

Operations Performance Metrics Monthly Report



November 2021 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 December 8, 2021.

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*
 - *BTM Solar Performance*
 - *BTM Solar Forecasting Performance*
 - *Net Load Forecasting Performance*
 - *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*

November 2021 Operations Performance Highlights

- Peak load of 20,690 MW occurred on 11/30/2021 HB 17
- All-time winter capability period peak load of 25,738 MW occurred on 01/07/2014 HB 18
- 3.35 hours of Thunderstorm Alerts were declared
- 0 hours of NERC TLR level 3 curtailment
- To reduce risks from COVID-19, the NYISO continues to take several actions to maintain critical business operations and protect the health and well-being of our employees and stakeholders.

The following table identifies the estimated production cost savings associated with the Broader Regional Market initiatives.

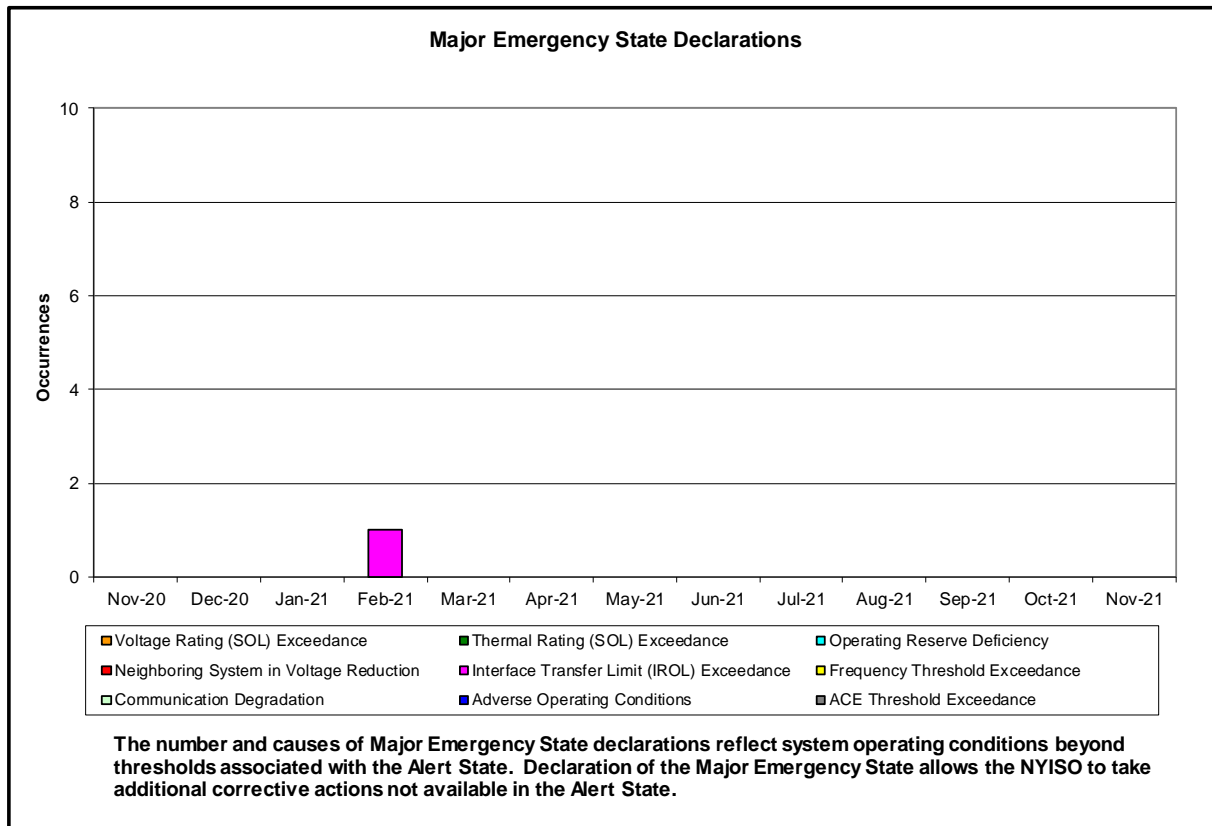
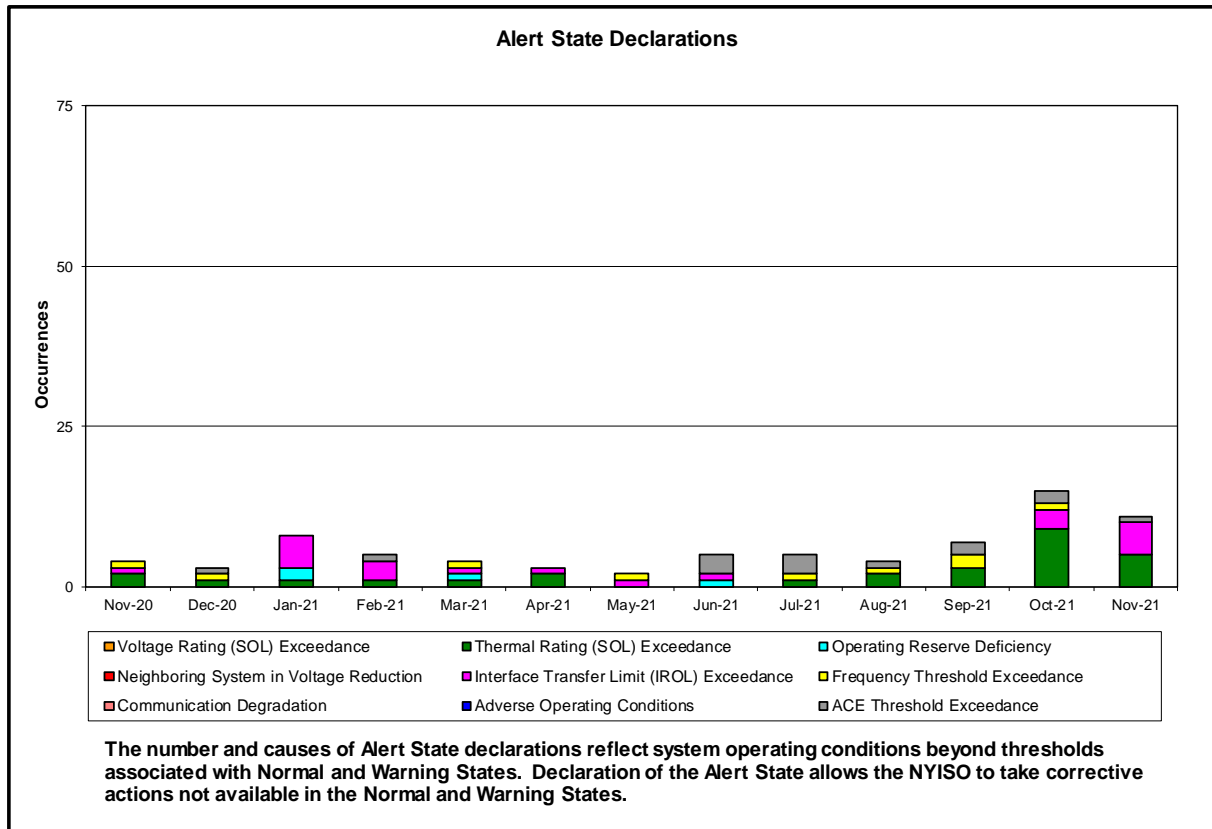
	Current Month Value (\$M)	Year-to-Date Value (\$M)
NY Savings from PJM-NY Congestion Coordination	\$2.28	\$16.22
NY Savings from PJM-NY Coordinated Transaction Scheduling	\$0.29	\$0.86
NY Savings from NE-NY Coordinated Transaction Scheduling	\$0.30	\$0.11
Total NY Savings	\$2.87	\$17.19
Regional Savings from PJM-NY Coordinated Transaction Scheduling	\$0.33	\$5.33
Regional Savings from NE-NY Coordinated Transaction Scheduling	\$0.05	\$0.35
Total Regional Savings	\$0.38	\$5.68

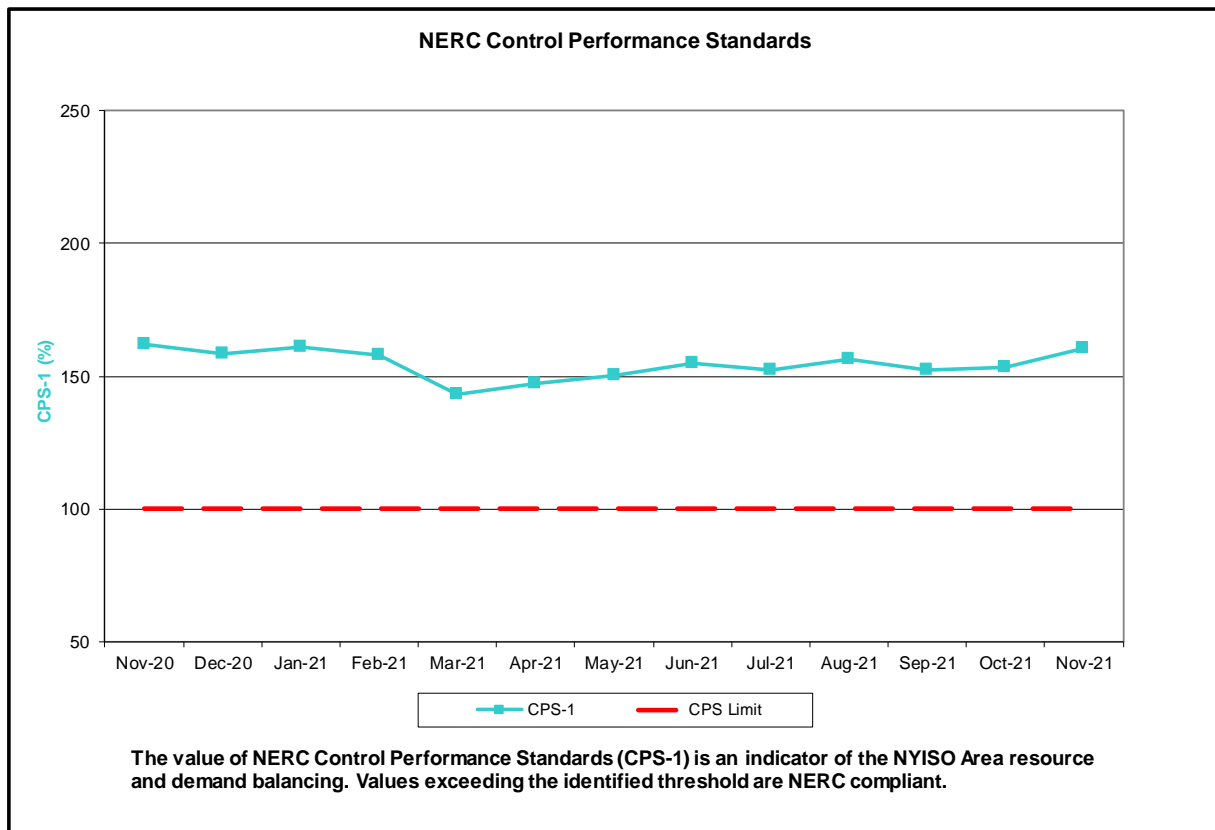
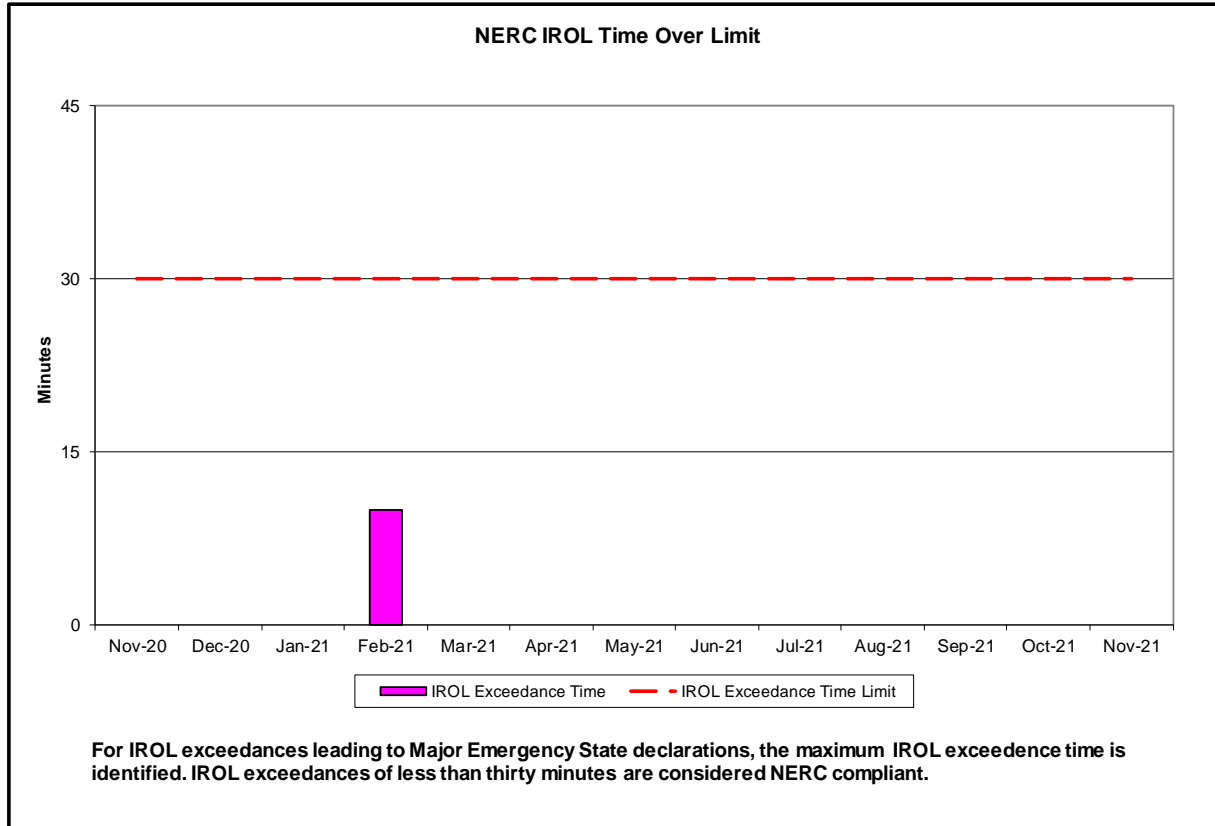
- Statewide uplift cost monthly average was (\$0.74)/MWh.
- The following table identifies the Monthly ICAP spot market prices and the price delta.

Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
December 2021 Spot Price	\$2.95	\$2.95	\$2.95	\$2.95
November 2021 Spot Price	\$1.65	\$1.65	\$1.65	\$1.65
Delta	\$1.30	\$1.30	\$1.30	\$1.30

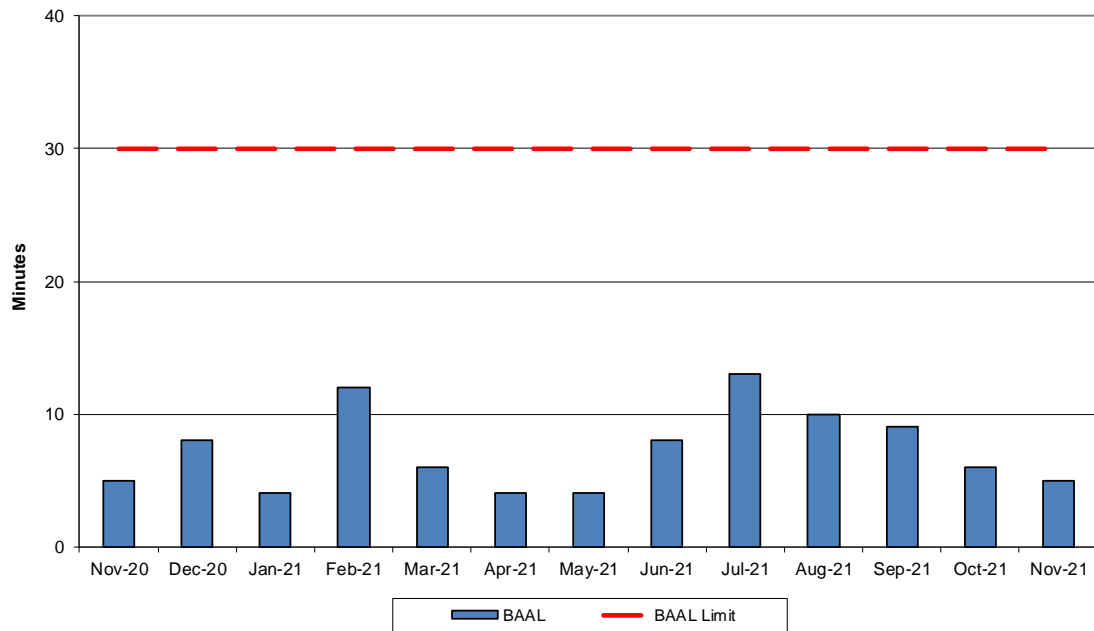
- NYCA experienced \$1.30 clearing price increase due to a decrease in net Imports. The clearing price for Lower Hudson Valley, New York City, and Long Island zones were set by NYCA.

Reliability Performance Metrics



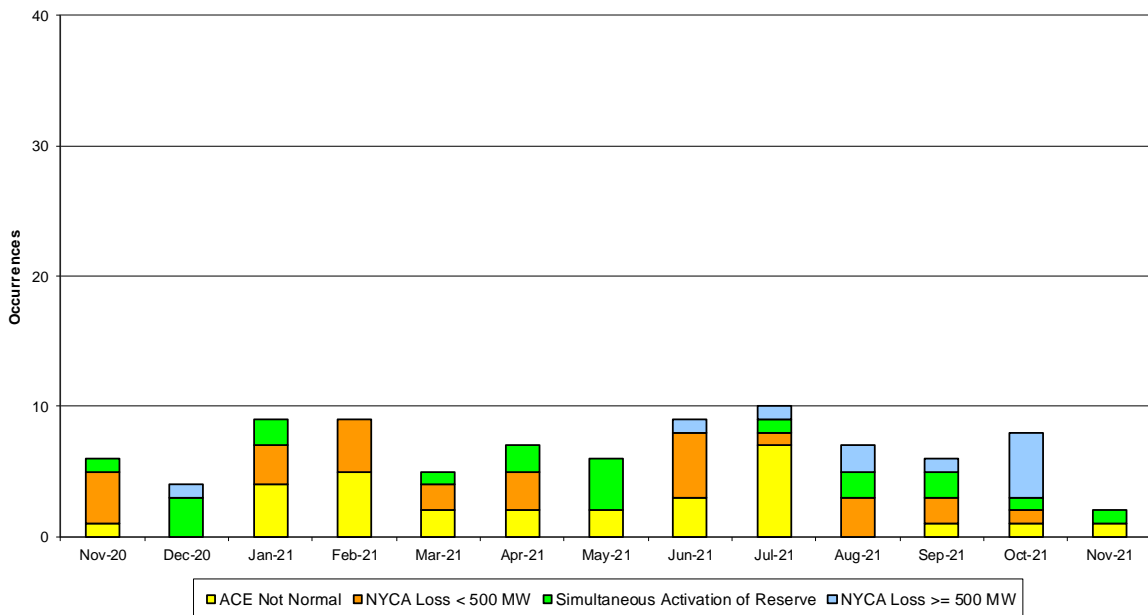


NERC Balancing Authority ACE Limit Standard



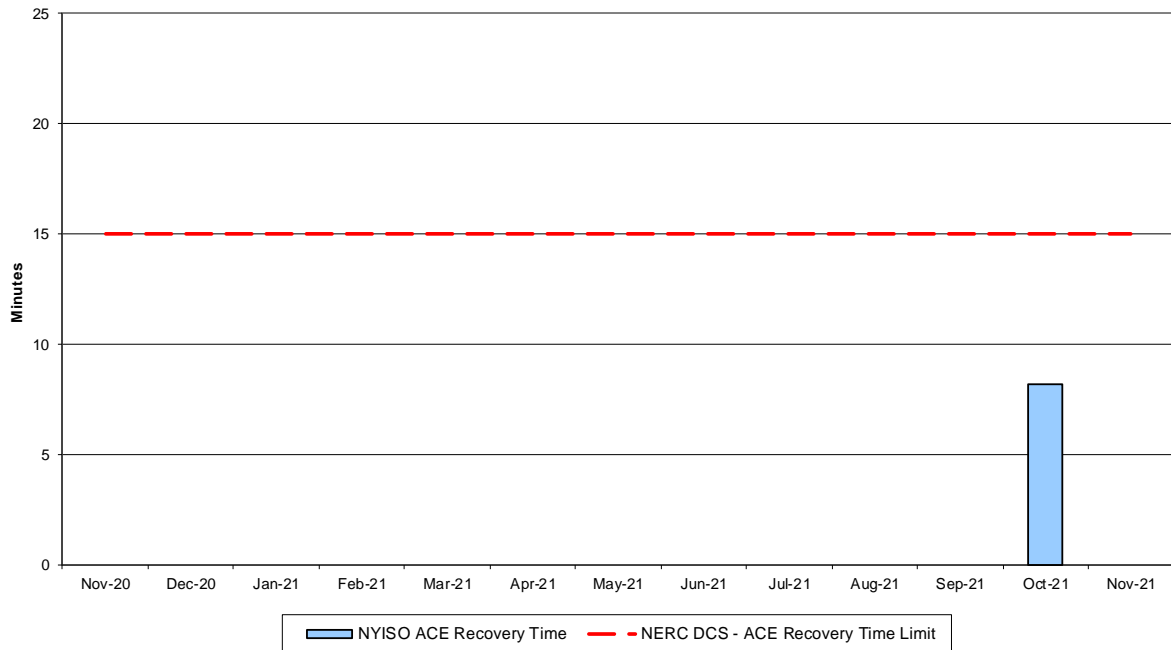
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



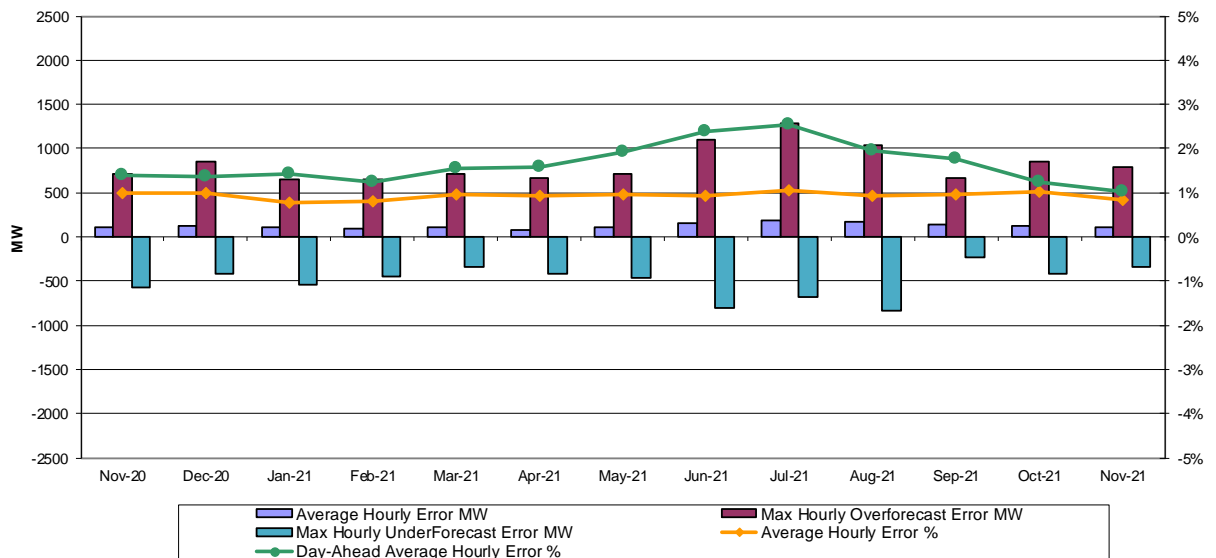
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

DCS Event Time to ACE Recovery



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

Load Forecast Performance

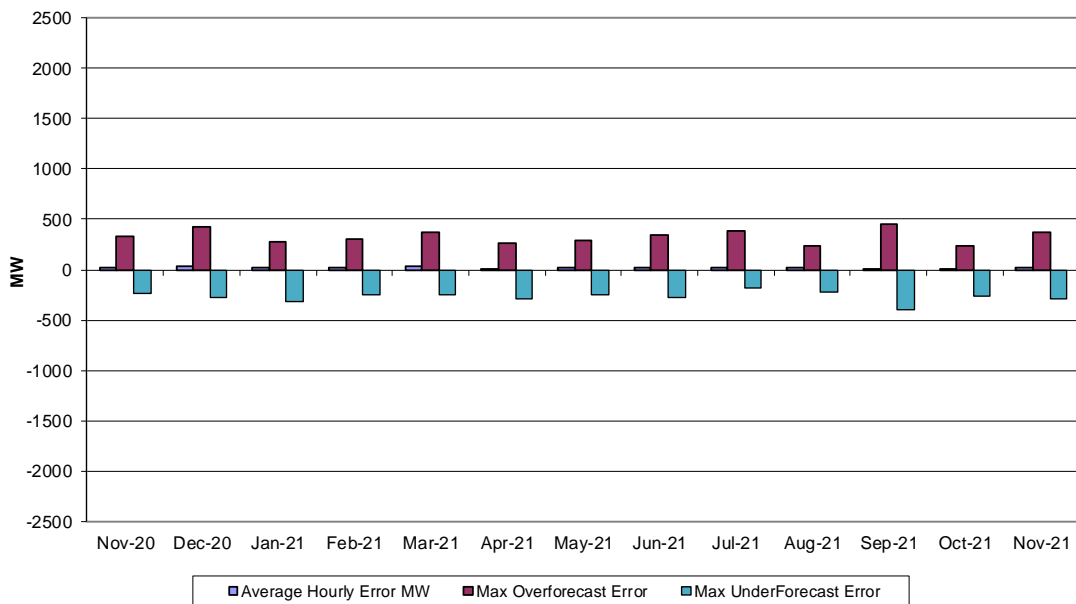


Hourly Error MW - Value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.

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

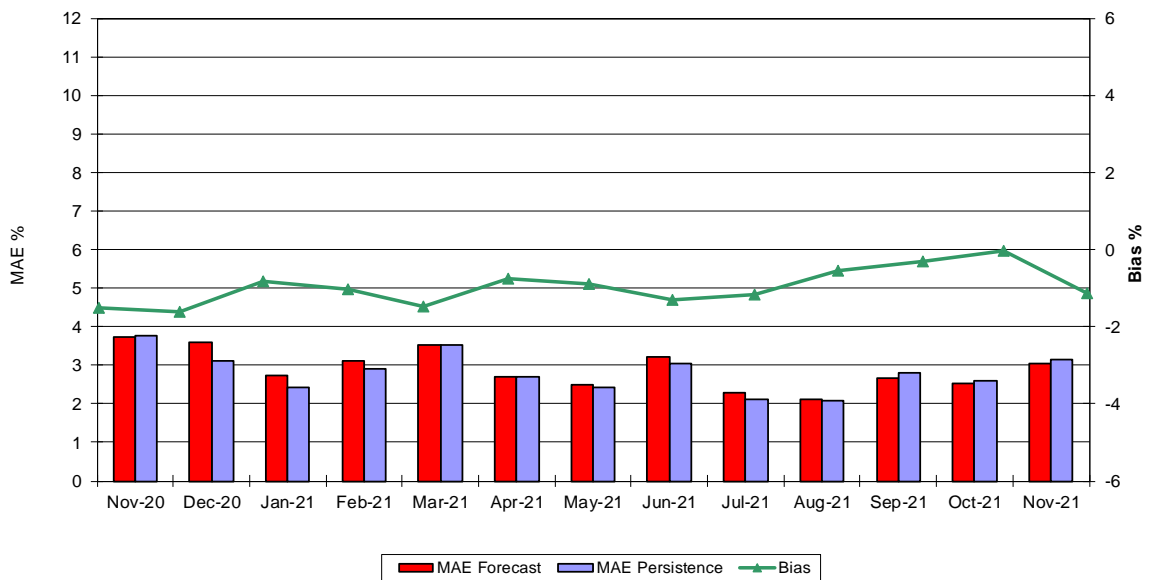
Day-Ahead Average Hourly Error % - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.

