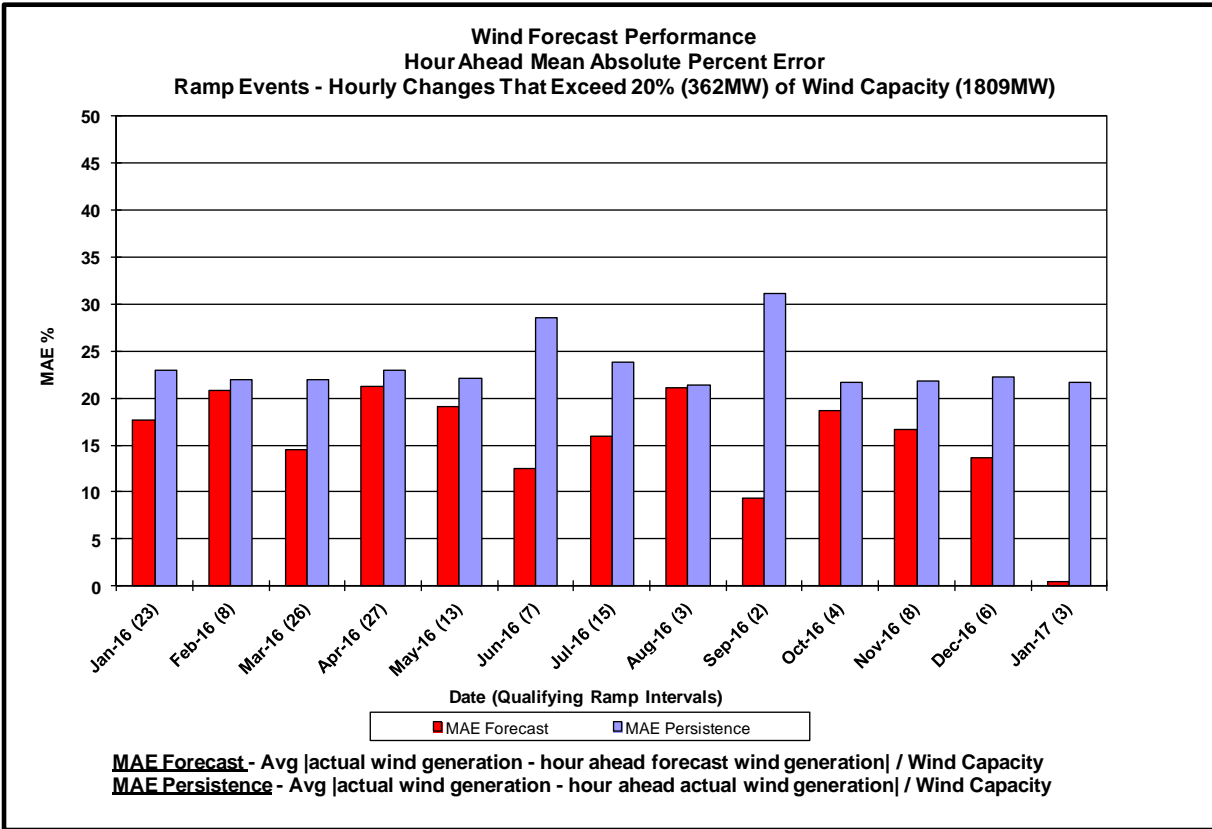
Reserve Activations

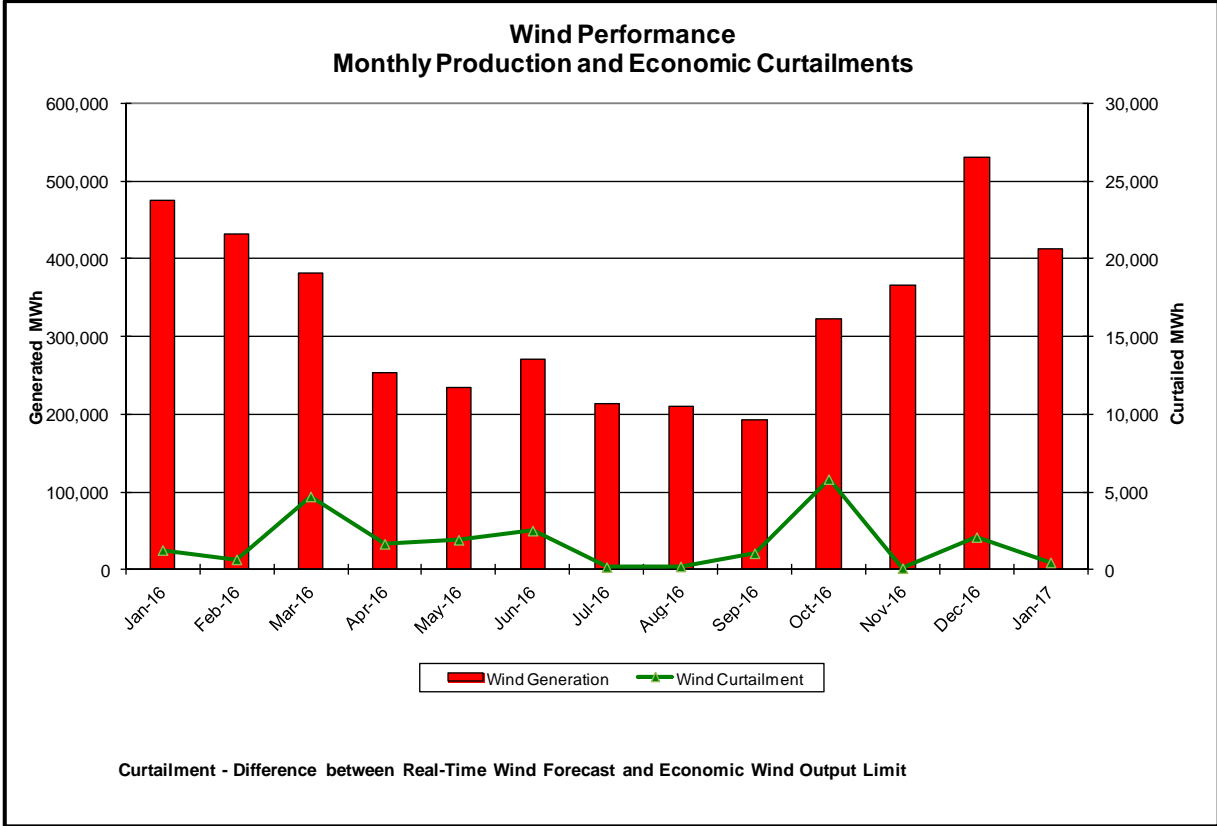


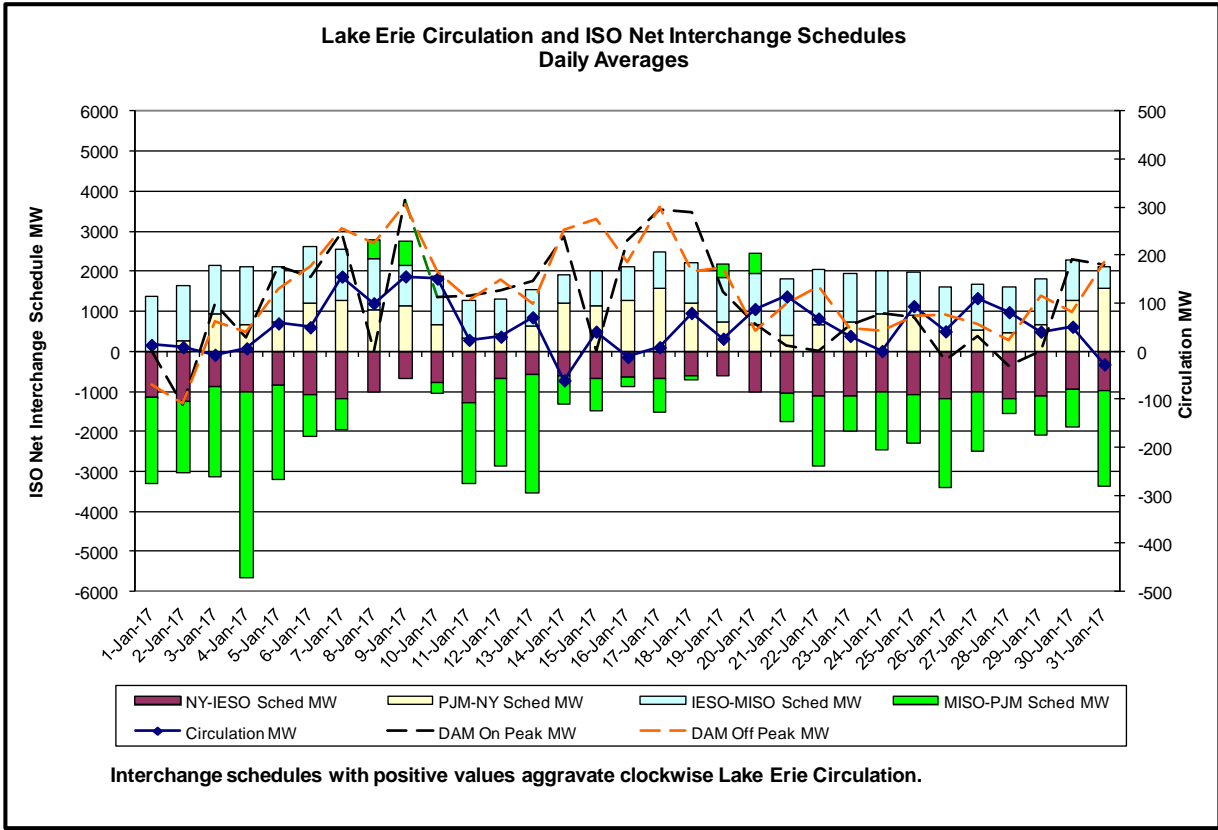
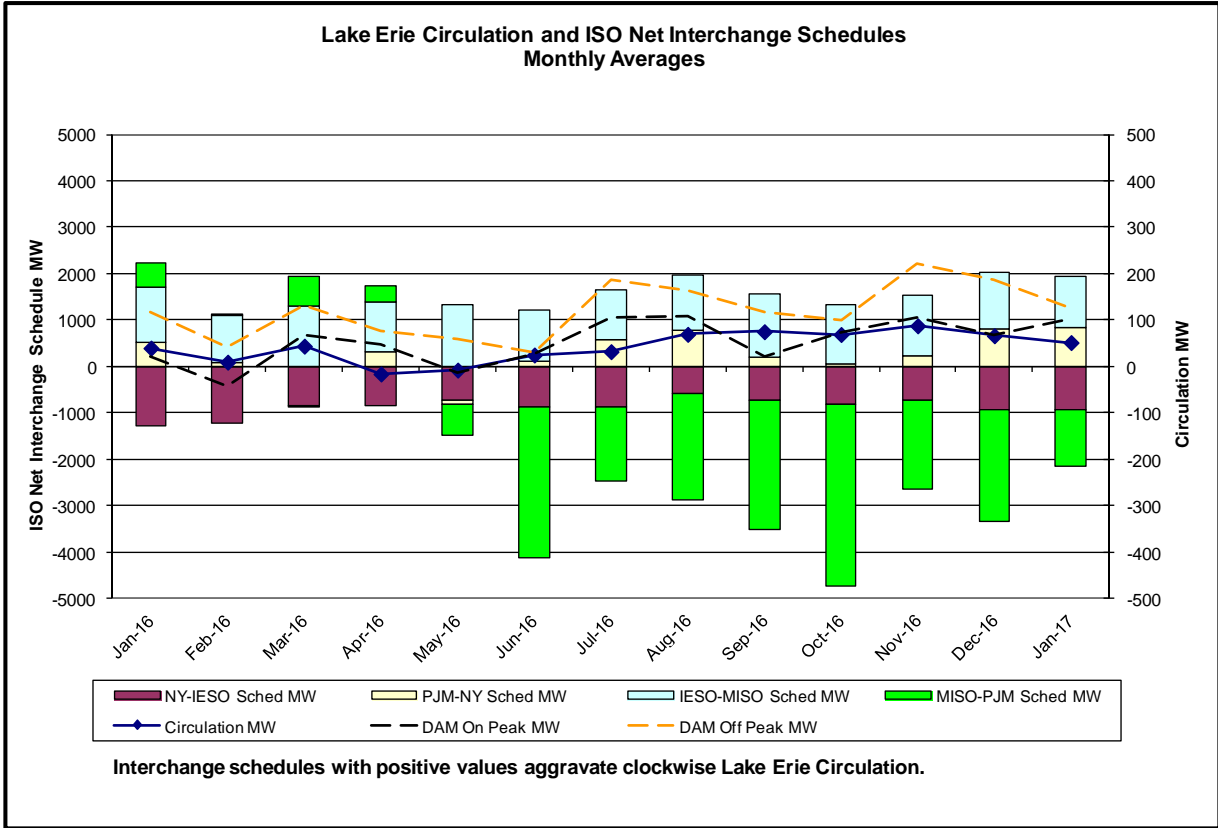
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.



