

Operations Performance Metrics Monthly Report



April 2023 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, 2023.

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April 2023 Operations Performance Highlights

Monthly Peak Load	Monthly Minimum Load	Winter 2022-2023 Peak	All-time Winter Peak
04/14/2023 HB 17 18,915 MW	04/09/2023 HB 14 11,742 MW	02/03/2023 HB 18 23,369 MW	01/07/2014 HB 18 25,738 MW

- 24.7 hours of Thunderstorm Alerts were declared
- 17.3 hours of NERC TLR level 3 curtailment
- NYISO began securing Reynolds Rd-Alps 345kV (#1), East Stolle Rd-Stolle Rd 345kV (#28) and Linden-Goethals 230kV (#A2253) facilities in the Real-Time Market on 04/19/2023 and in the Day-Ahead Market execution occurring on 04/20/2023 for the 04/21/2023 market day.
- The Princetown 345kV and Knickerbocker 345kV substations associated with AC Transmission Public Policy Segment A were placed in-service on 04/20/2023 and 04/28/2023 respectively.

Installed Wind, Solar and Energy Storage Resource Nameplate Values:

Land-Based Wind	Behind-the-Meter Solar	Front-of-the-Meter Solar	Energy Storage Resource (ESR)
2,528 MW	4,528 MW	154 MW	20 MW

Estimated production cost savings associated with the Broader Regional Market initiatives:

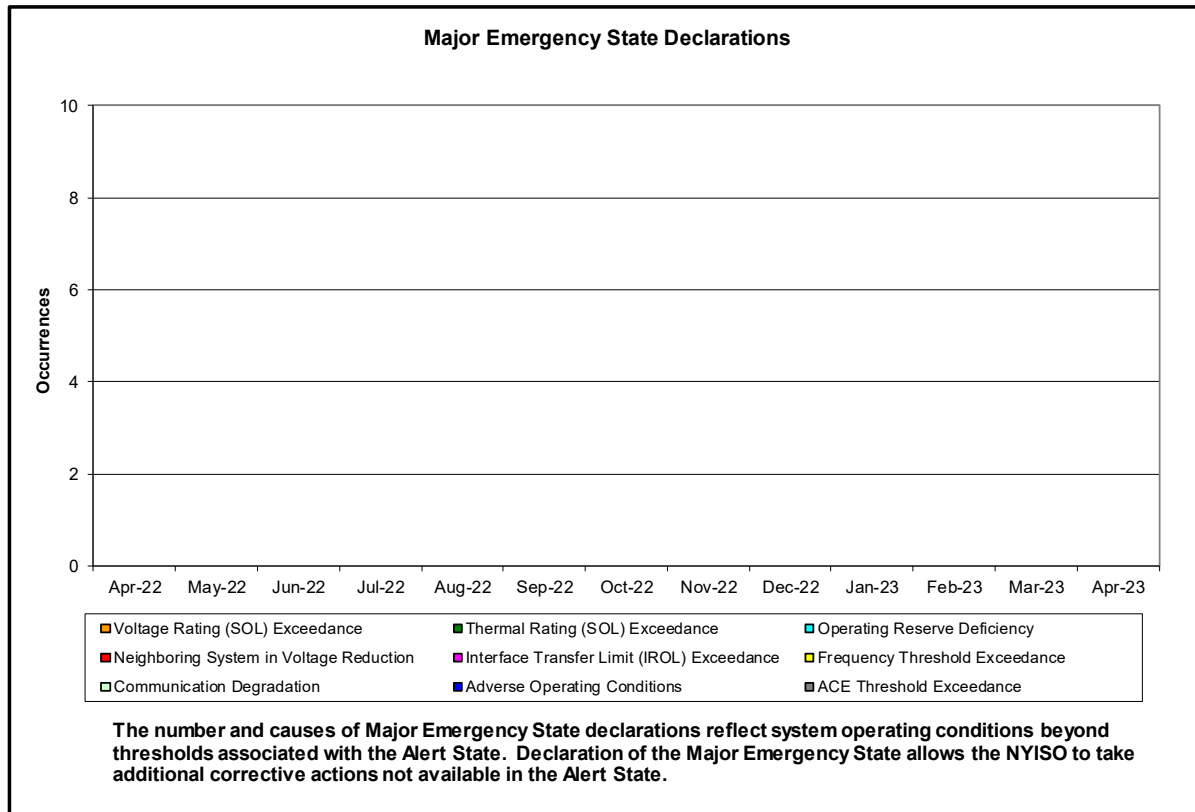
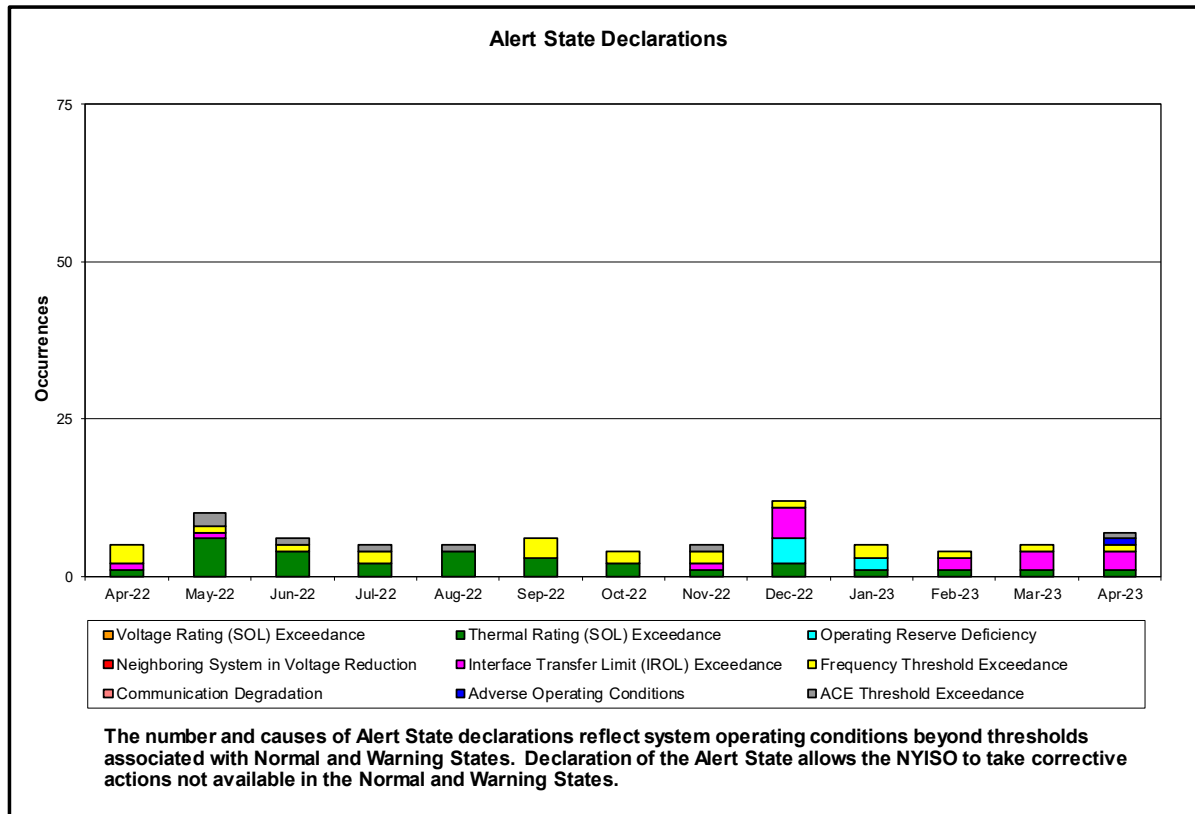
	Current Month Value (\$M)	Year-to-Date Value (\$M)
NY Savings from PJM-NY Congestion Coordination	\$3.89	\$12.77
NY Savings from PJM-NY Coordinated Transaction Scheduling	(\$0.06)	(\$0.46)
NY Savings from NE-NY Coordinated Transaction Scheduling	\$0.32	(\$0.82)
Total NY Savings	\$4.15	\$11.49
Regional Savings from PJM-NY Coordinated Transaction Scheduling	\$0.28	\$1.08
Regional Savings from NE-NY Coordinated Transaction Scheduling	\$0.10	\$0.38
Total Regional Savings	\$0.38	\$1.46