Wind Forecast Performance Hour Ahead MW Error

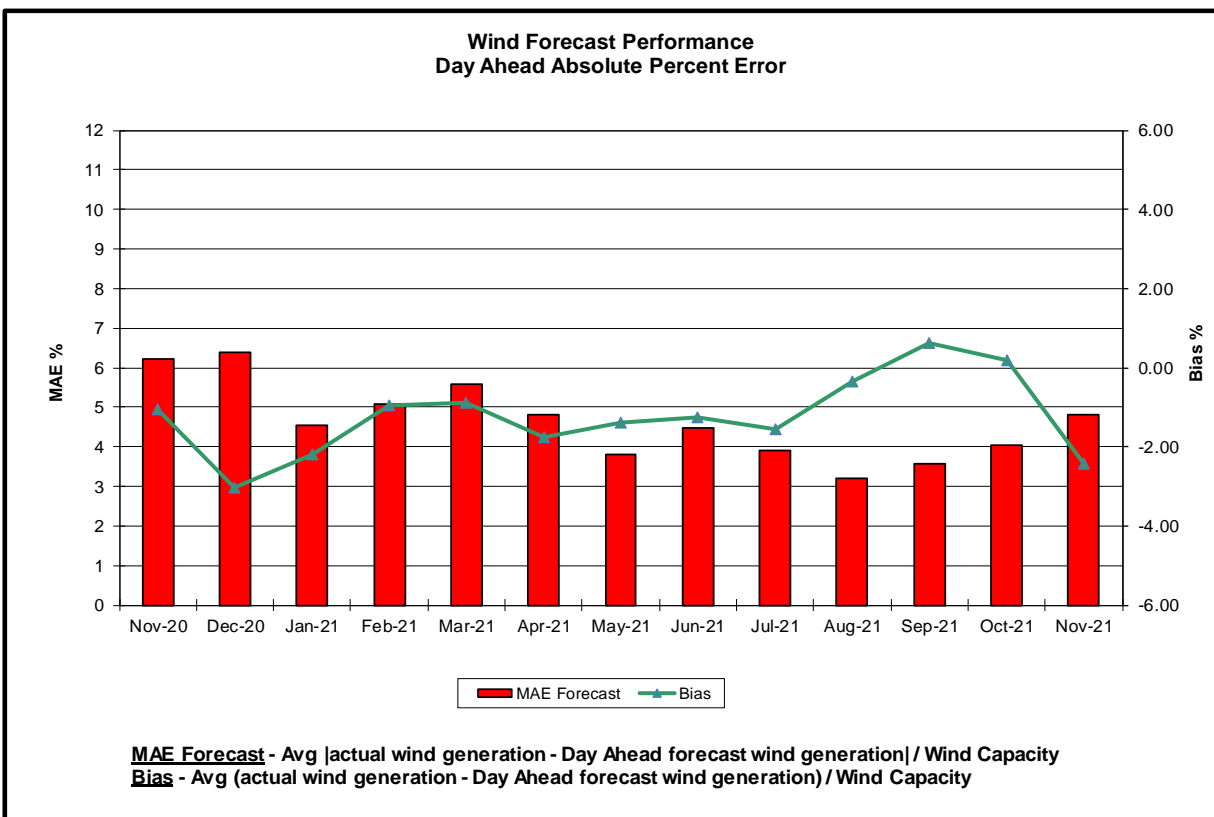
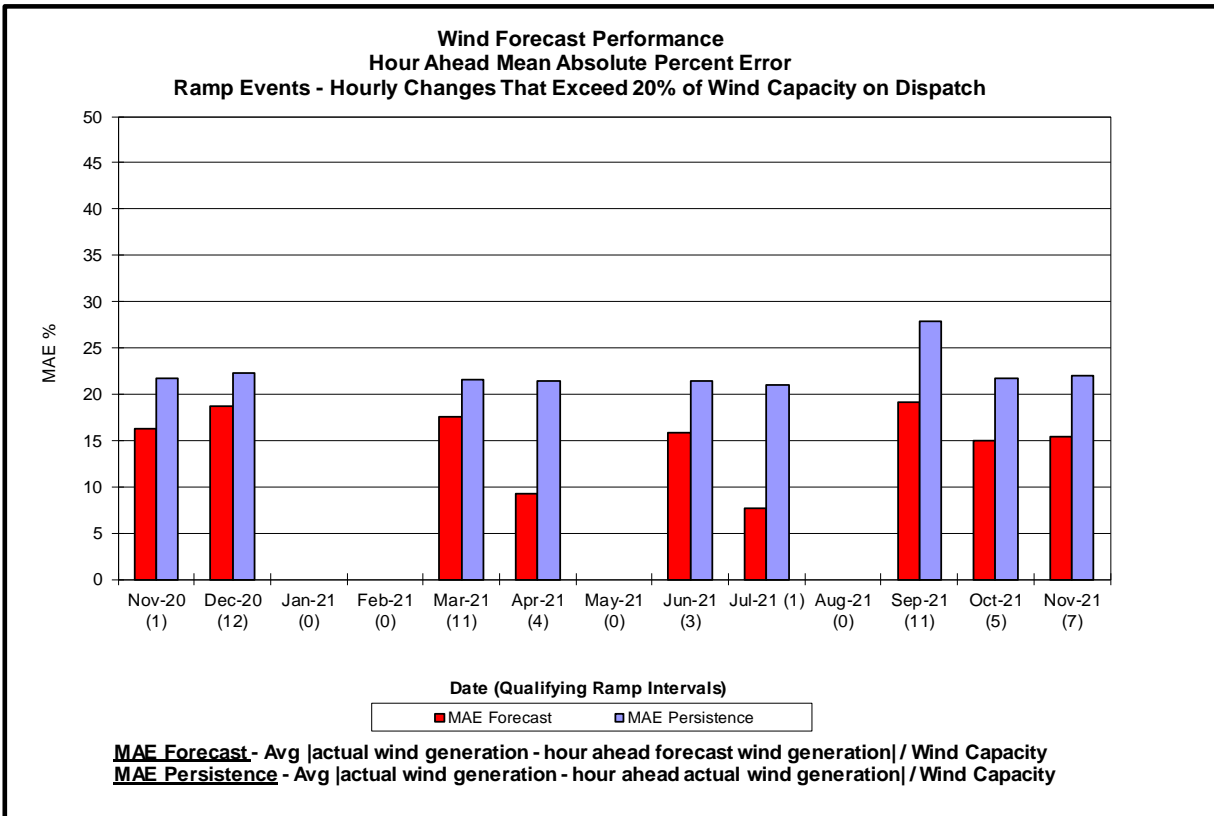


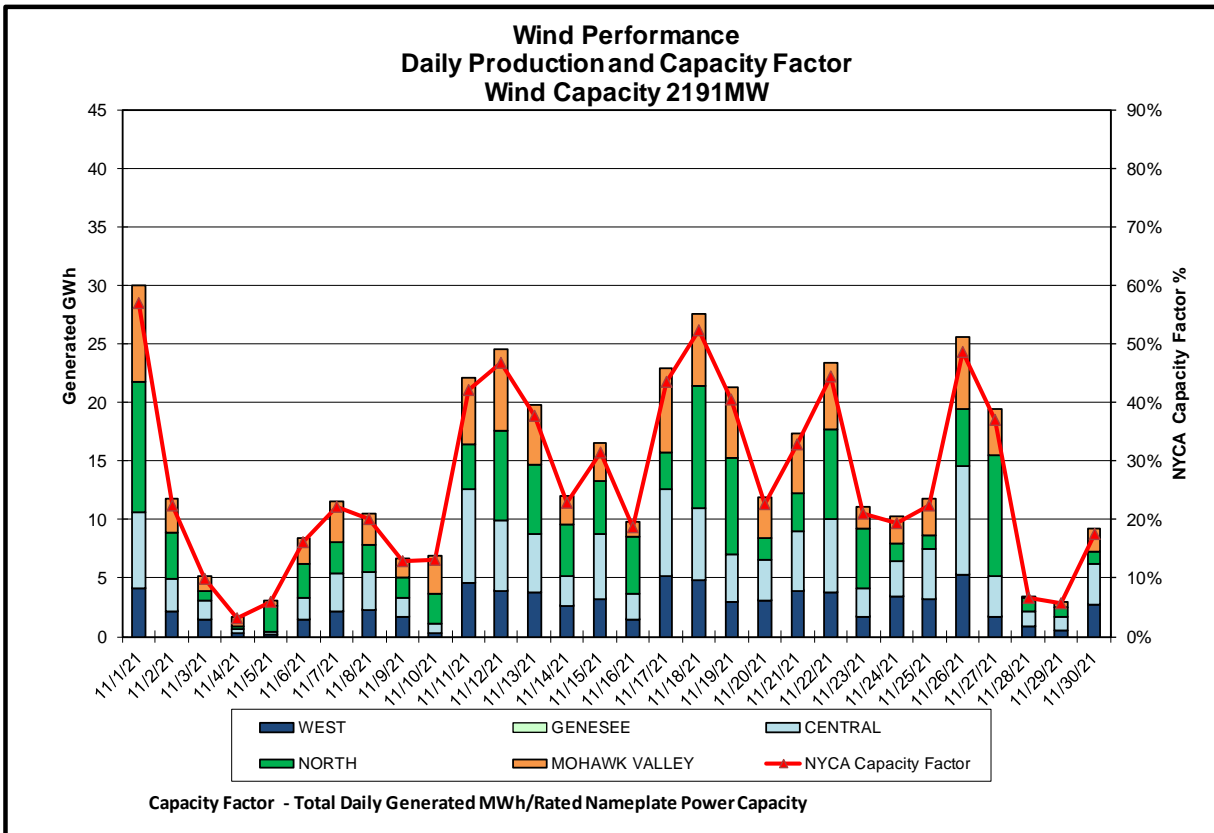
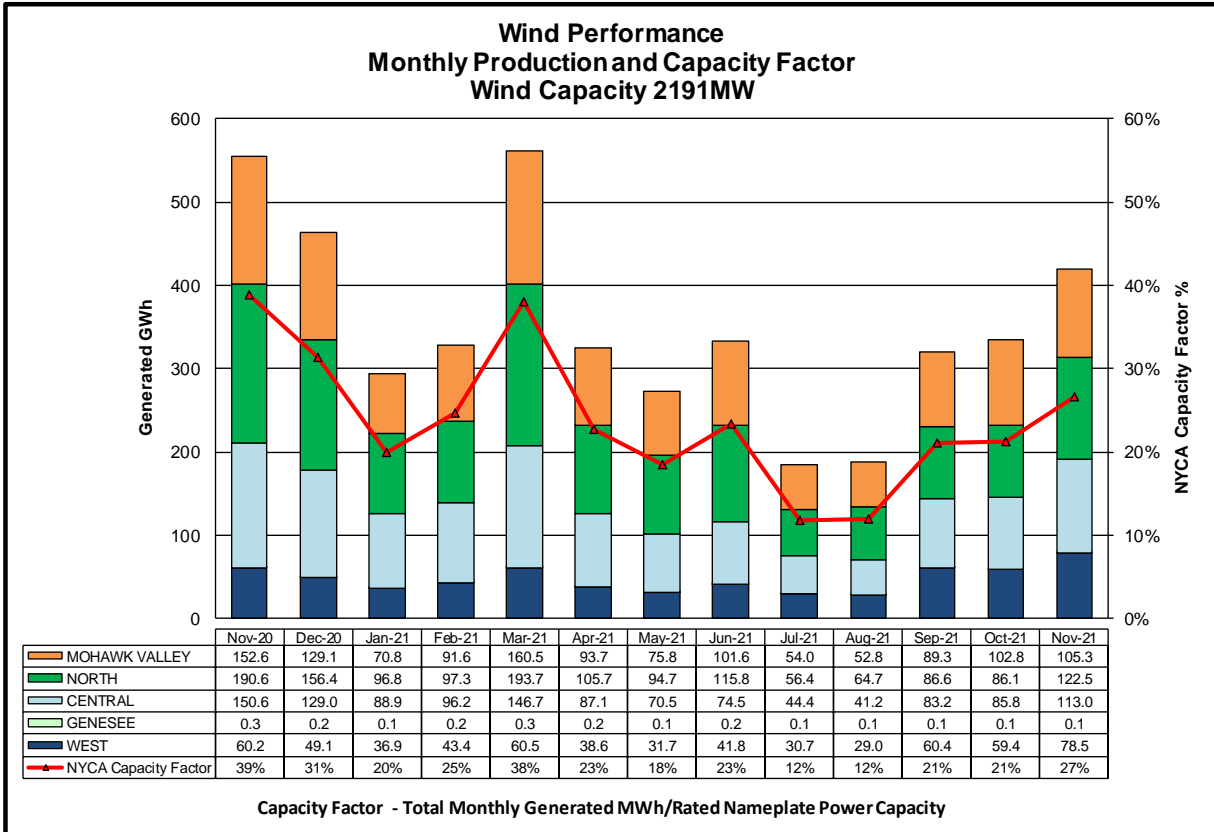
Hourly Error MW - Value of the difference between the hourly average actual wind generation and the average hour ahead forecast wind generation.

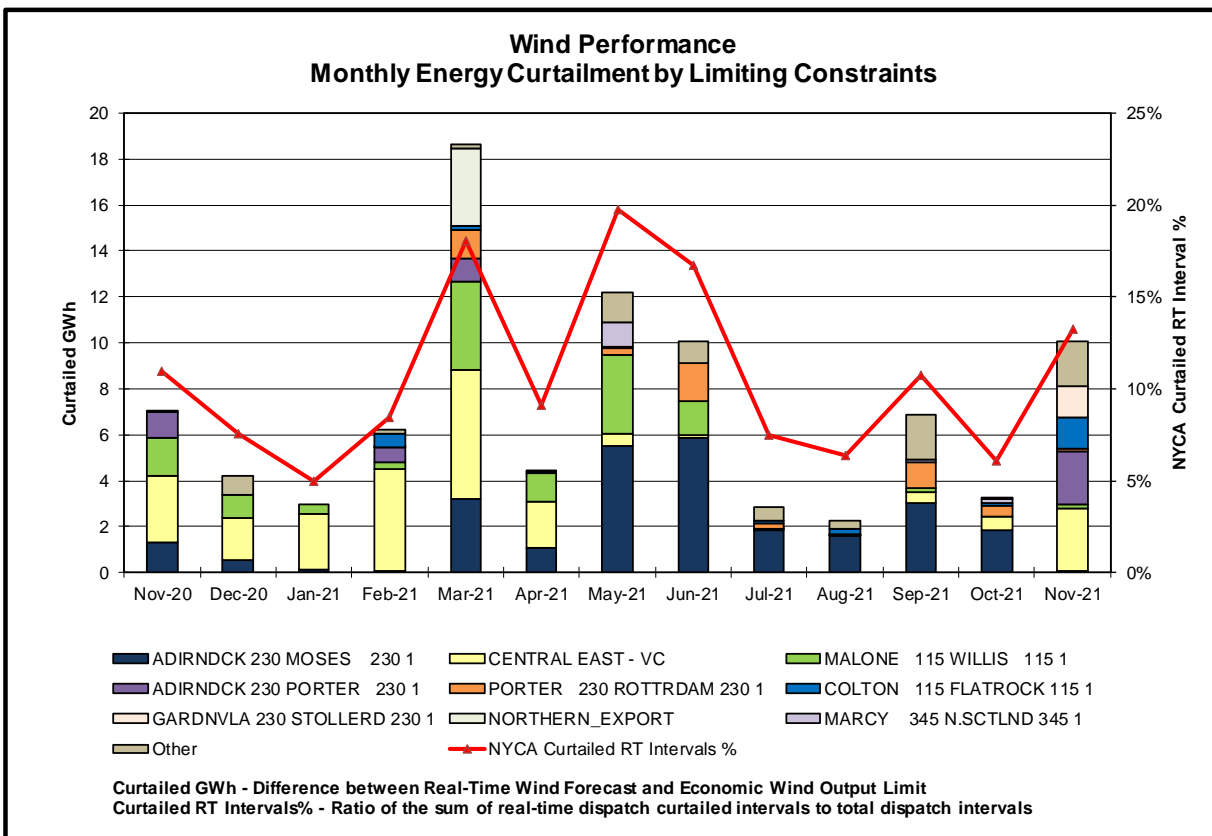
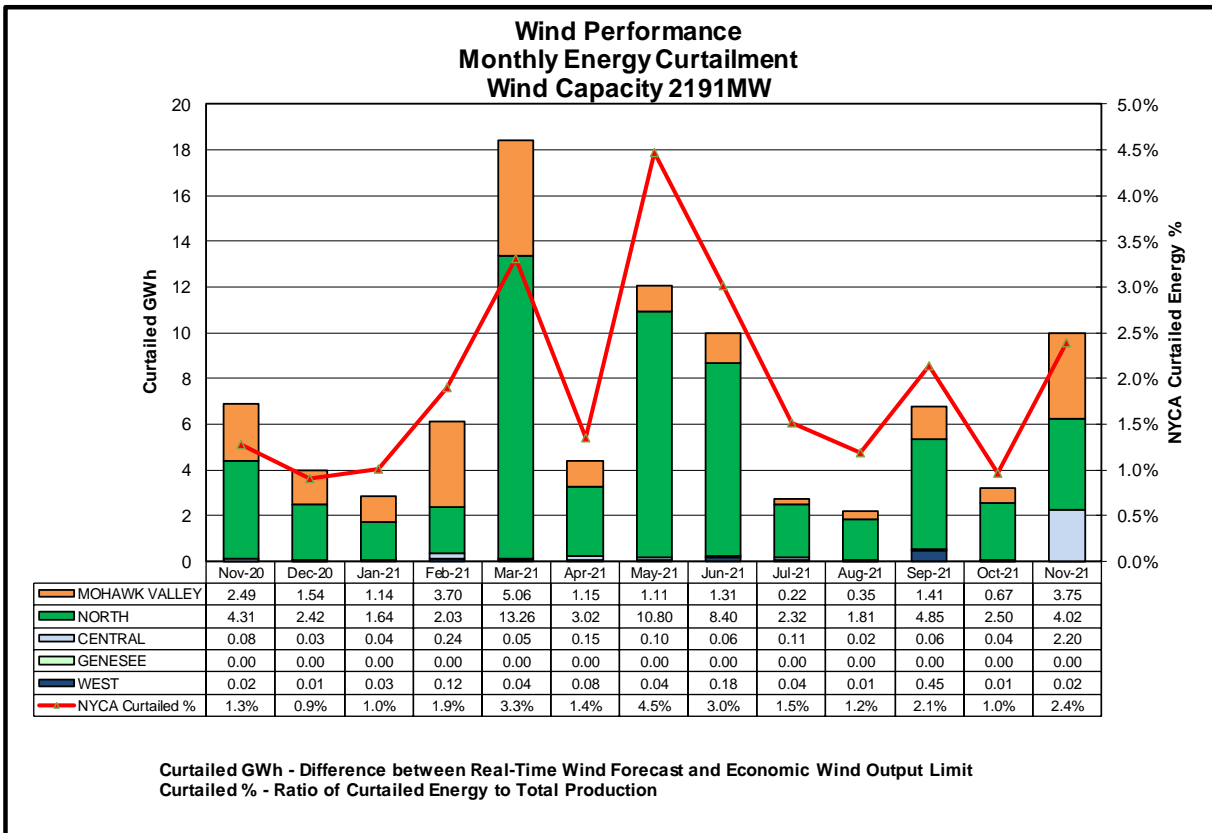
Wind Forecast Performance Hour Ahead Percent Error