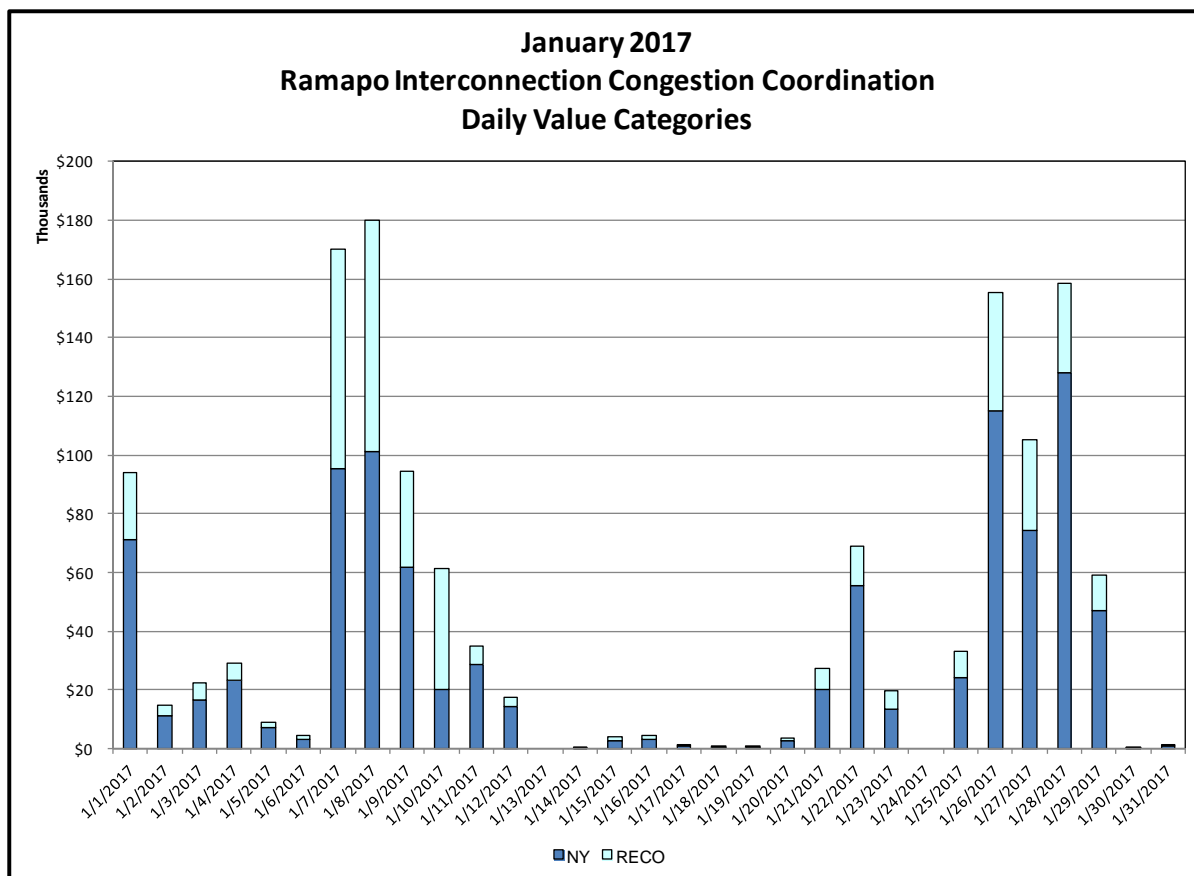
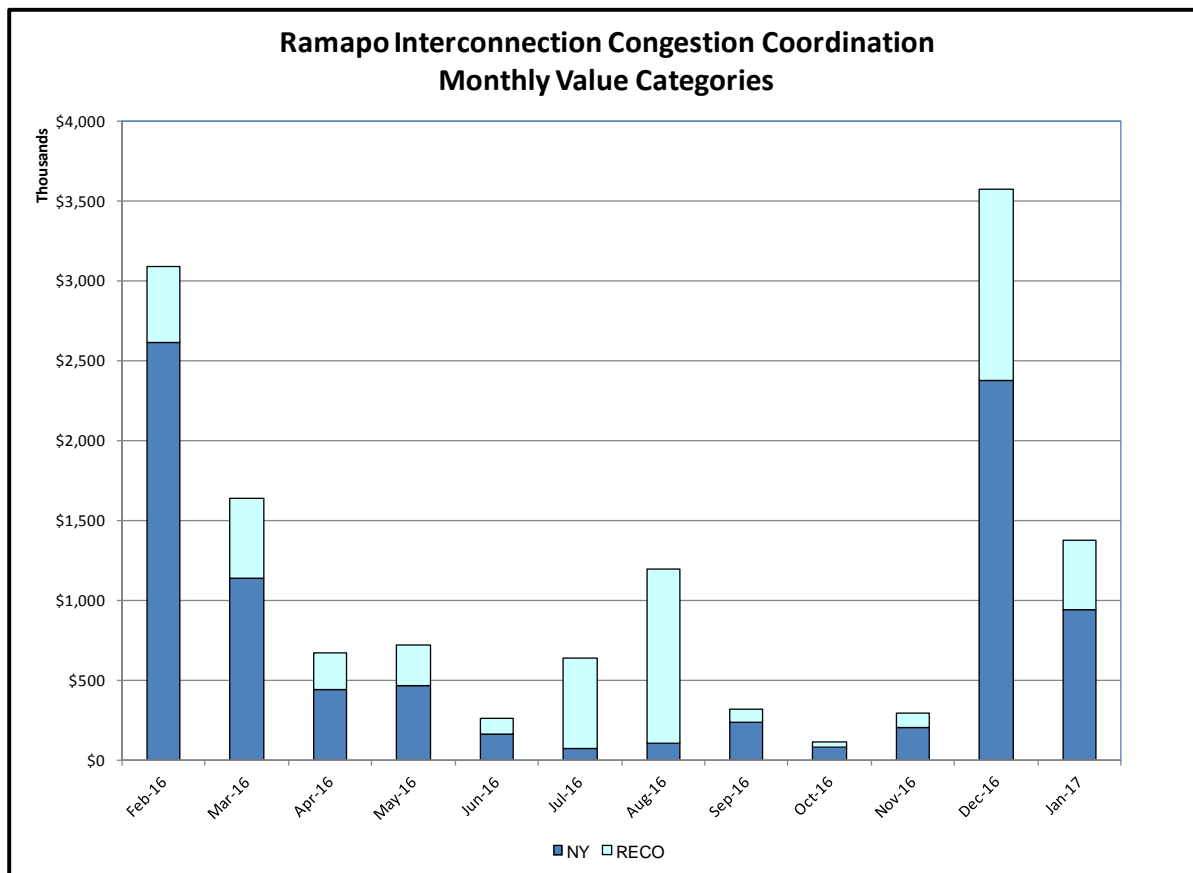