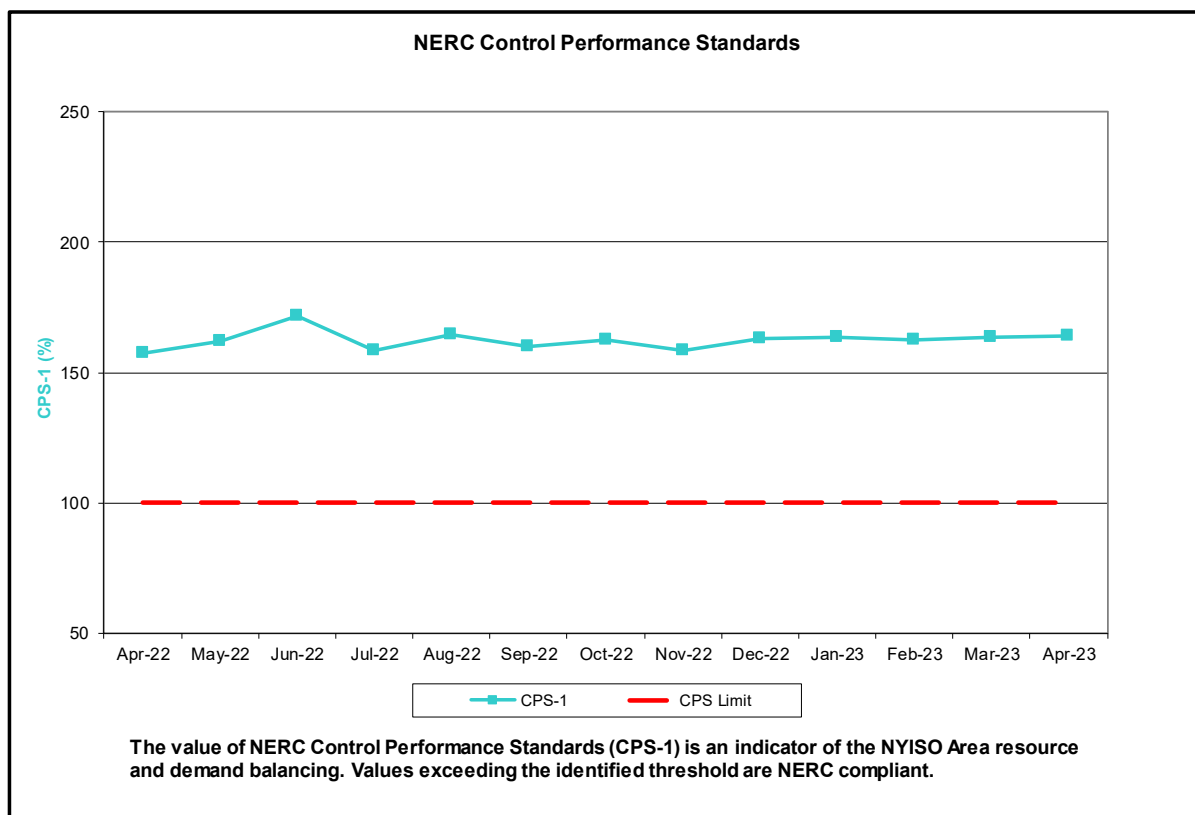
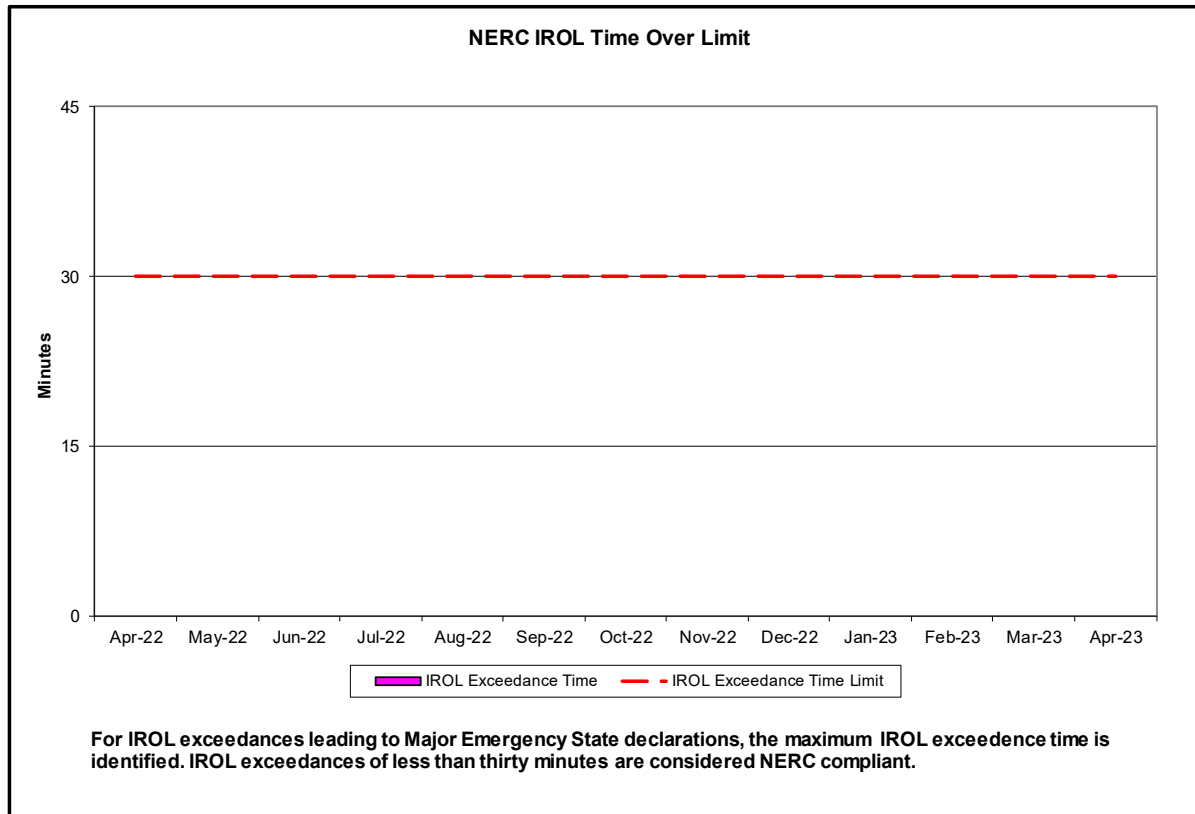
- Statewide uplift cost monthly average was (\$0.38)/MWh.
- The following table identifies the Monthly ICAP spot market prices and the price delta.

Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
May 2023 Spot Price	\$5.70	\$5.70	\$18.58	\$5.70
October 2022 Spot Price	\$2.92	\$3.18	\$3.27	\$6.48
Delta	\$2.78	\$2.52	\$15.31	(\$0.78)

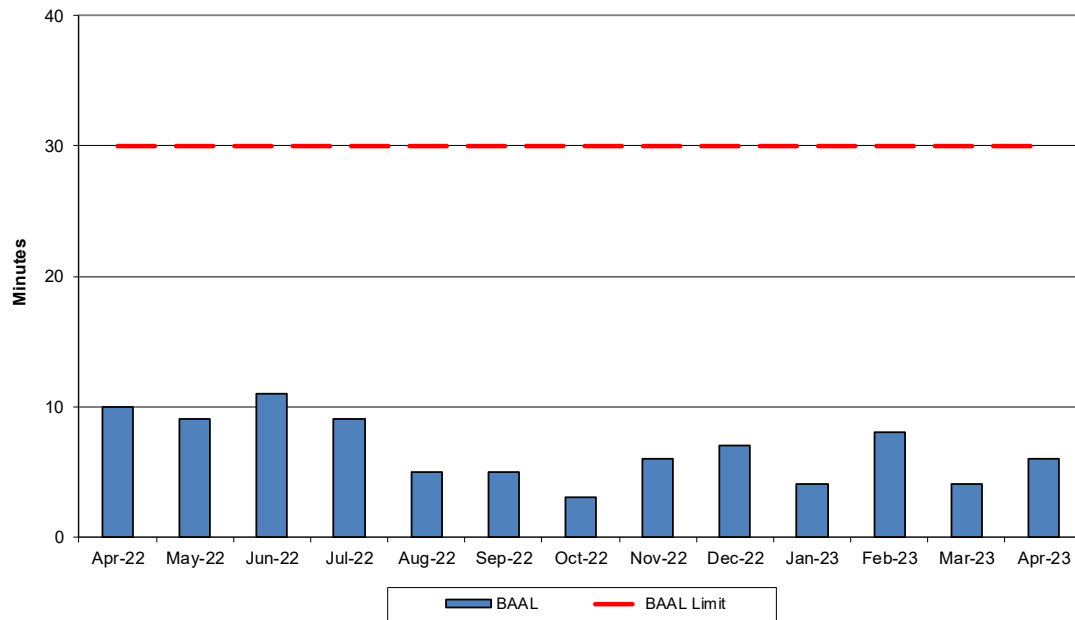
- The price in LI decreased due an increase in generation UCAP. The price in NYC and G-J increased due to a decrease in generation UCAP. The price in NYCA increased due to a decrease in imports and generation UCAP.