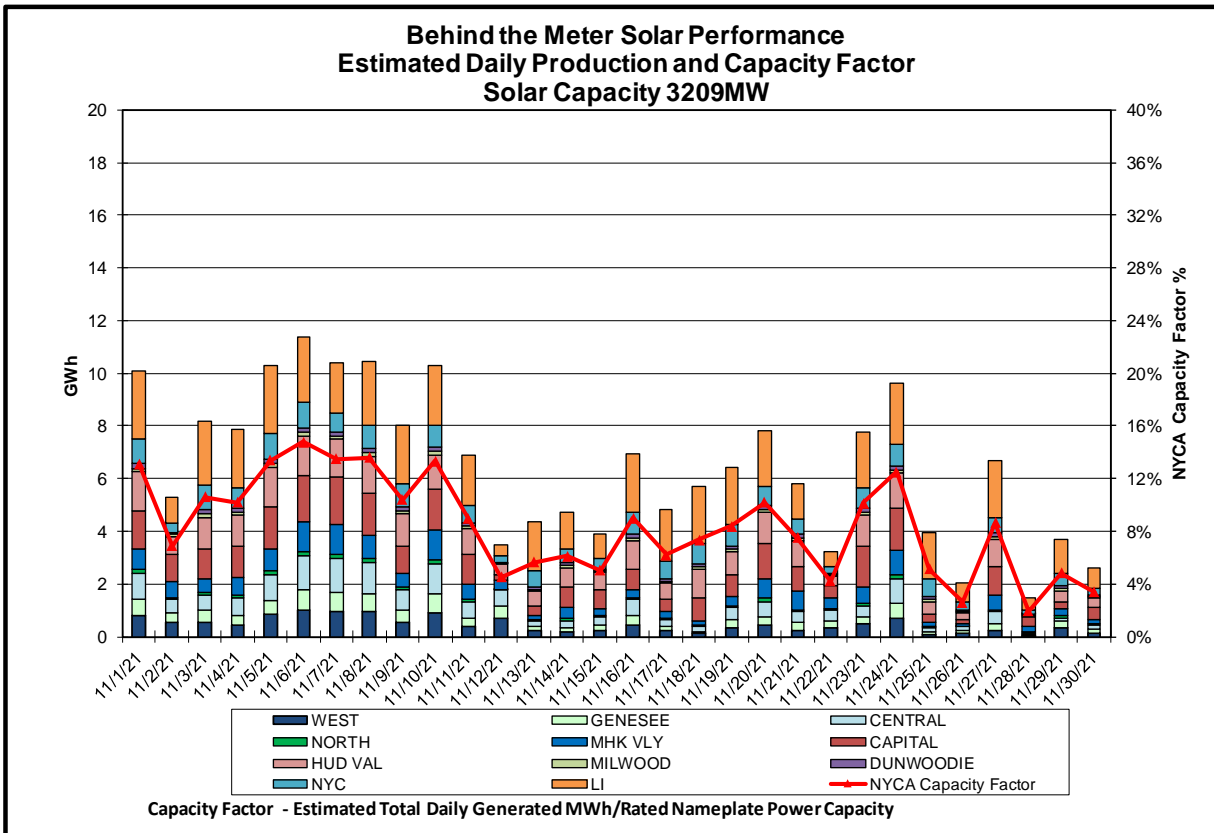
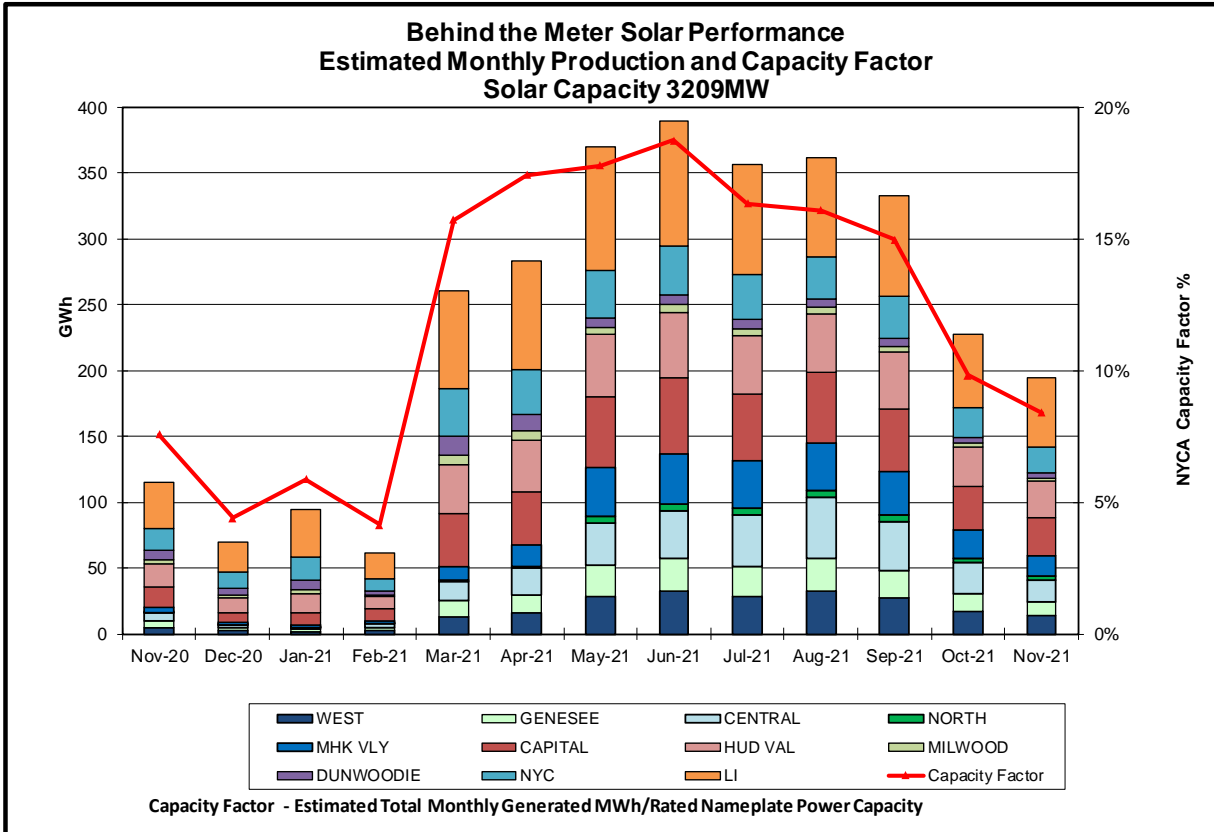


MAE Forecast - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity
MAE Persistence - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity
Bias - Avg (actual wind generation - hour ahead forecast wind generation) / Wind Capacity