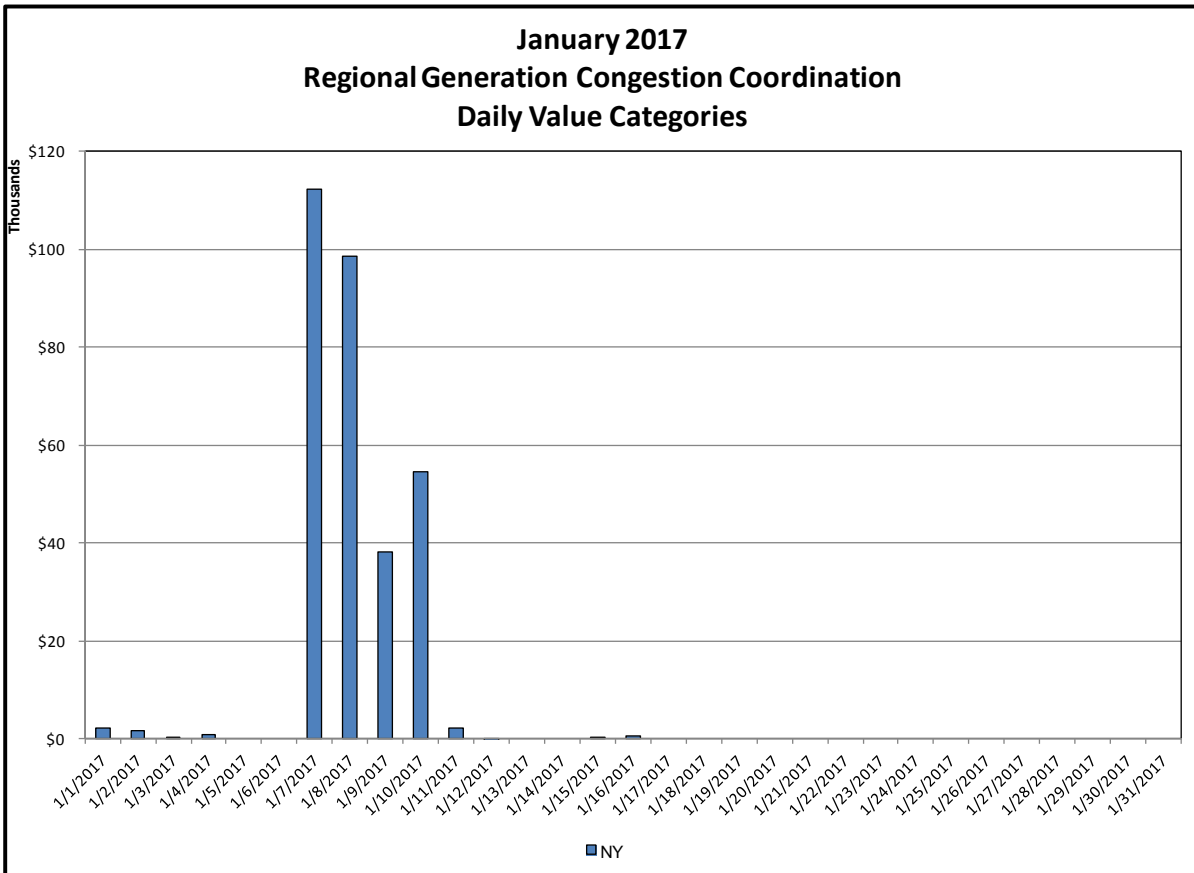
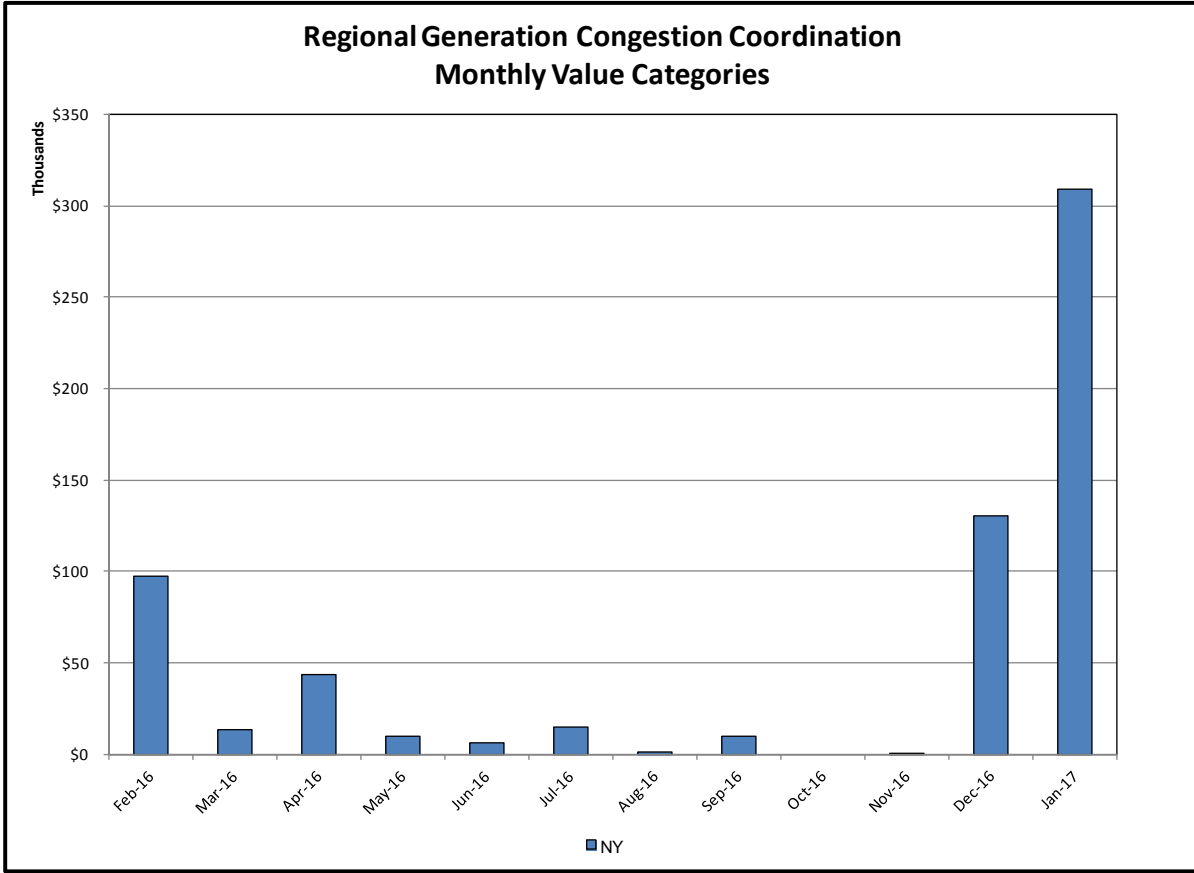


Broader Regional Market Performance Metrics



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. |



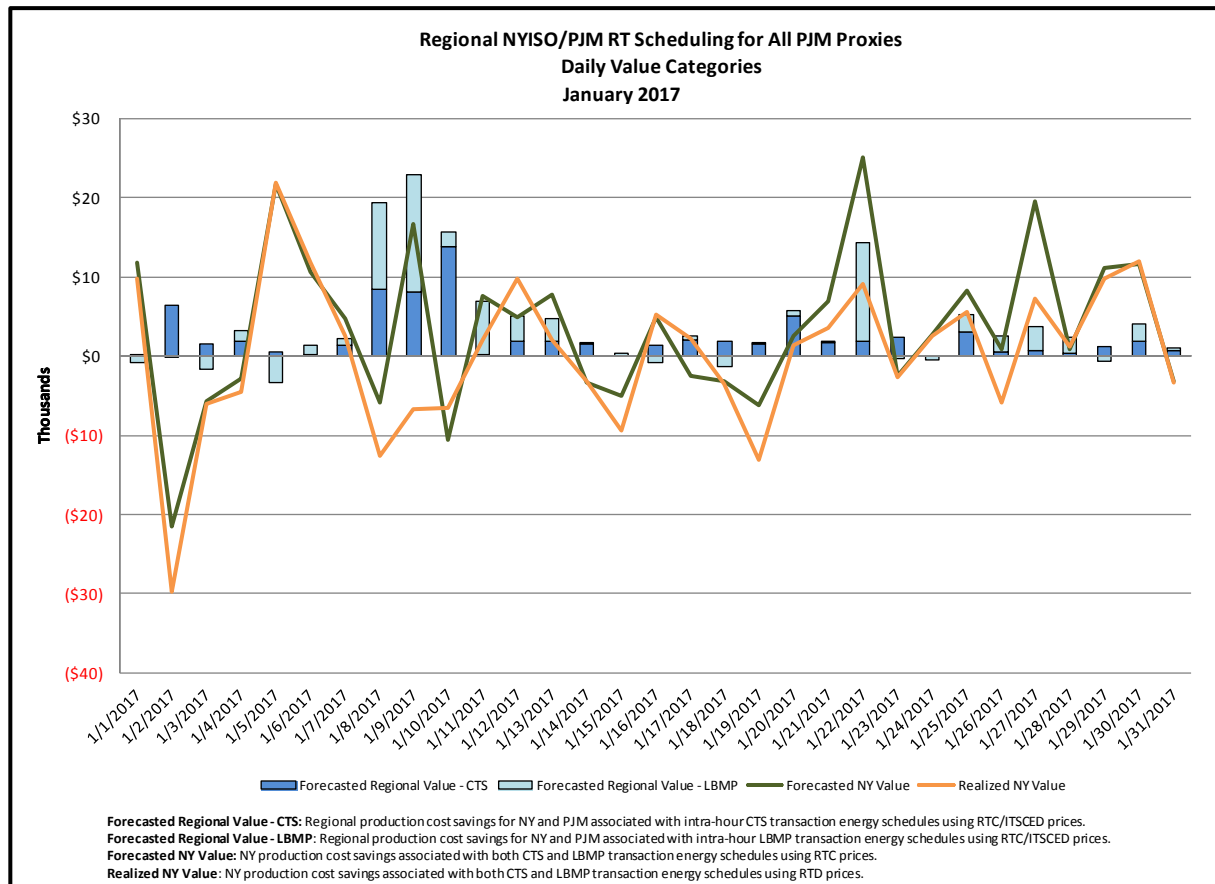
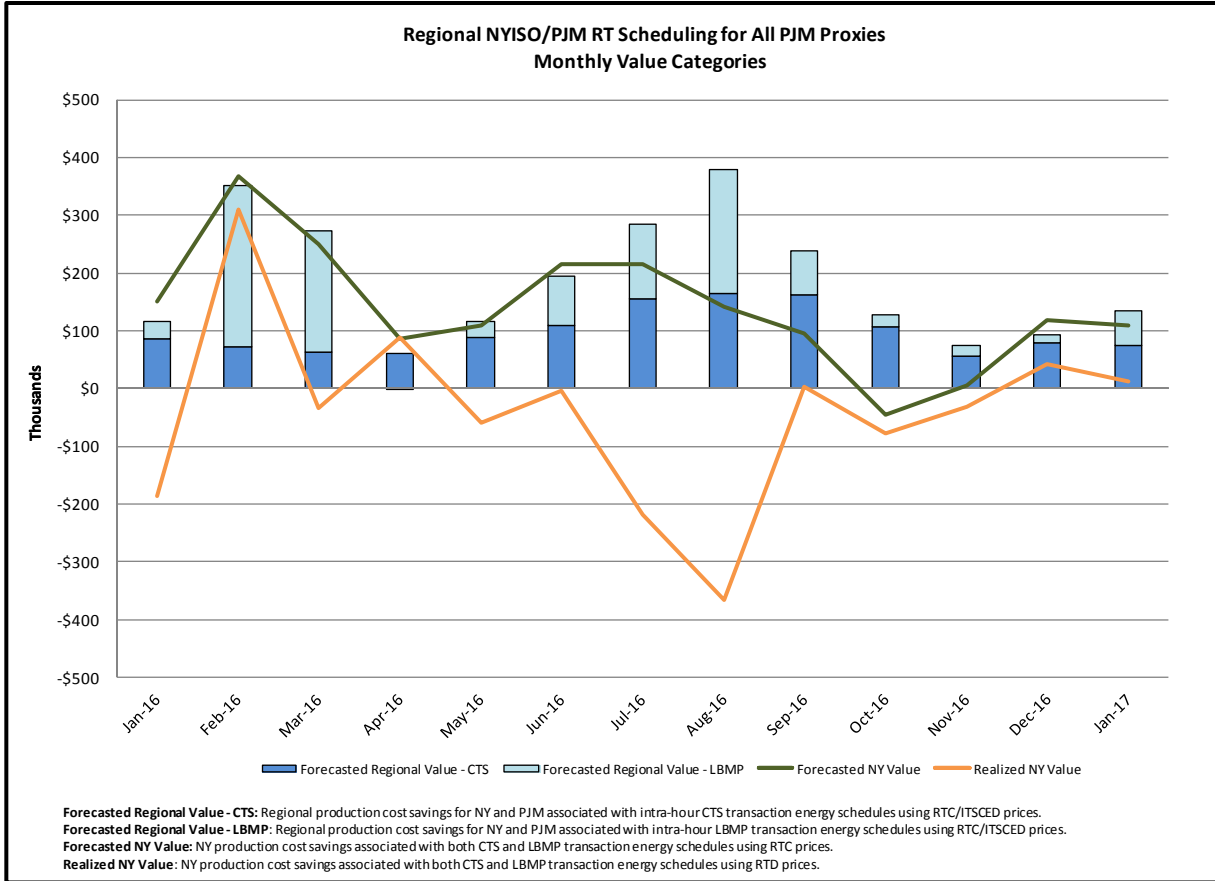
Regional Generation Congestion Coordination