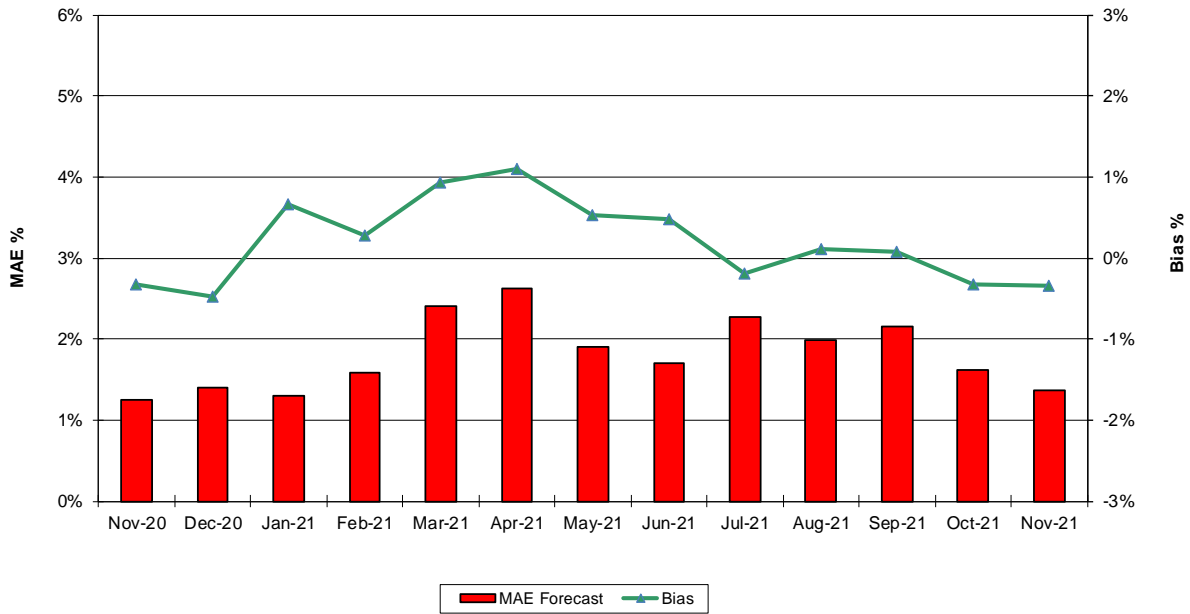






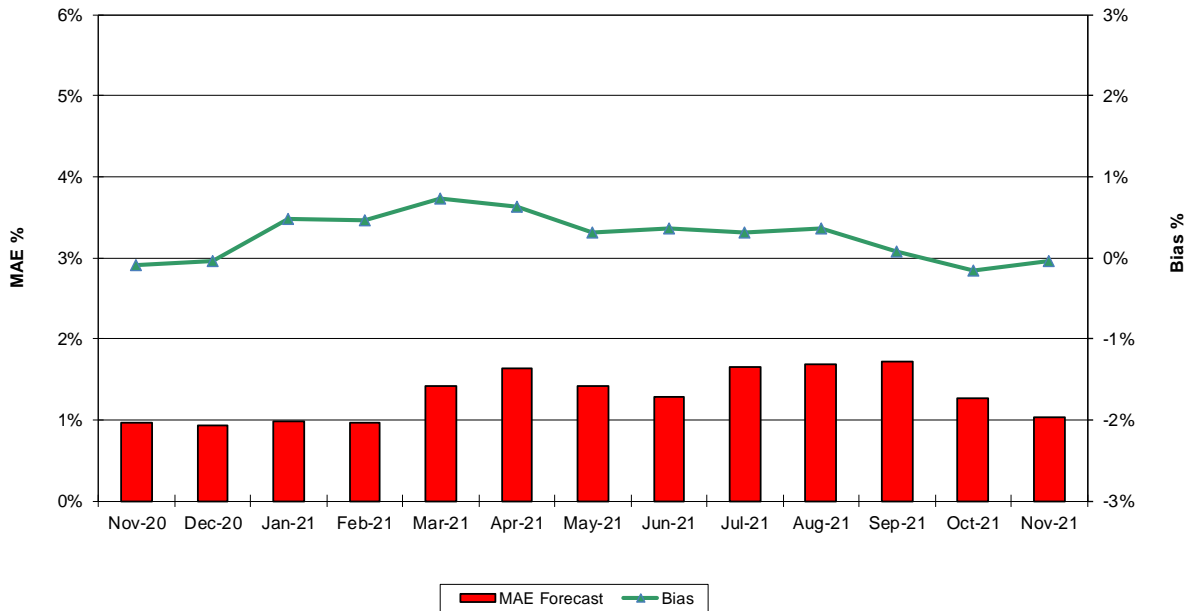


Behind the Meter Solar Forecast Performance Day Ahead Percent Error

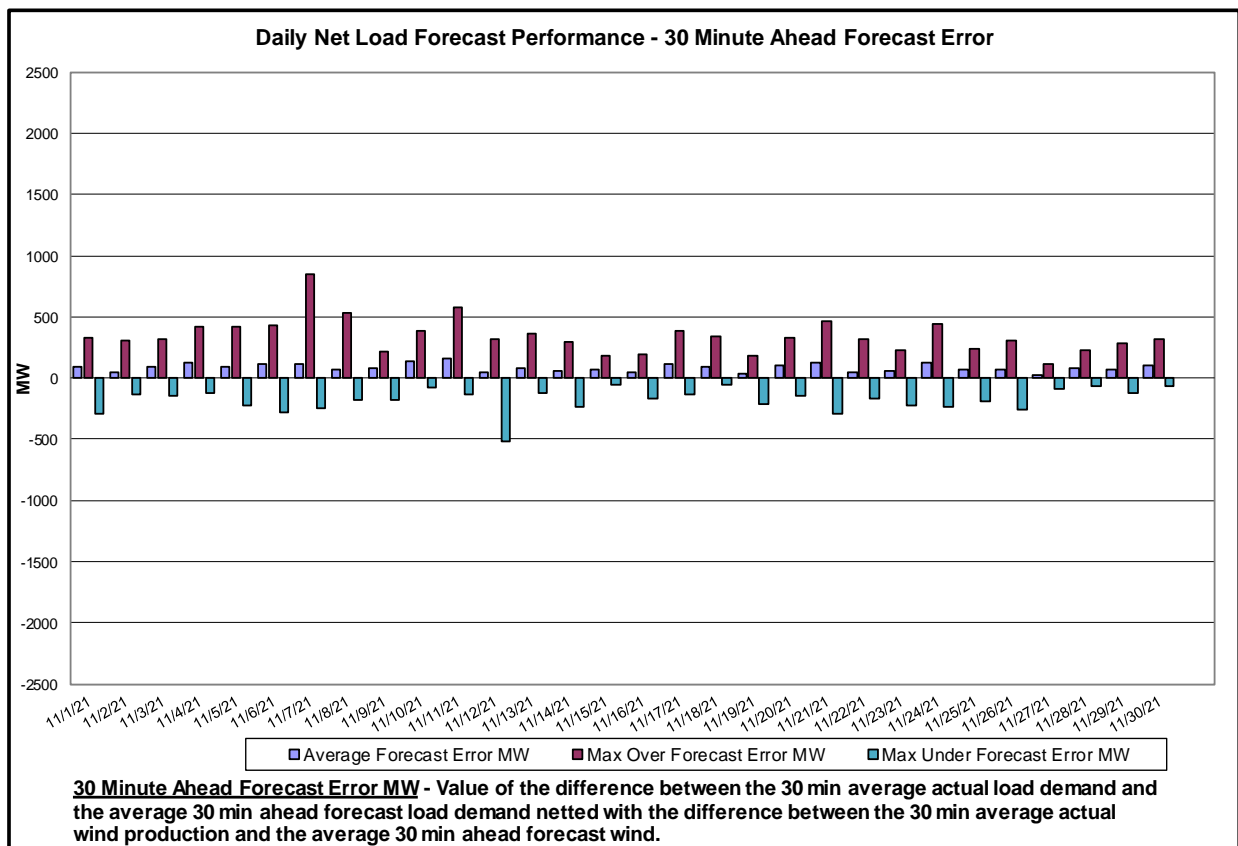
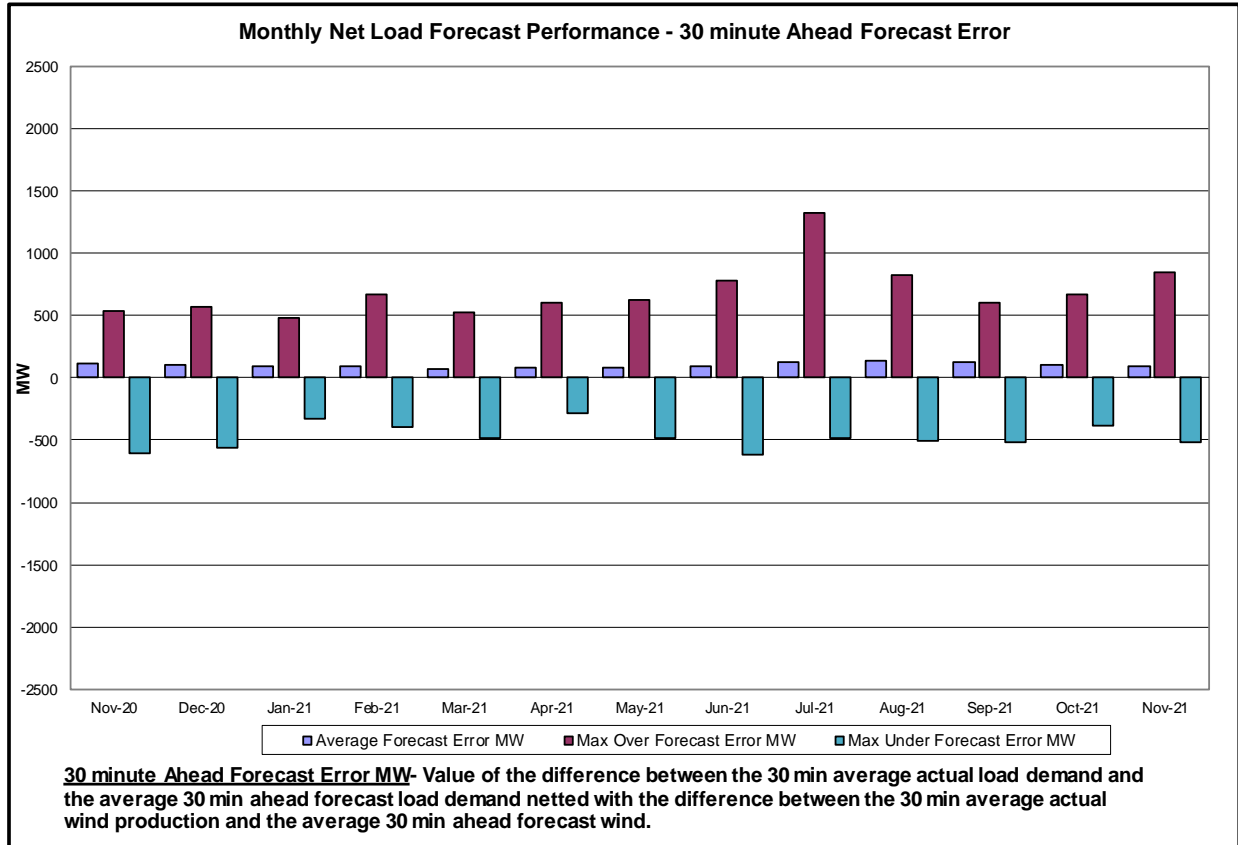


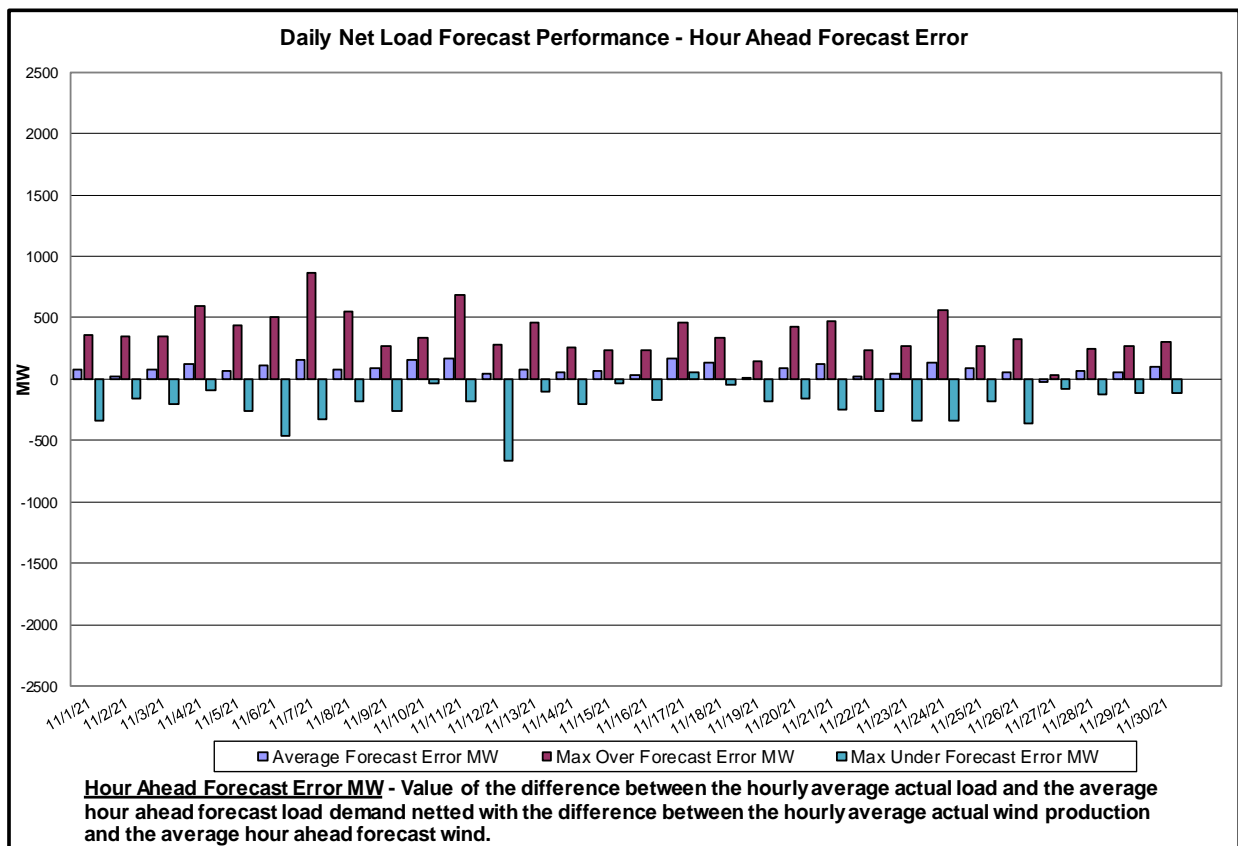
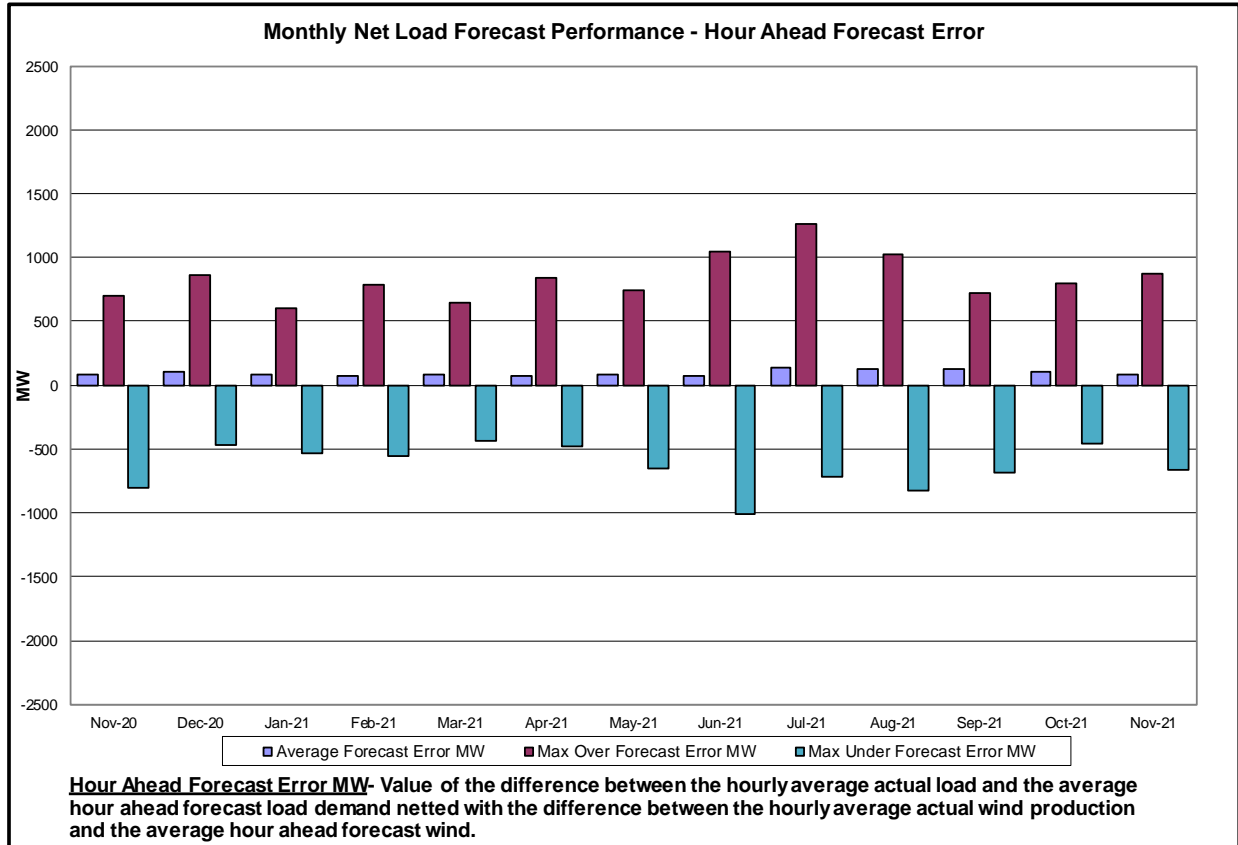
MAE Forecast - Avg |est. actual solar generation - Day Ahead forecast solar generation| / Solar Capacity
Bias - Avg (est. actual solar generation - Day Ahead forecast solar generation) / Solar Capacity

Behind the Meter Solar Forecast Performance Hour Ahead Percent Error

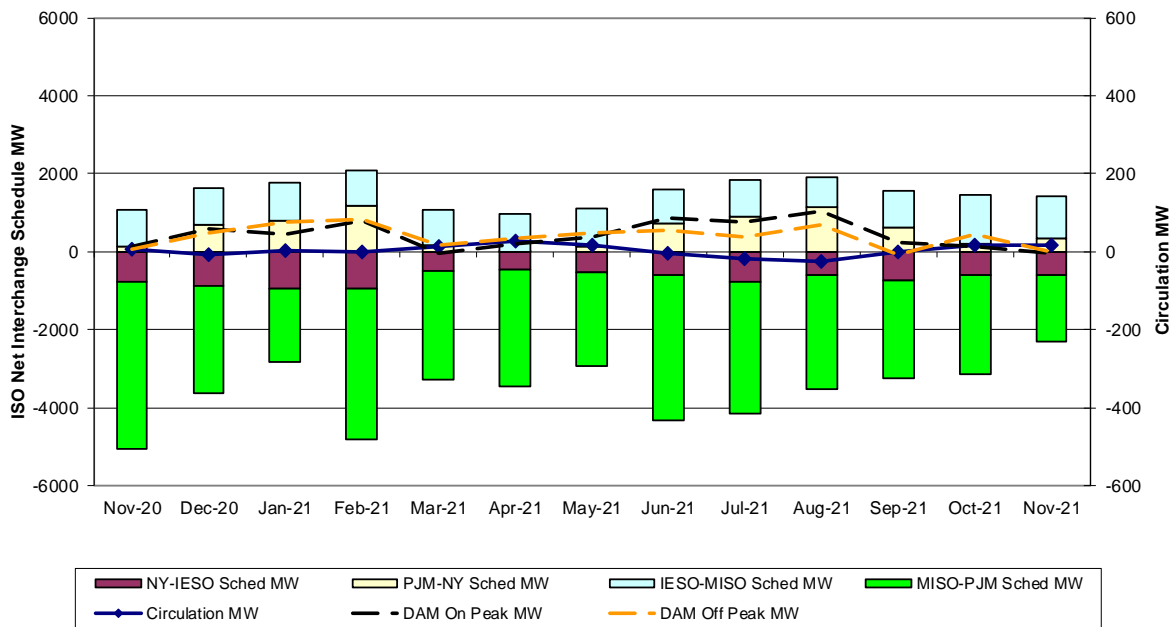


MAE Forecast - Avg |est. actual solar generation - Hour Ahead forecast solar generation| / Solar Capacity
Bias - Avg (est. actual solar generation - Hour Ahead forecast solar generation) / Solar Capacity