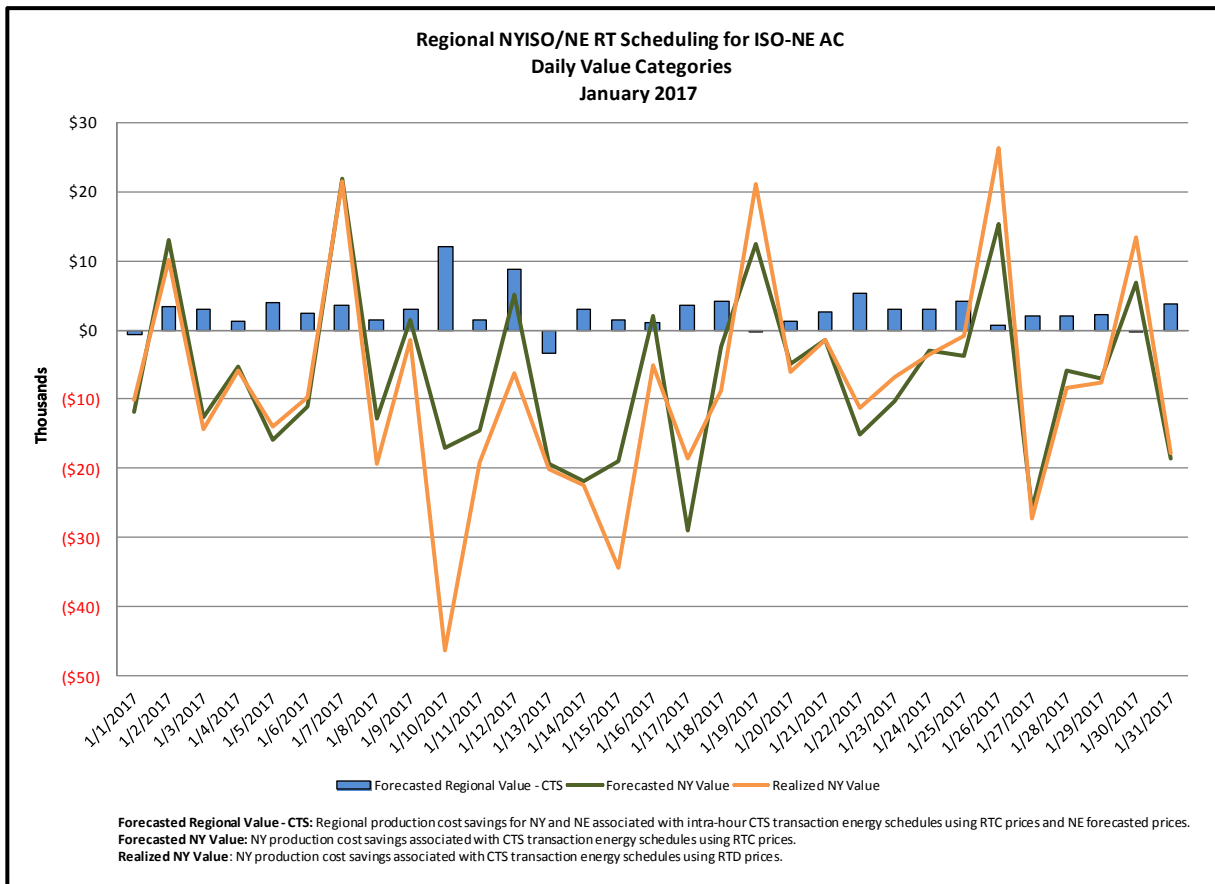
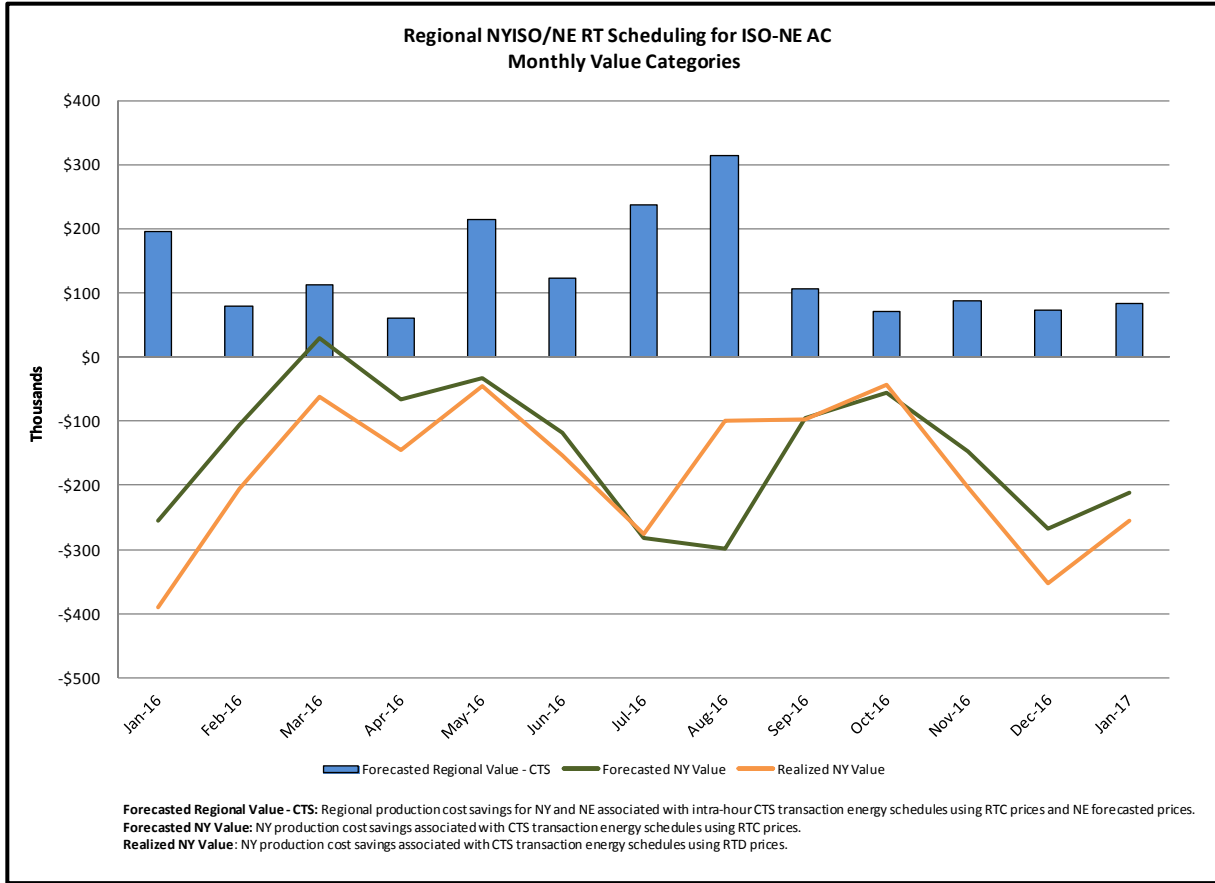
Category

NY

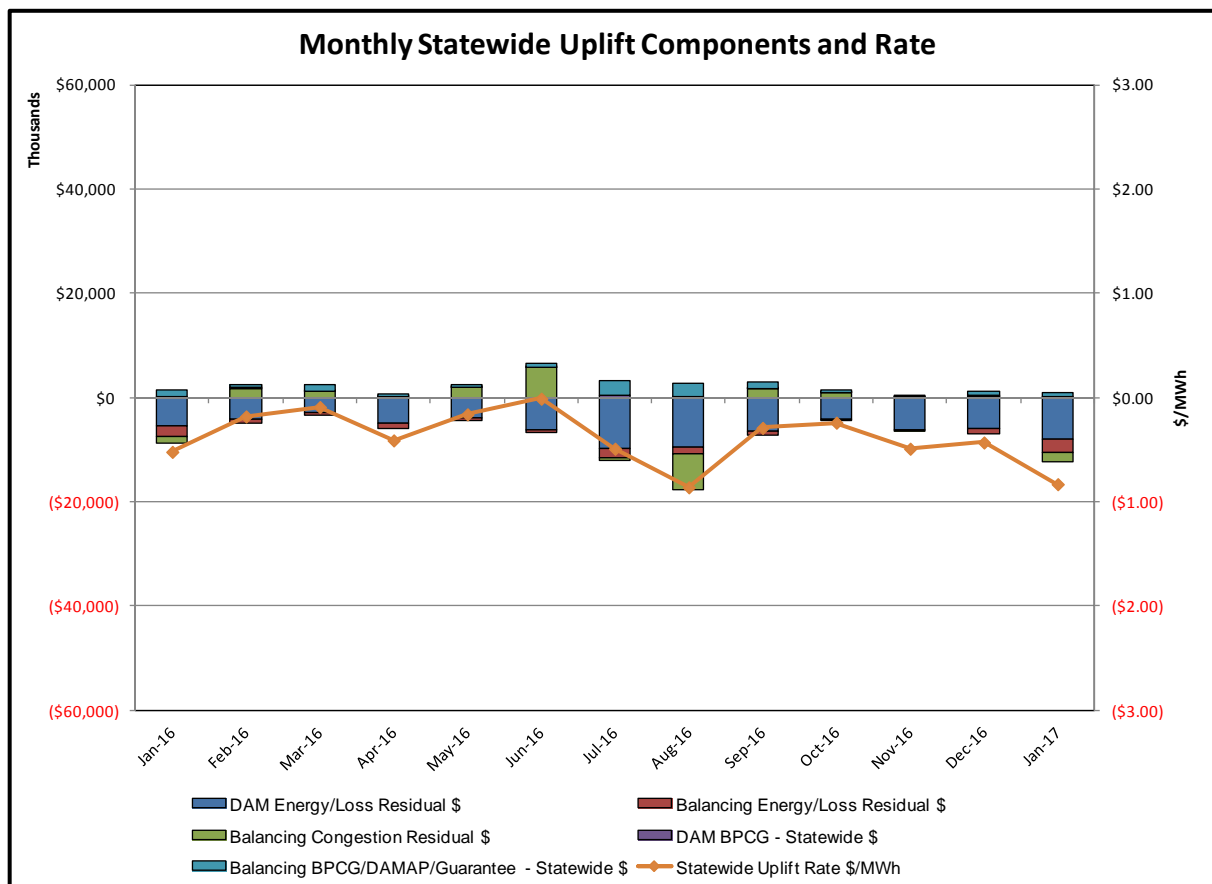
Description

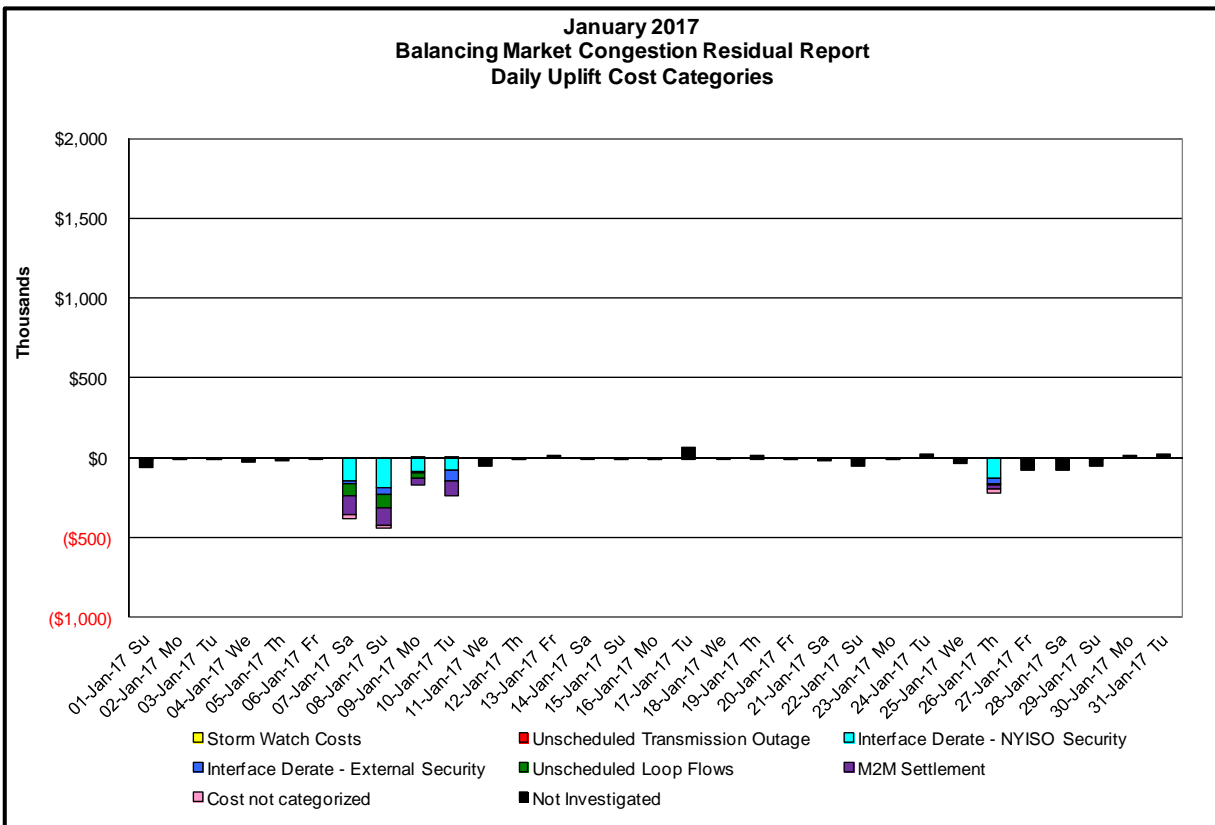
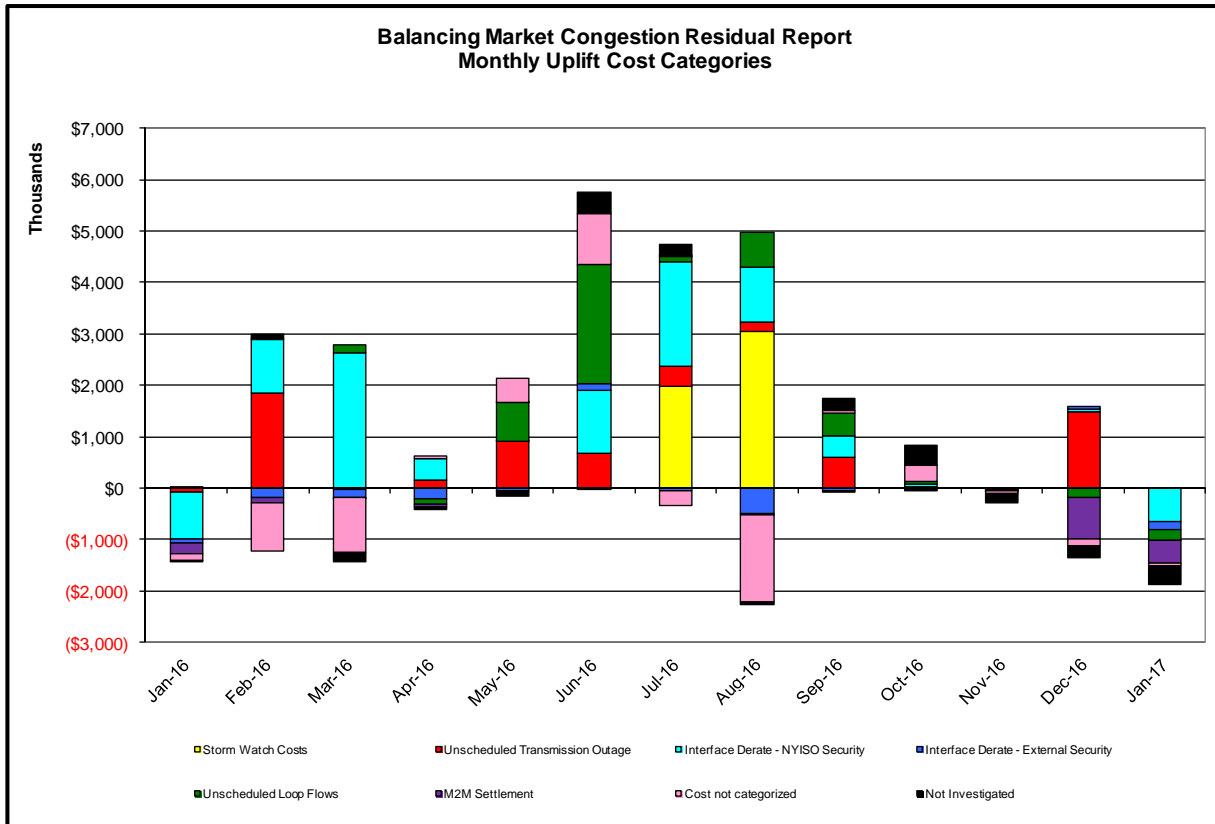
NYISO savings that result from PJM payments to NYISO when PJM's transmission use (PJM's market flow) is greater than PJM's entitlement of the NY transmission system and NYISO is incurring Western or Central NY congestion. Additionally, NYISO savings may result from the more efficient regional utilization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