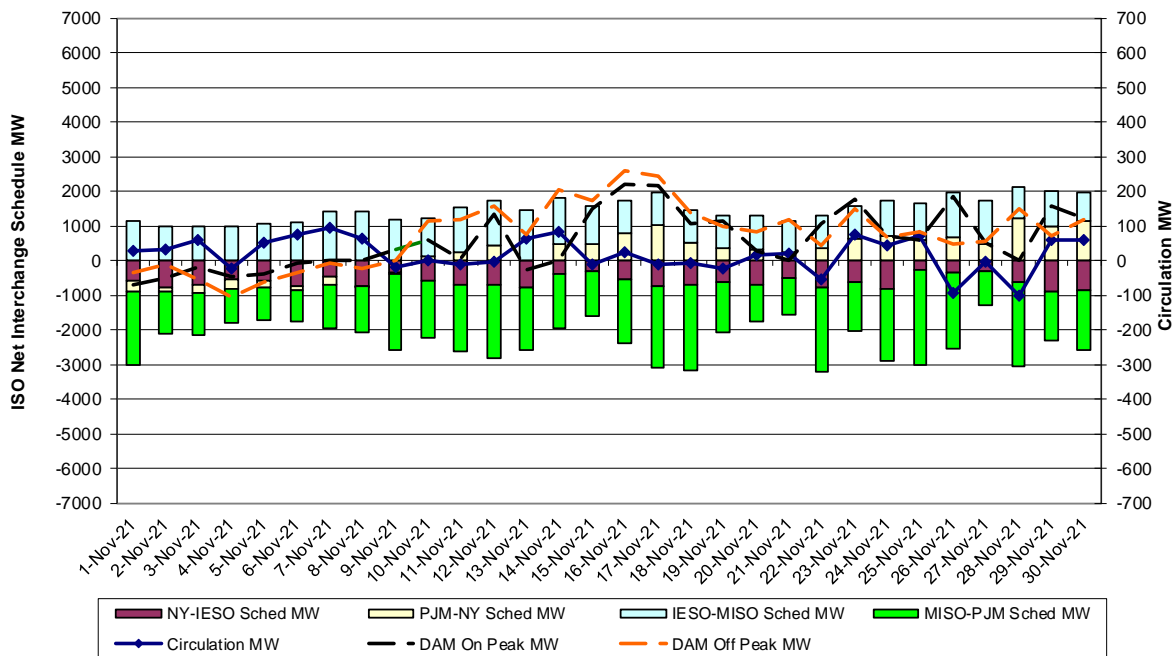


**Lake Erie Circulation and ISO Net Interchange Schedules
Monthly Averages**



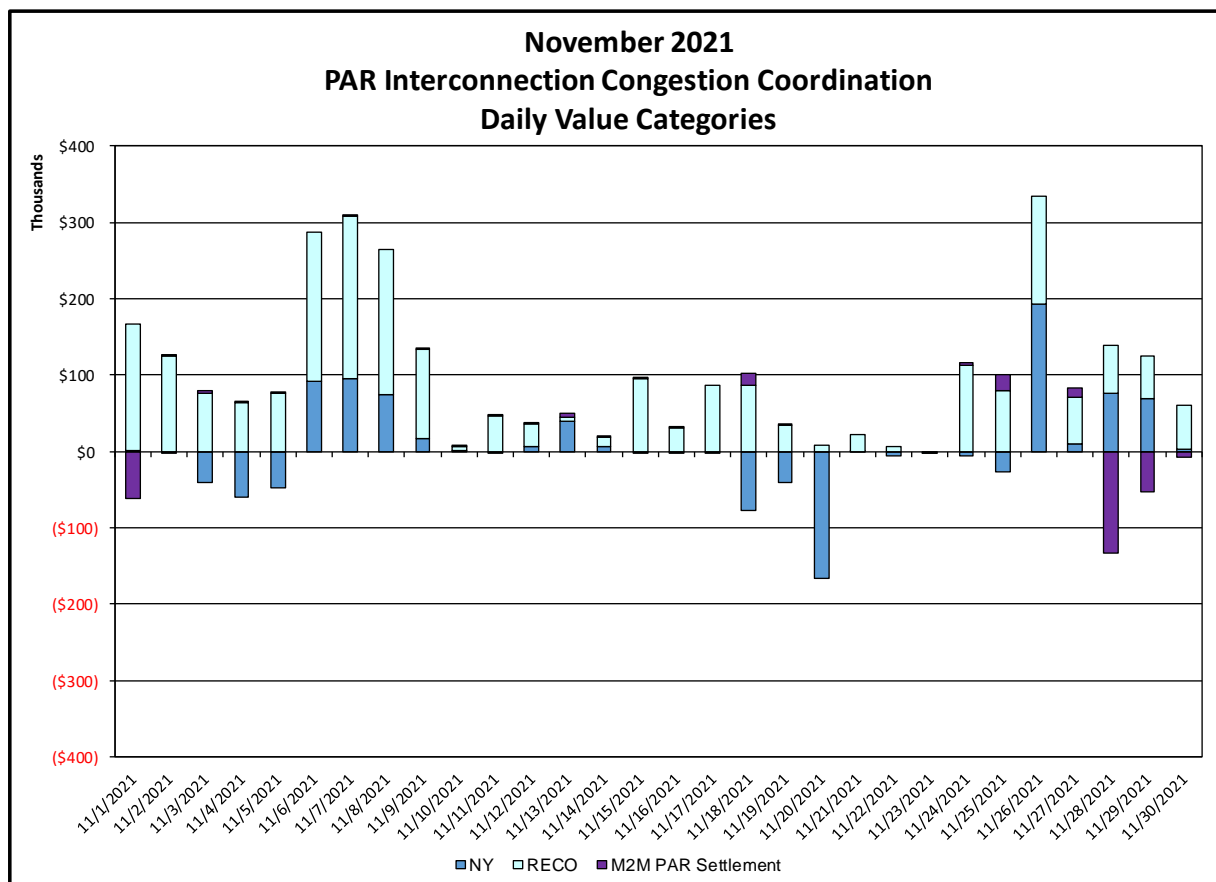
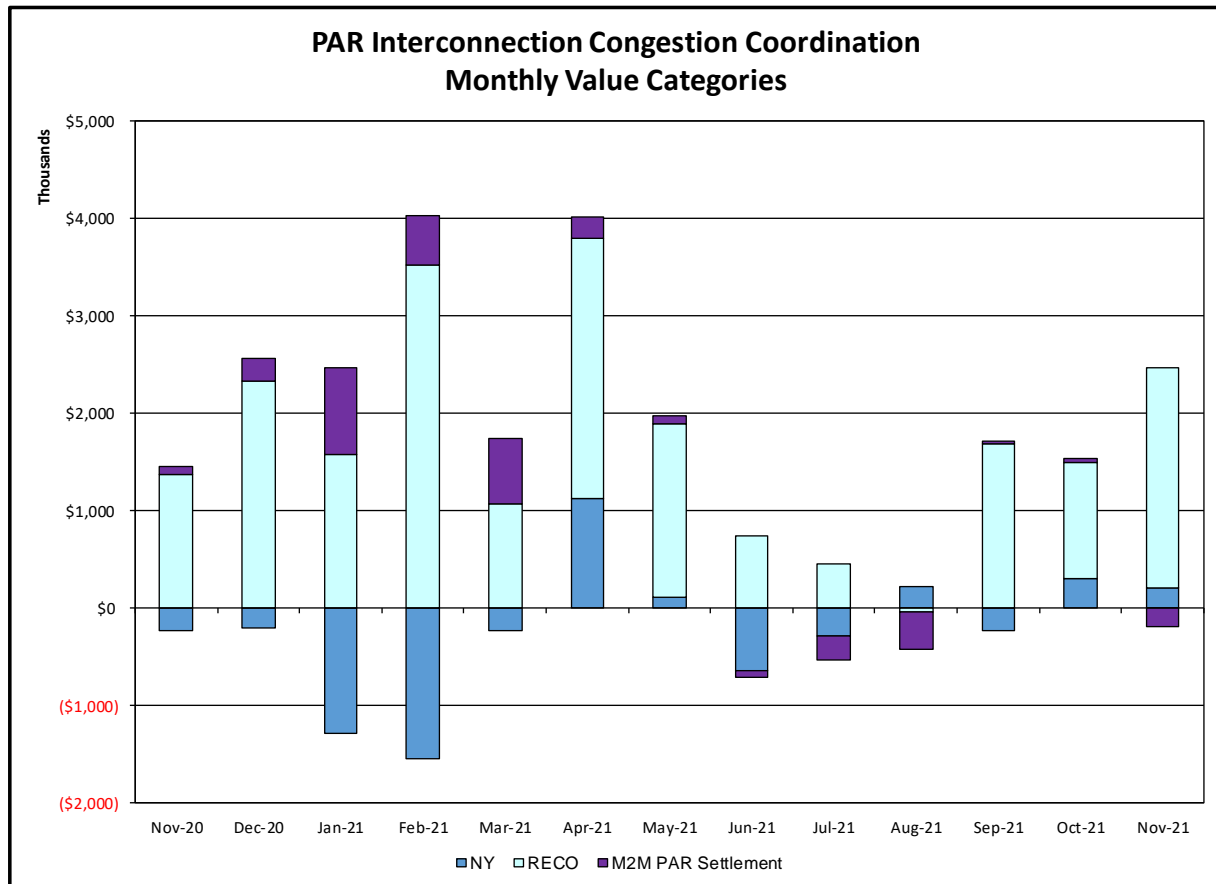
Interchange schedules with positive values aggravate clockwise Lake Erie Circulation.

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

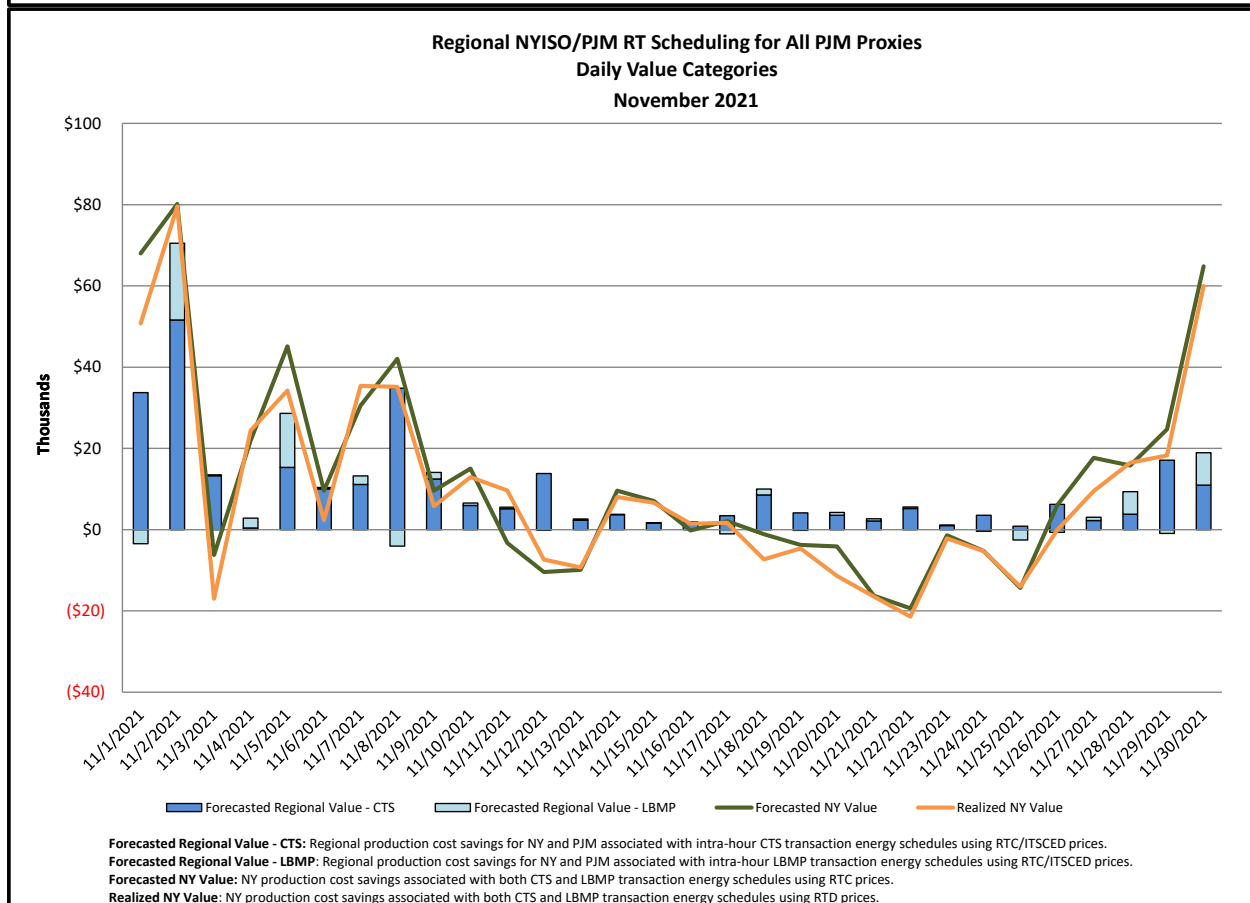
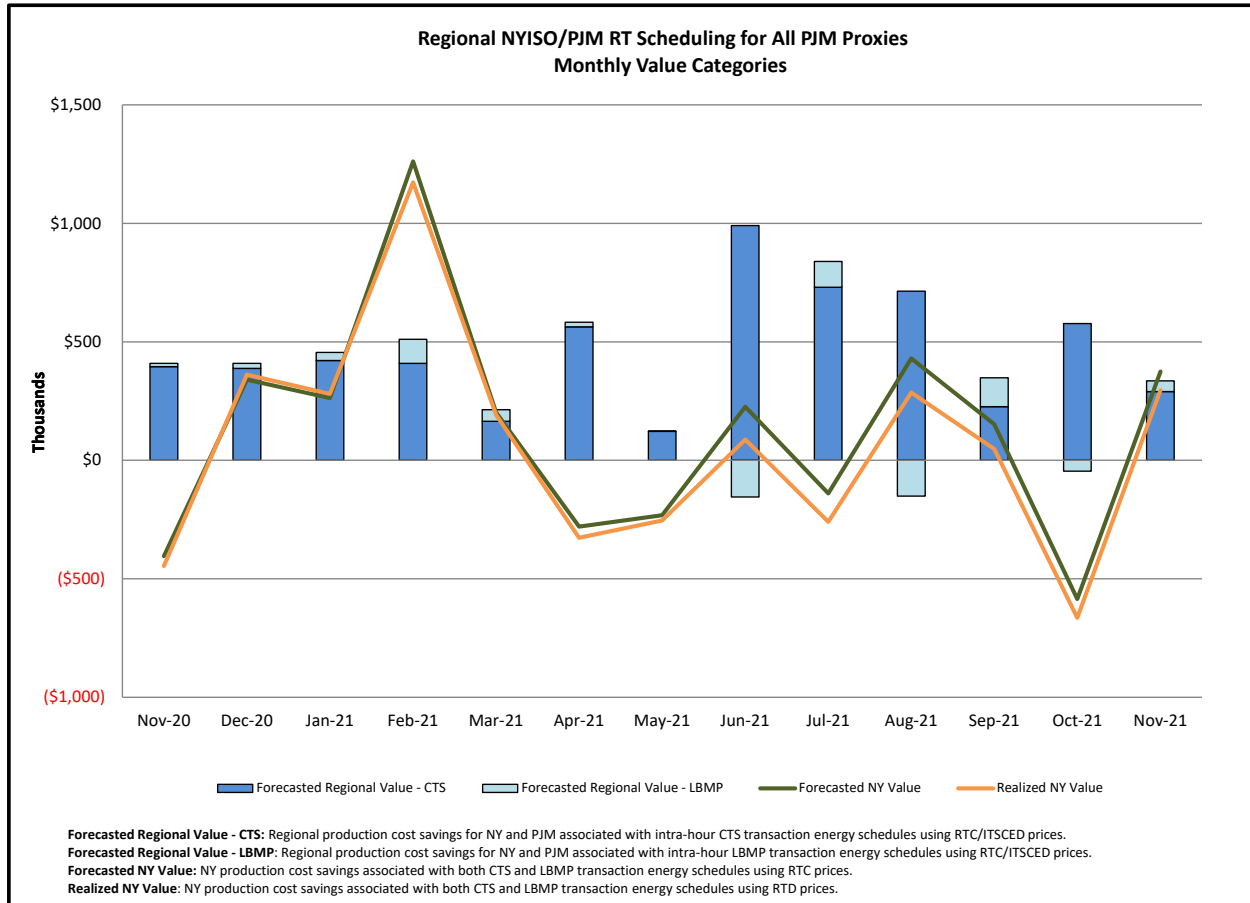