Market Performance Metrics





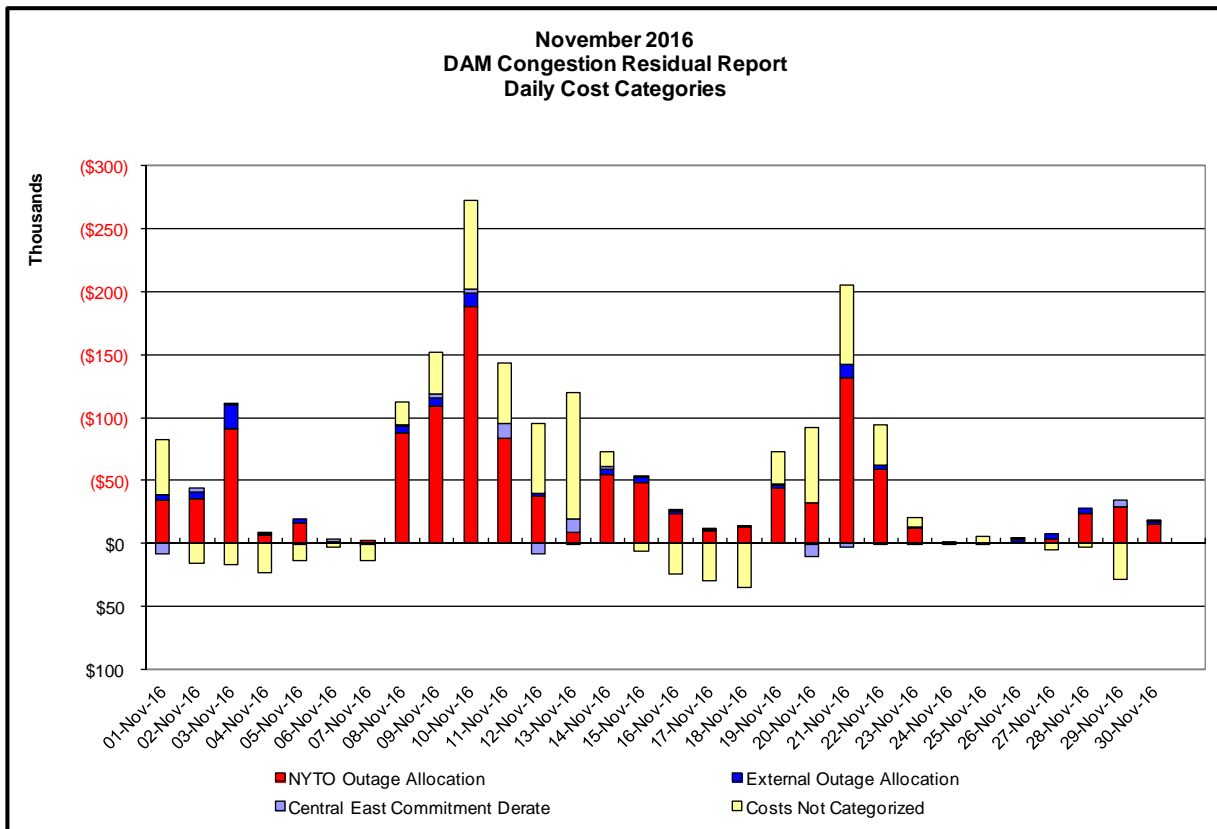
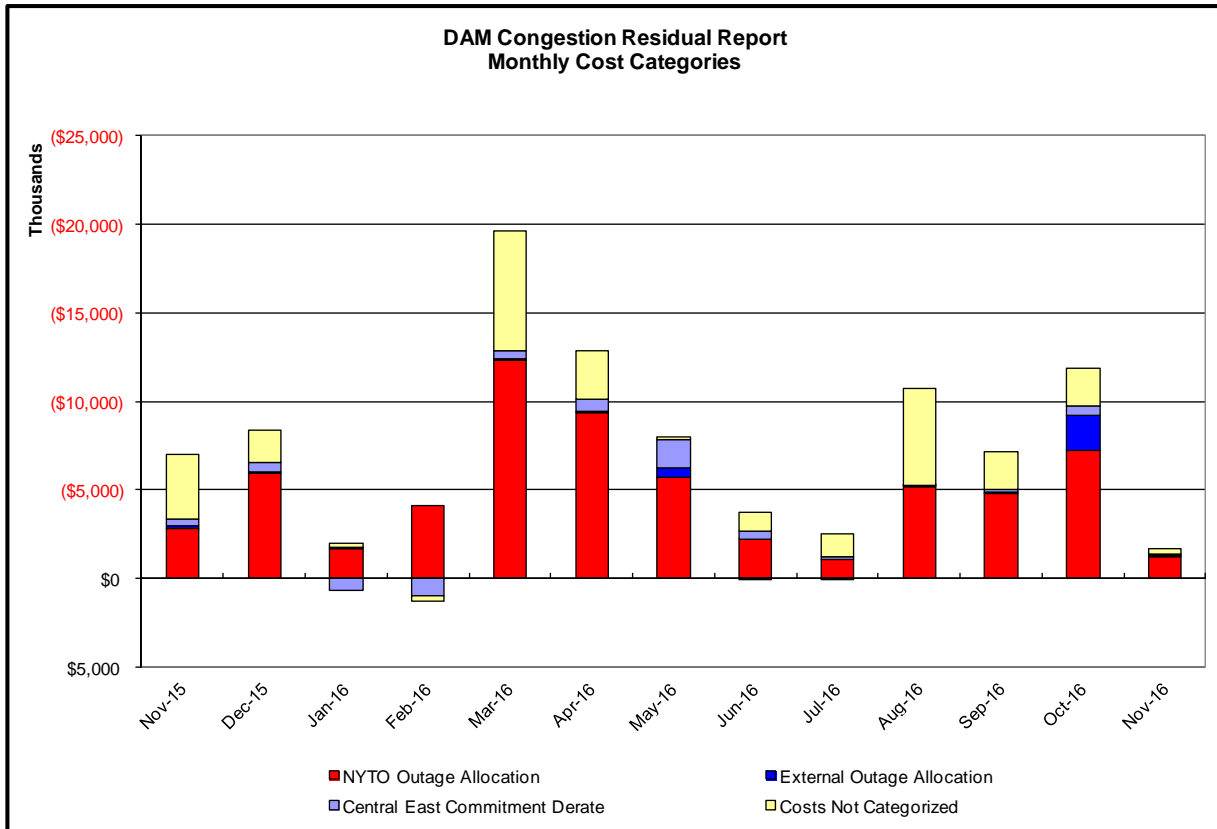
| Day's investigated in January: 7,8,9,10,26 | | | |
|--------------------------------------------|-----------------|-------------------|---------------------------------------------------------------|
| Event | Date (yyyymmdd) | Hours | Description |
| | 1/7/2017 | 0,12-15,17-23 | Uprate Central East |
| | 1/7/2017 | 12,15,18 | Uprate East 179th Street-HellGate 138kV (#15054) |
| | 1/7/2017 | 15,18 | NE_AC DNI Ramp Limit |
| | 1/7/2017 | 11,13-15,17-20 | Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East |
| | 1/8/2017 | 10,13,21 | NYCA DNI Ramp Limit |
| | 1/8/2017 | 0-4,6,10-18,20-23 | Uprate Central East |
| | 1/8/2017 | 0,13,20,21,22 | NE_AC DNI Ramp Limit |
| | 1/8/2017 | 10-16,18,20-22 | Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East |
| | 1/9/2017 | 0,2 | NYCA DNI Ramp Limit |
| | 1/9/2017 | 0-3,14-17,19-23 | Uprate Central East |
| | 1/9/2017 | 11 | Derate East 13th Street-Farragut 345kV (#45) |
| | 1/9/2017 | 0,14 | NE_AC DNI Ramp Limit |
| | 1/9/2017 | 23 | PJM_AC DNI Ramp Limit |
| | 1/9/2017 | 11 | HQ_CEDARS-NY Scheduling Limit |
| | 1/9/2017 | 0 | IESO_AC DNI Ramp Limit |
| | 1/9/2017 | 14-16,19,20,23 | Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East |
| | 1/10/2017 | 0-6 | Uprate Central East |
| | 1/10/2017 | 0 | NYCA DNI Ramp Limit |
| | 1/10/2017 | 0-2 | HQ_CHAT-NY Scheduling Limit |
| | 1/10/2017 | 0,1,5,6 | NE_AC DNI Ramp Limit |
| | 1/10/2017 | 0 | PJM_AC DNI Ramp Limit |
| | 1/26/2017 | 16-21,23 | Uprate Central East |
| | 1/26/2017 | 21,22 | NYCA ACTIVE DNI |
| | 1/26/2017 | 16,22 | NE_AC DNI Ramp Limit |
| | 1/26/2017 | 18 | Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East |

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 | |

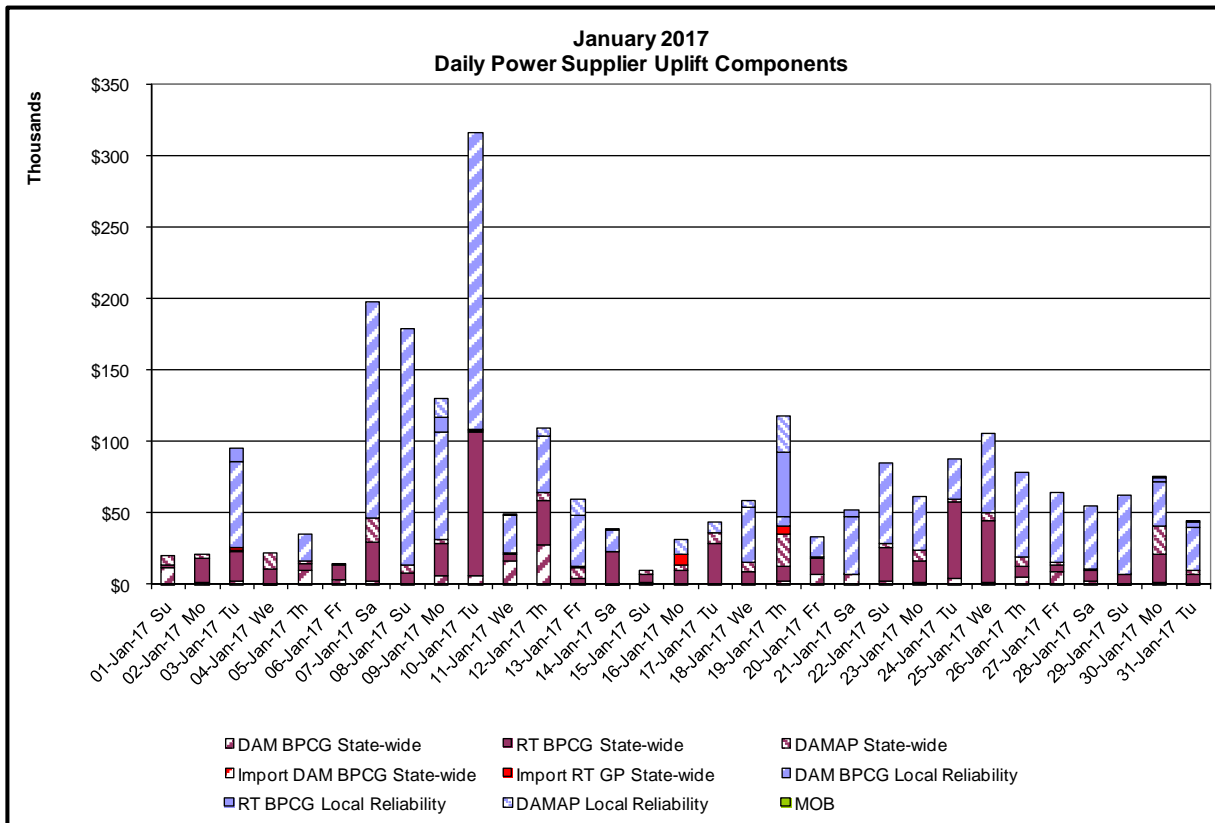
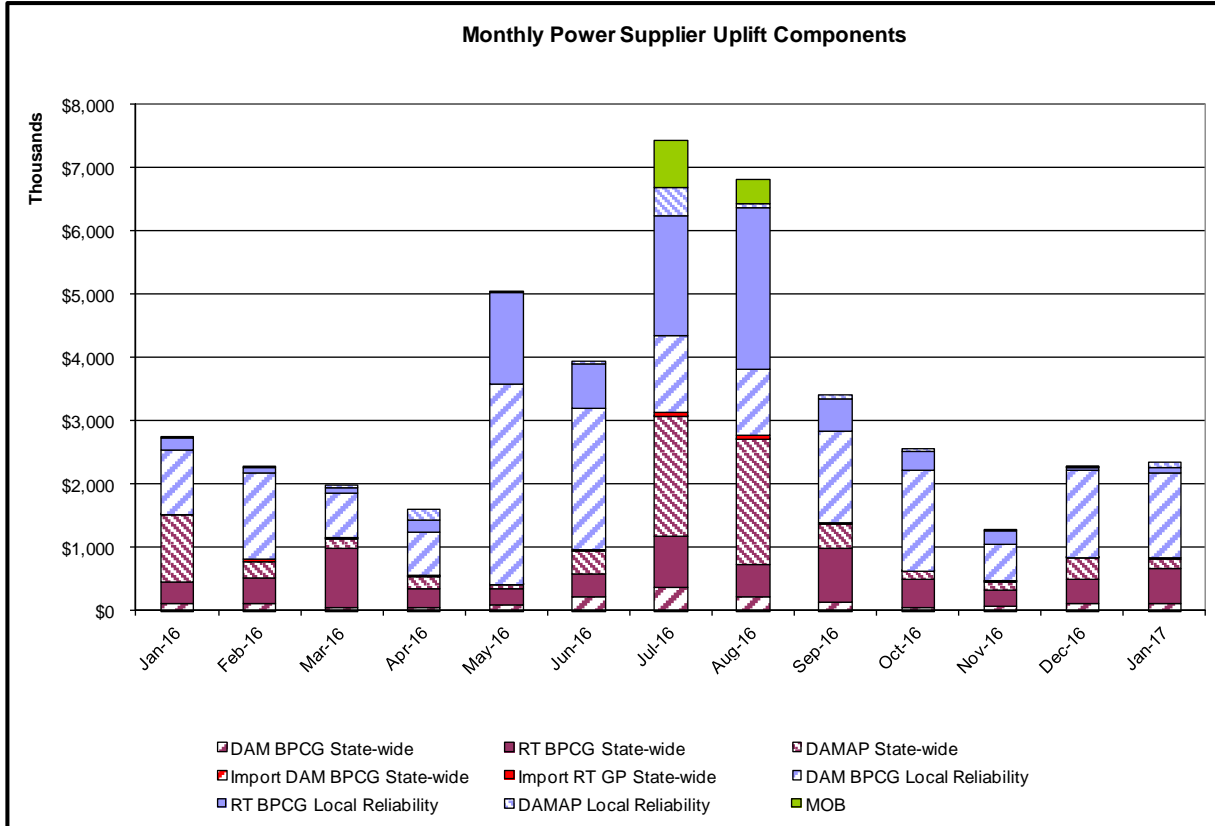
Monthly Balancing Market Congestion Report Assumptions/Notes