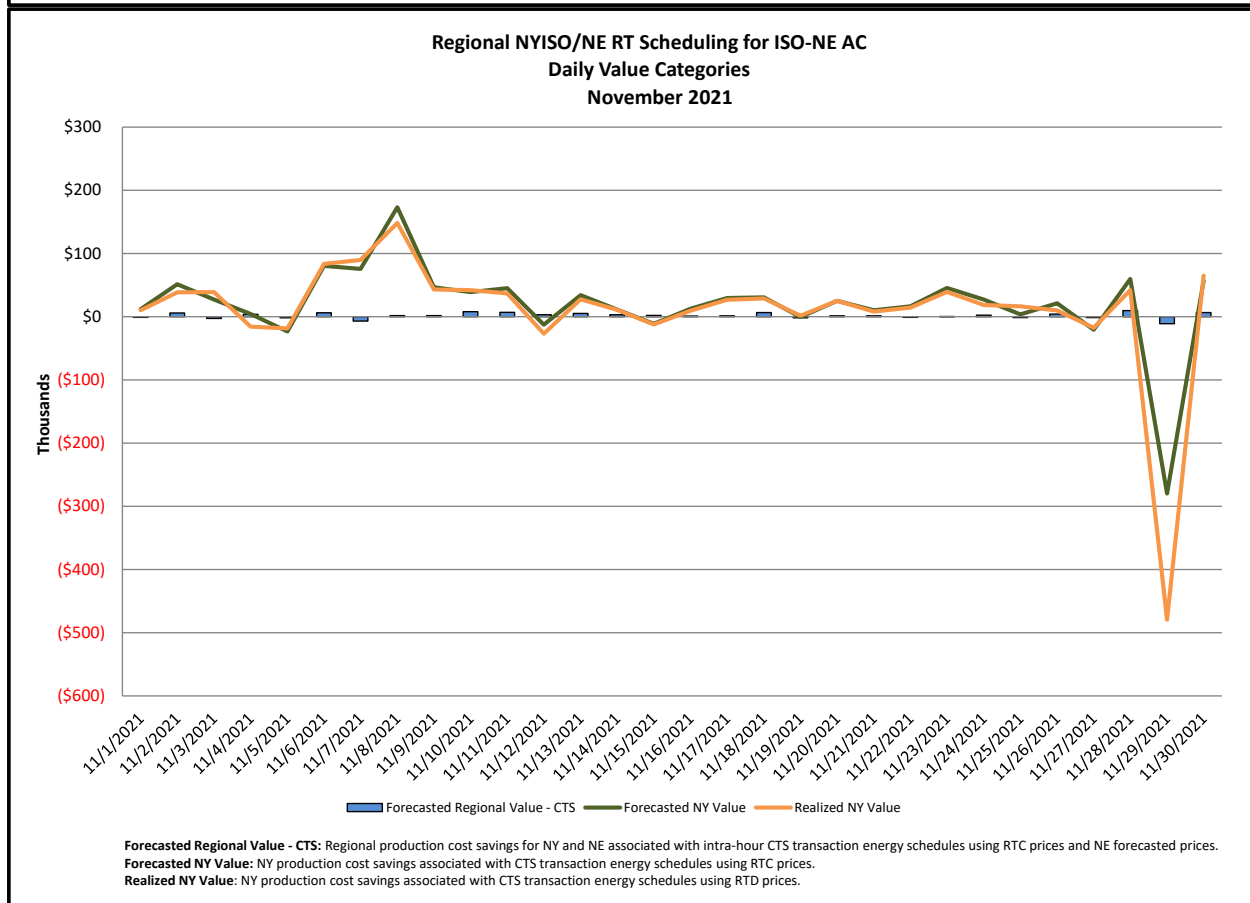
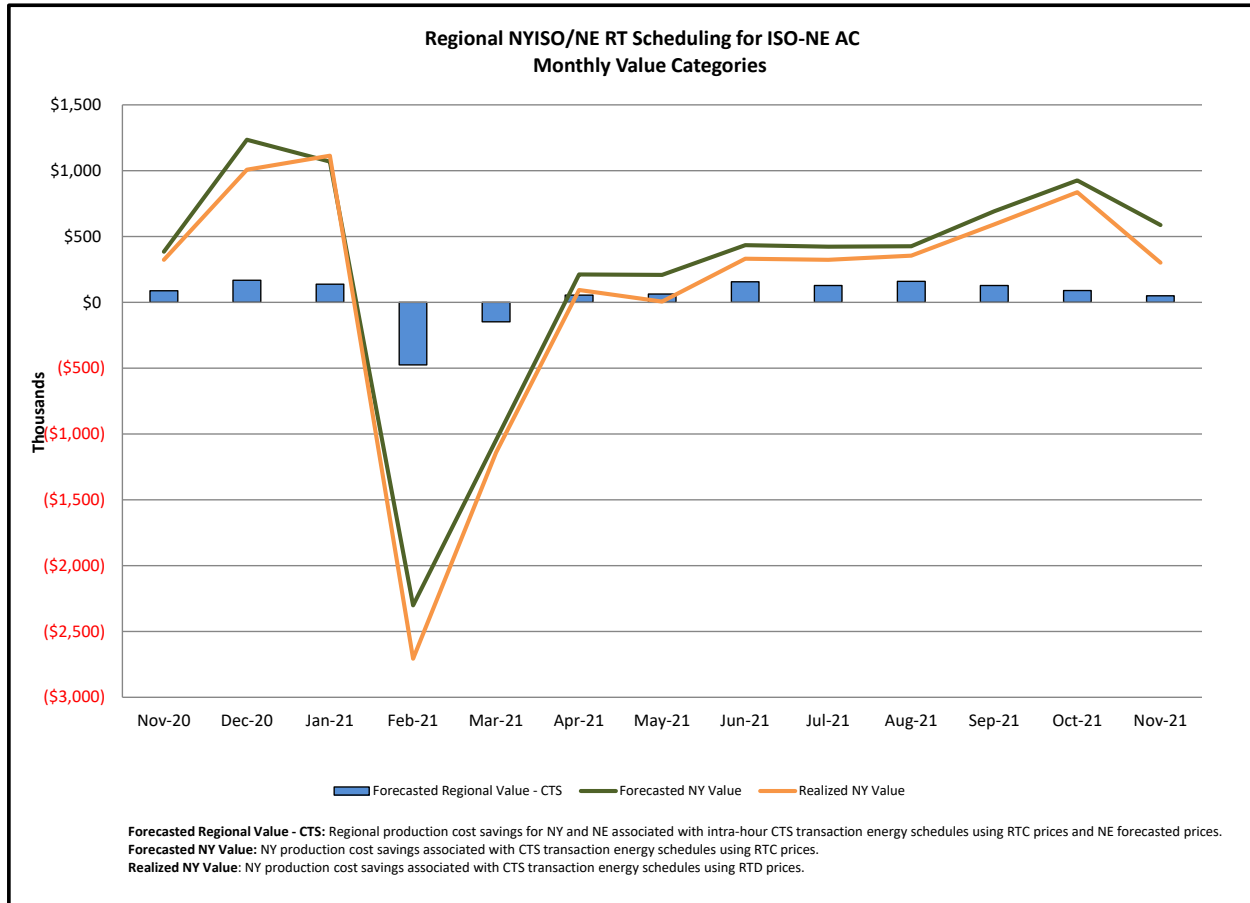
Interchange schedules with positive values aggravate clockwise Lake Erie Circulation.