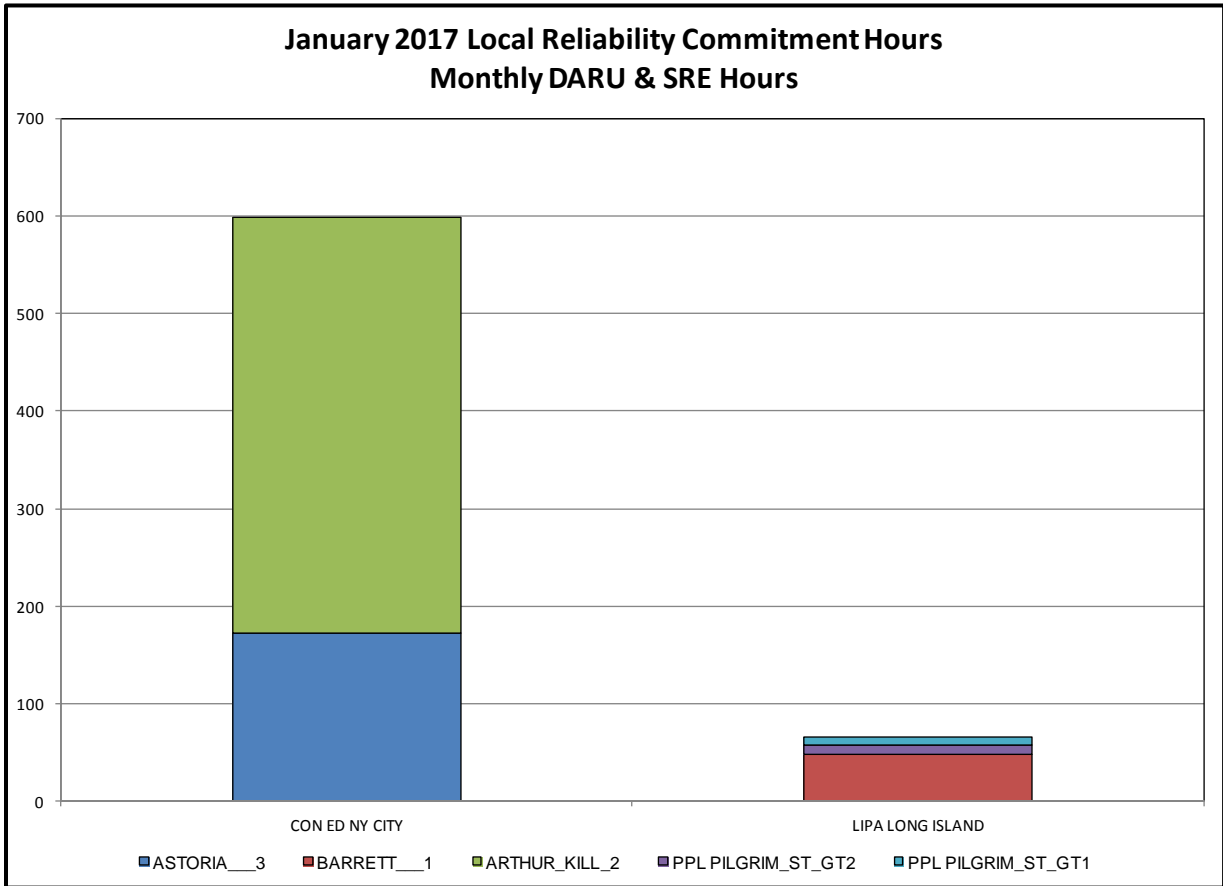
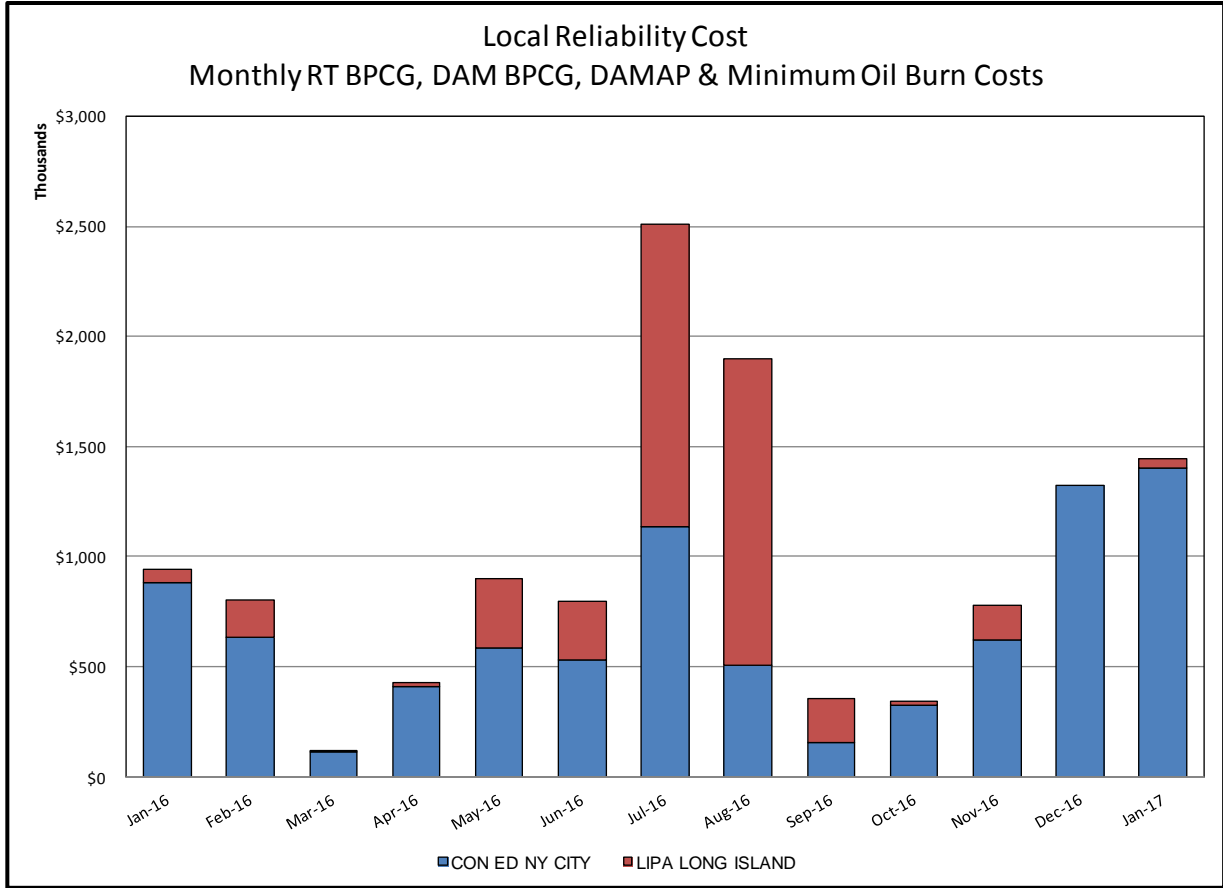
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