Broader Regional Market Performance Metrics

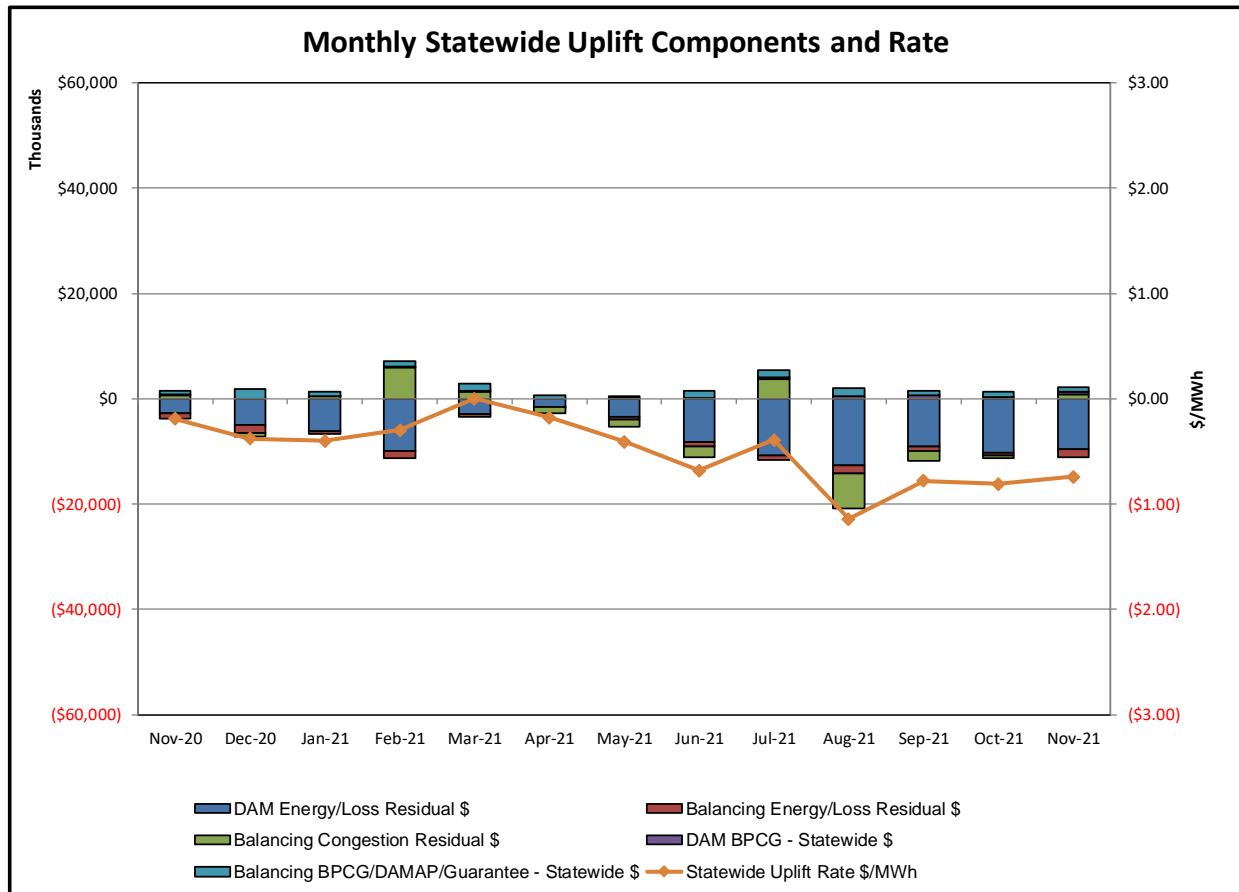


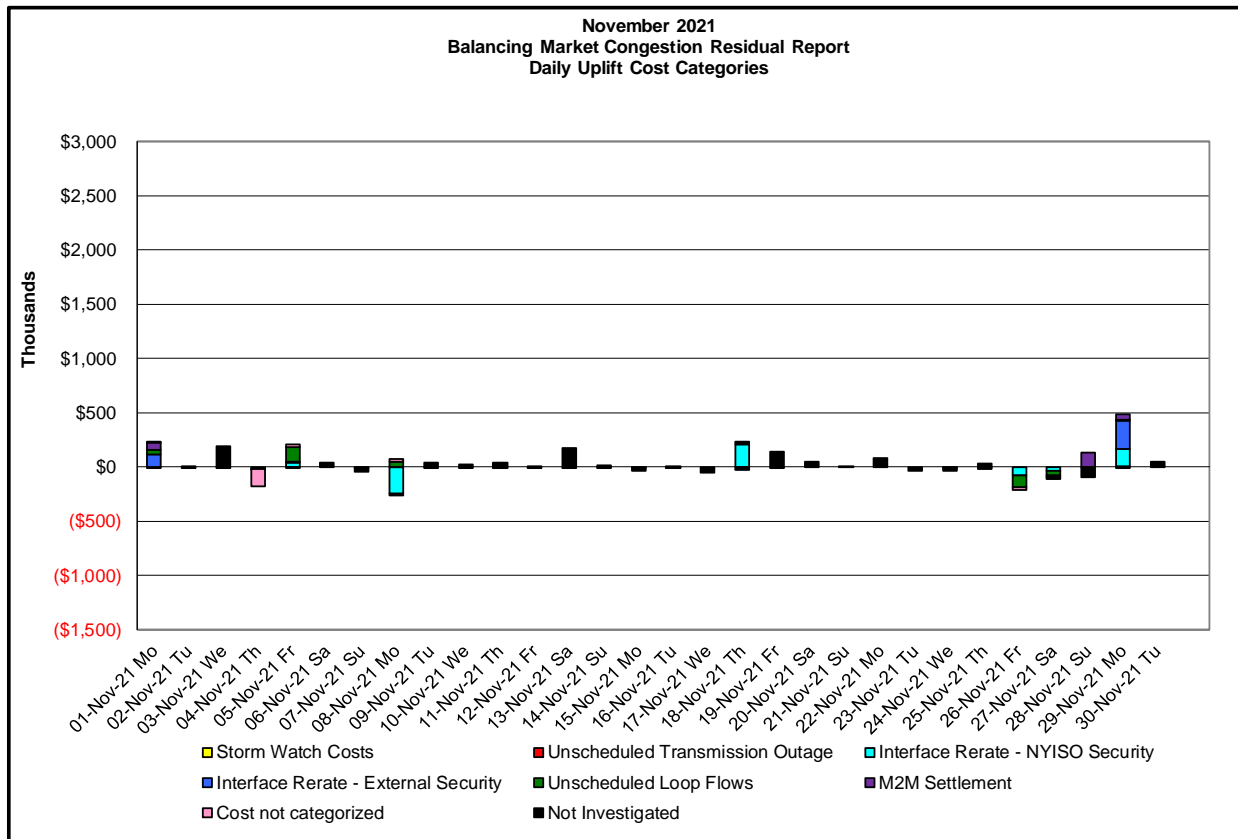
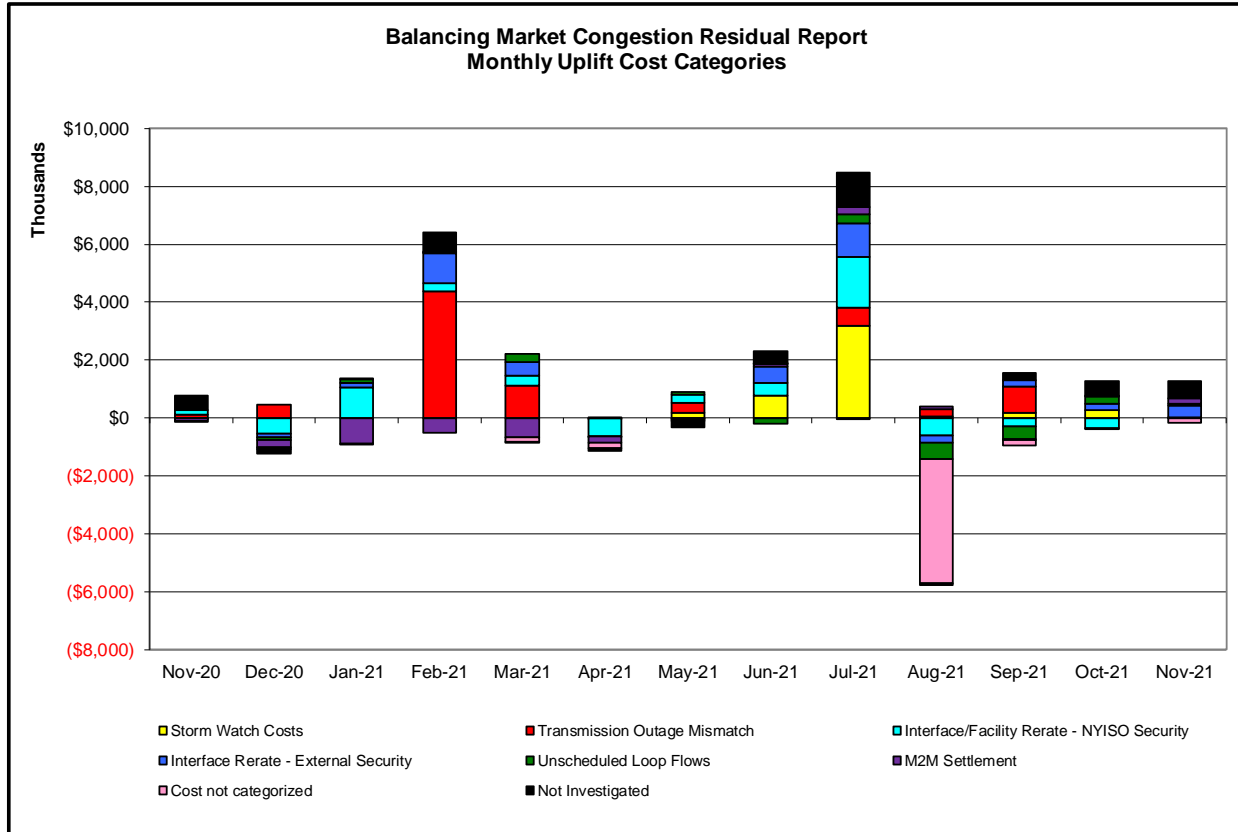
<u>PAR Interconnection Congestion Coordination</u>	
<u>Category</u>	<u>Description</u>
NY	Represents the value NY realizes from Market-to-Market PAR Coordination when experiencing congestion. This is the estimated savings to NY for additional deliveries into NY
RECO	Represents the value of PJM's obligation 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.





Market Performance Metrics





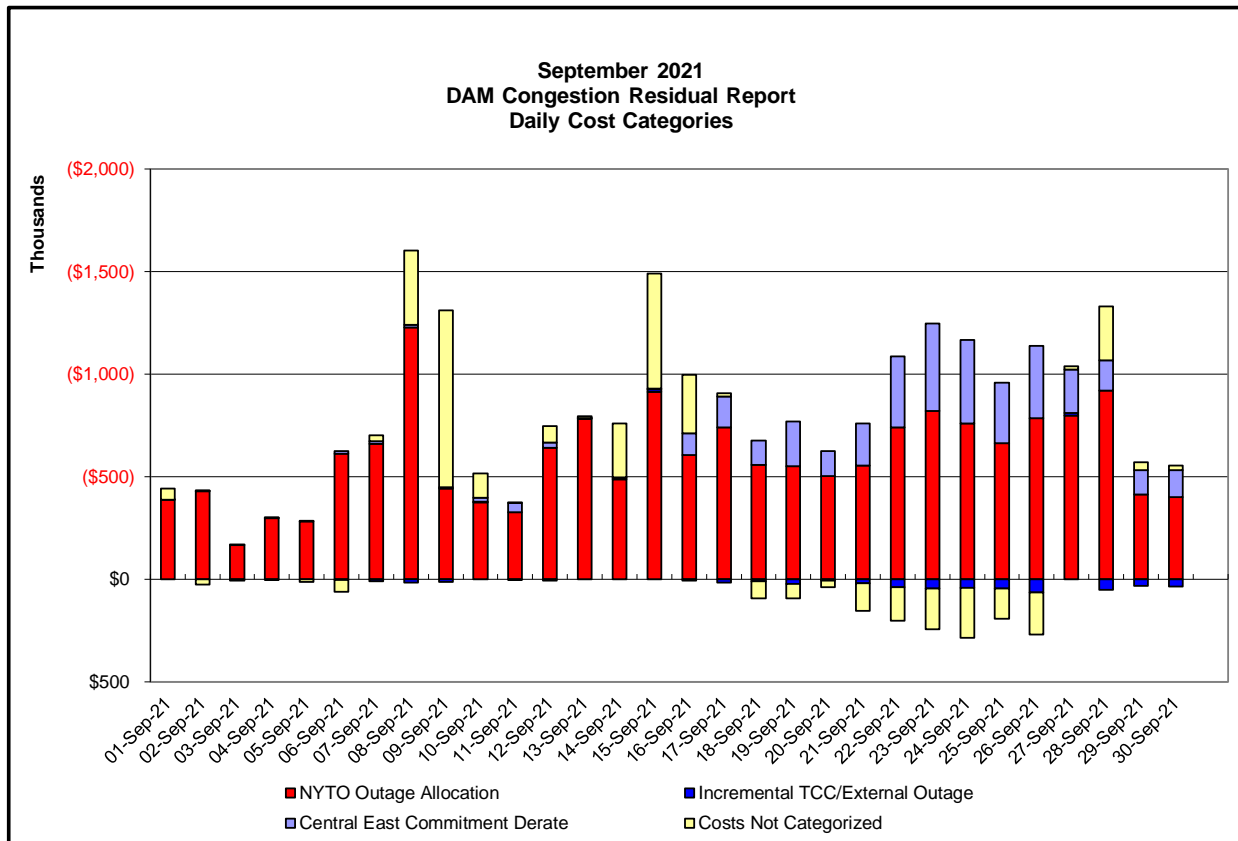
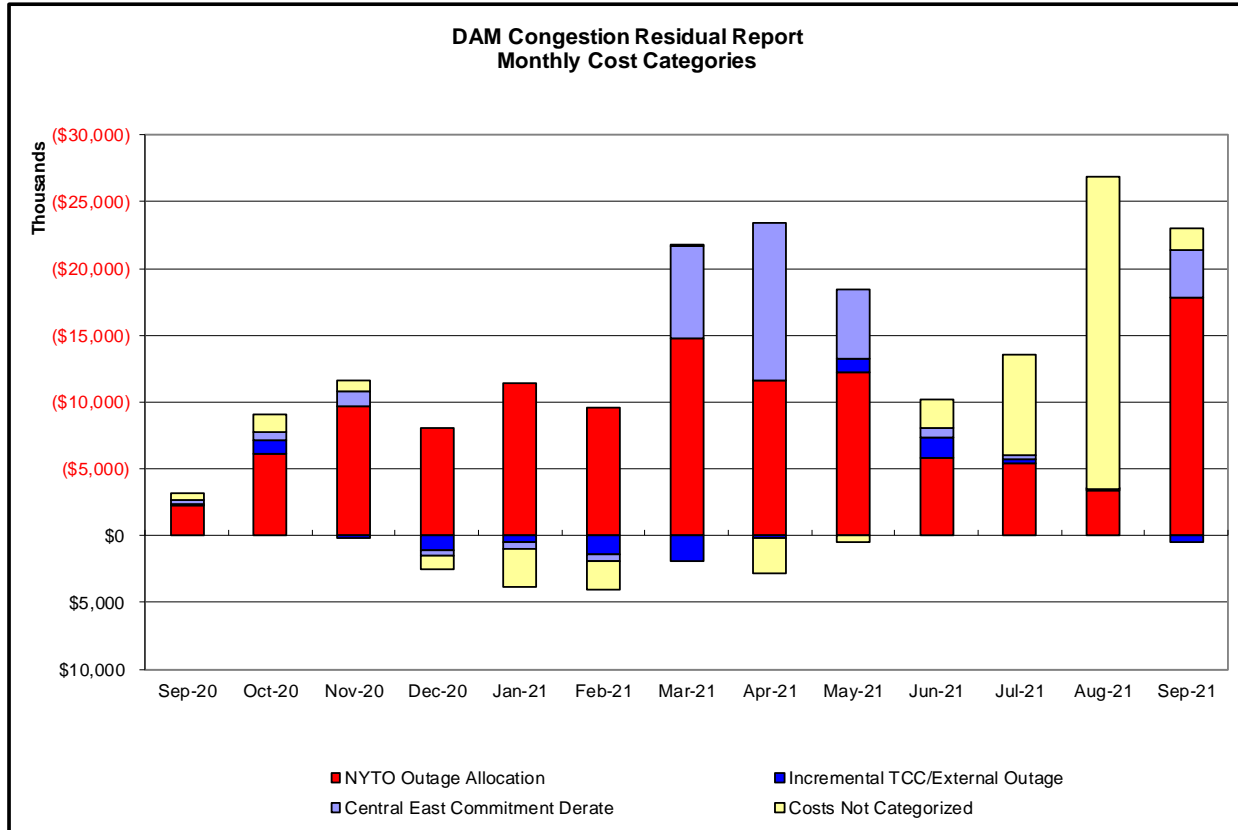
Day's investigated in November: 1,4,5,8,18,19,26,27,29			
Event	Date (yyyymmdd)	Hours	Description
	11/1/2021	20	Derate Adirondack - Moses 230kV (#MA1) for SIN:MSU1&7040& HQ GN&LD PROXY
	11/1/2021	11	Uprate Central East
	11/1/2021	12-14, 16, 18	PJM_AC-NY Scheduling Limit
	11/1/2021	6-8, 16, 18	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/1/2021	7, 8, 16, 18	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/4/2021	22	Uprate Central East
	11/4/2021	9	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/4/2021	9	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/5/2021	22, 23	Uprate Central East
	11/5/2021	7, 8	Derate Porter-Rotterdam 230kV (#31) for BUS:N.SCTLD #99&18&1&94&BK1&C2
	11/5/2021	7	NE_NNC-NY Scheduling Limit
	11/5/2021	7	NE_AC Active DNI Ramp Limit
	11/5/2021	12, 14-16, 21	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/5/2021	12-16, 21	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/8/2021	8, 17-19	NYCA DNI Ramp Limit
	11/8/2021	1, 5, 8, 17-23	Uprate Central East
	11/8/2021	16	Derate Elwood-Pulaski 69kV (#670) I/o TWR:HOLTSVILLE 881& 882& 880
	11/8/2021	20	NE_AC Active DNI Ramp Limit
	11/8/2021	23	IESO_AC DNI Ramp Limit
	11/8/2021	12, 13	NE_NNC1385-NY Scheduling Limit
	11/8/2021	15, 16	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/8/2021	14-16	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/18/2021	2, 10-12	Derate Adirondack - Porter 230kV (#12) for I/o CHASLAKE-PORTER 230 11
	11/18/2021	0, 6, 7, 15-19	Uprate Central East
	11/18/2021	2, 3, 10-14	Derate Gardenville - Stolle Road 230kV (#66)
	11/18/2021	14	PJM_AC Active DNI Ramp Limit
	11/18/2021	16, 19	NE_AC Active DNI Ramp Limit
	11/18/2021	0, 6, 7, 13, 17-19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/18/2021	0, 6, 7, 13, 17-19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/19/2021	10-12	Extended outage East Garden City - Valley Stream 138kV (#261)
	11/19/2021	10-12	Derate Adirondack - Porter 230kV (#12) for I/o CHASLAKE-PORTER 230 11
	11/19/2021	10-12	Derate Dunwoodie - Shore Road 345kV (Y50) for SCB:SPBK(RNS2):Y49&M29&Y49_ST
	11/19/2021	18	Derate Elwood-Pulaski 69kV (#670) I/o TWR:HOLTSVILLE 881& 882& 880
	11/19/2021	7-12	Derate Gardenville - Stolle Road 230kV (#66)
	11/19/2021	7-12	Derate Niagara - Packard 115kV (#194) for I/o NIAGARA -PACKARD 115 193
	11/19/2021	7	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/19/2021	7	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/26/2021	3, 7, 12-21, 23	Uprate Central East
	11/26/2021	3, 7, 9-14, 17, 21, 23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/27/2021	0, 18, 19, 21-23	Uprate Central East
	11/27/2021	9, 12, 14-16, 18, 19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/27/2021	18, 19	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	11/29/2021	19	Forced Outage ChasesLake-Porter 230kV (#11)
	11/29/2021	9	NYCA DNI Ramp Limit
	11/29/2021	2	Derate Central East
	11/29/2021	7, 9, 10	Derate Dunwoodie - Shore Road 345kV (Y50)
	11/29/2021	10, 18, 19	Derate Dunwoodie - Shore Road 345kV (Y50) for SCB:SPBK(RNS2):Y49&M29&Y49_ST
	11/29/2021	17	Uprate Buffalo-Huntley 115kV (#130) I/o SIN:Packard-WalckRd (#129)
	11/29/2021	1	Uprate Central East
	11/29/2021	10, 22	NE_AC Active DNI Ramp Limit
	11/29/2021	17, 22	NE_AC-NY Scheduling Limit
	11/29/2021	7	PJM_AC Active DNI Ramp Limit
	11/29/2021	7-9	HQ_Cedars-NY Scheduling Limit
	11/29/2021	1-3	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	11/29/2021	18	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West

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
Transmission Outage Mismatch	Market-wide	Changes in DAM to RTM transfers related to transmission outage mismatch	Forced Line Outage, Unit AVR Outages Early Line Return from Outage
Interface/Facility Rerate - NYISO Security	Market-wide	Changes in DAM to RTM transfers not related to transmission outage	Interface/Facility Rerates due to RTM voltages
Interface Rerate - External Security	Market-wide	Changes 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.
Incremental TCC/External Outage Impacts	All TO by Monthly Allocation Factor	Allocation associated with transmission equipment status change caused by change in status of external equipment or change in status of equipment associated with Incremental TCC.	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.	