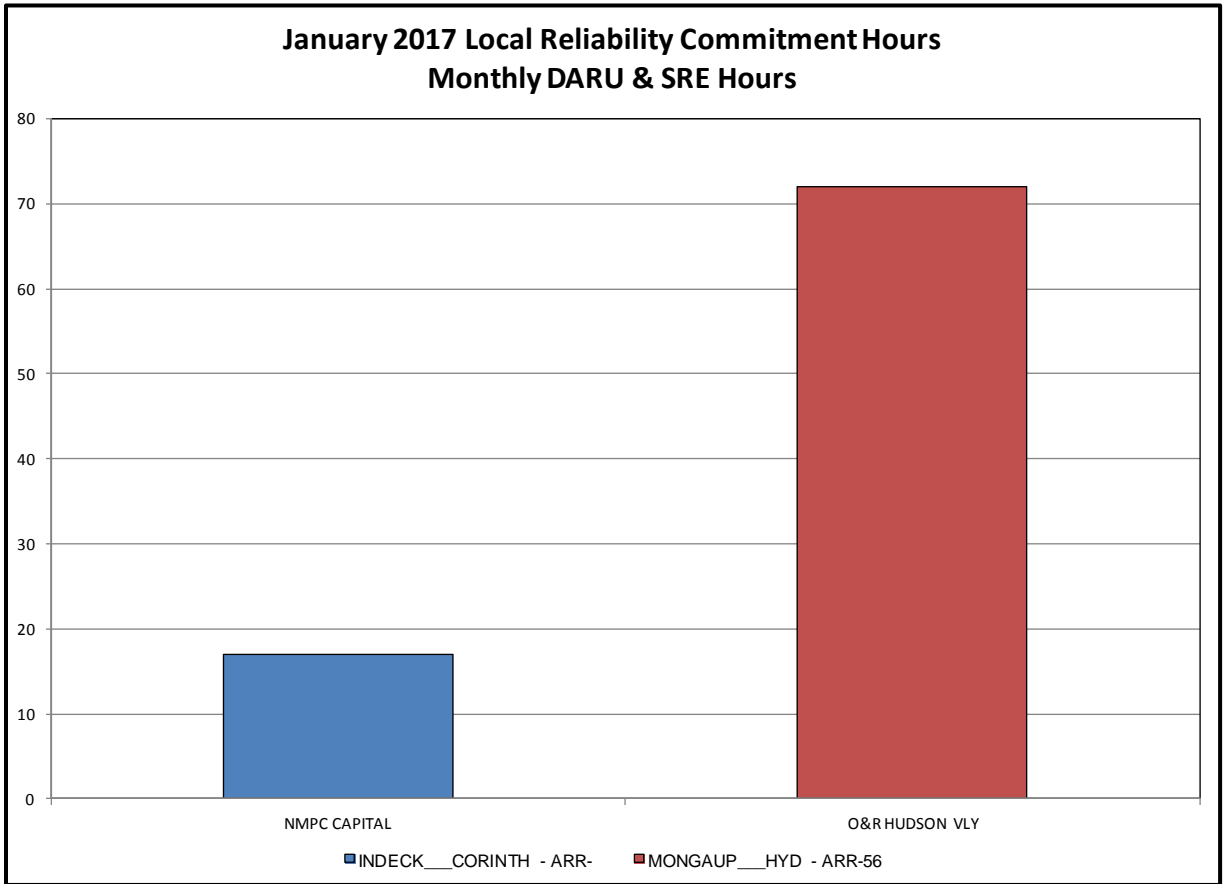
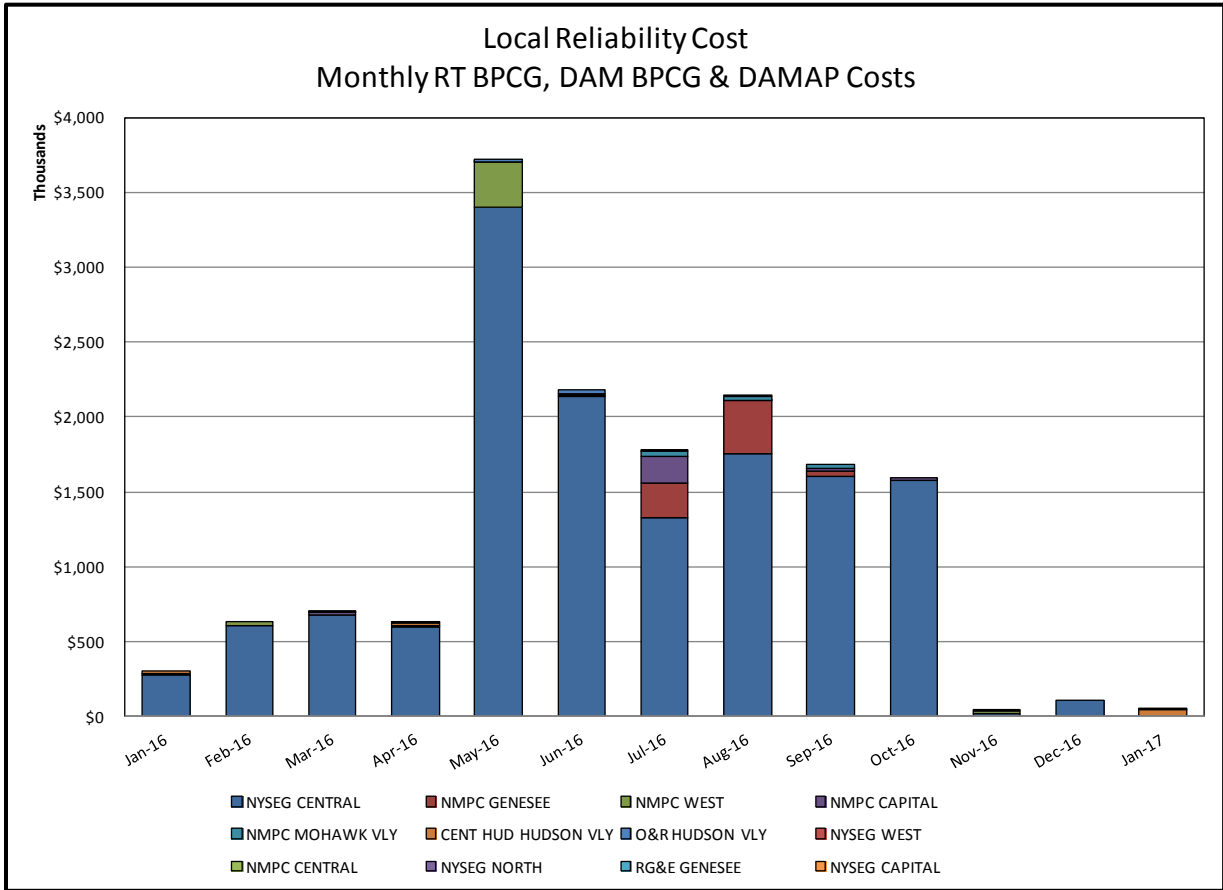


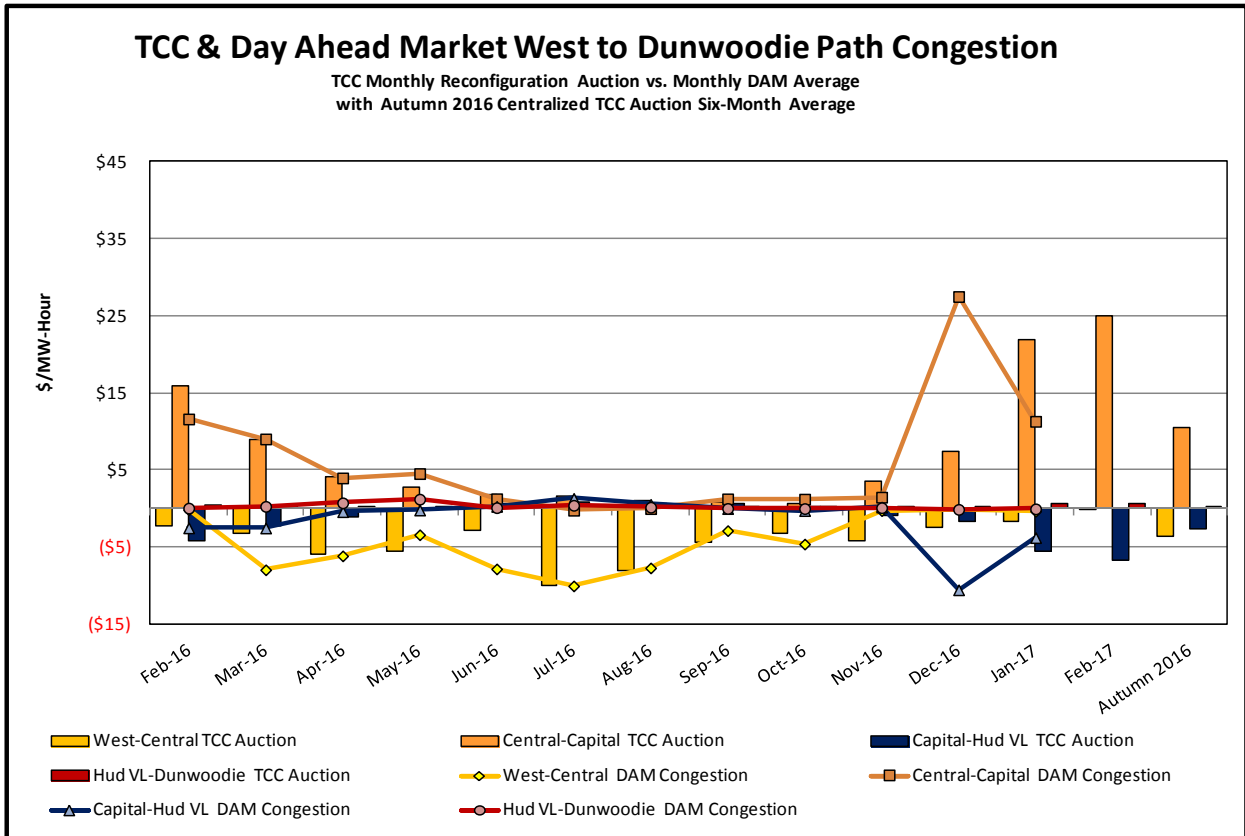
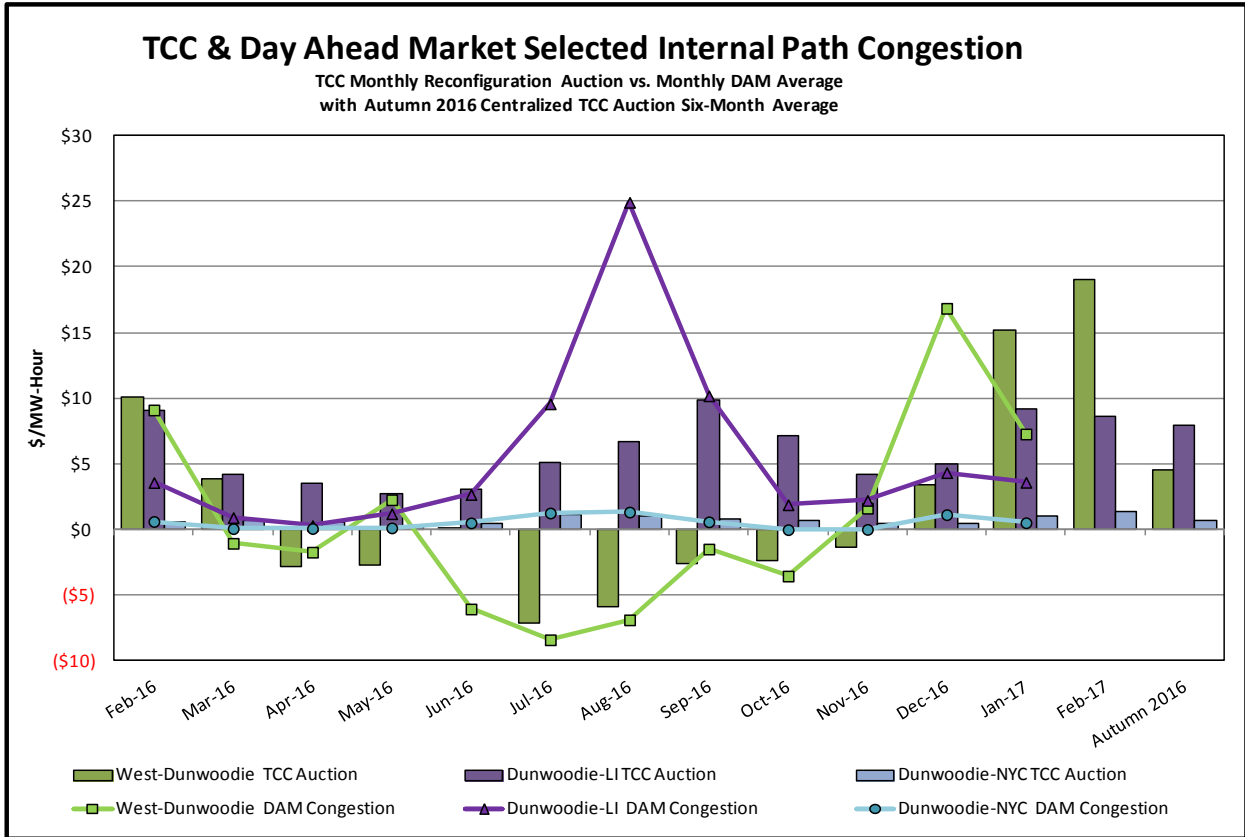
Day-Ahead Market Congestion Residual Categories

| <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