Reliability Performance Metrics



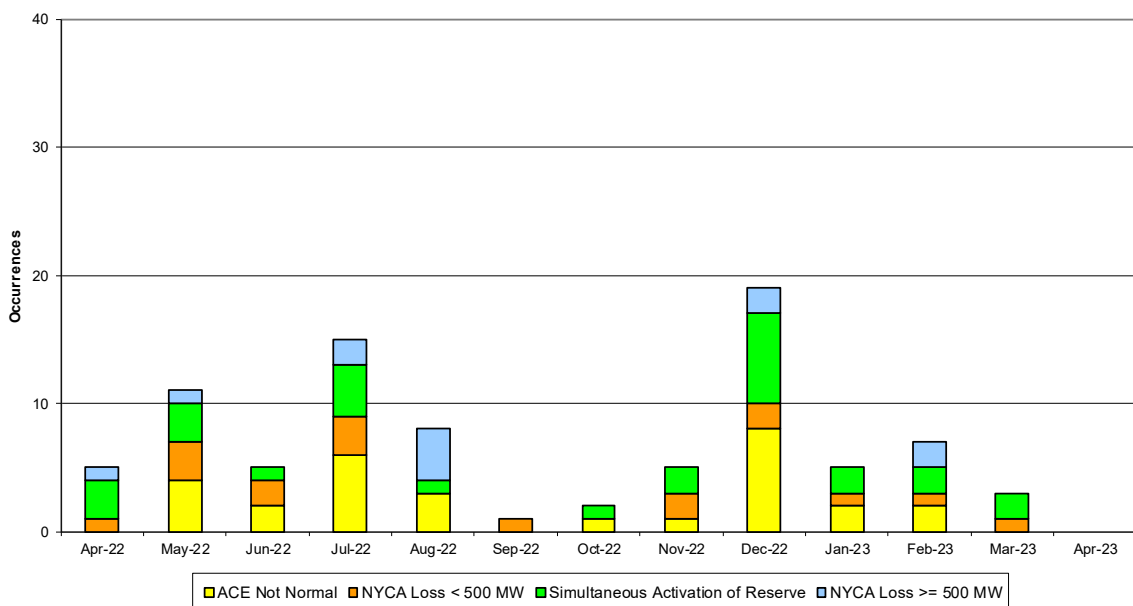


NERC Balancing Authority ACE Limit Standard



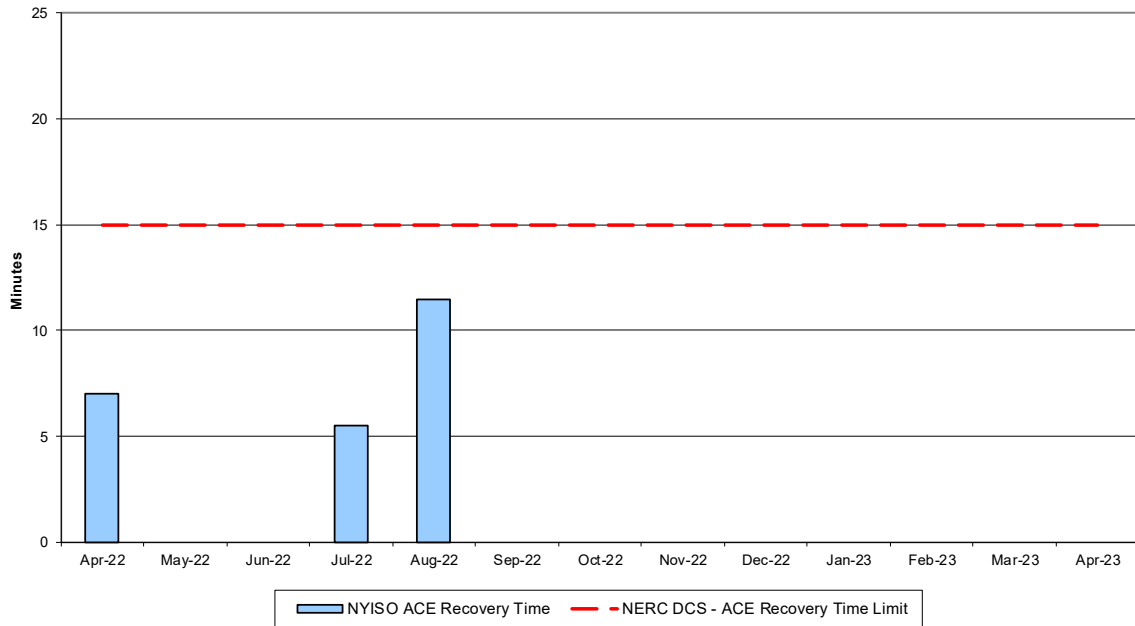
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



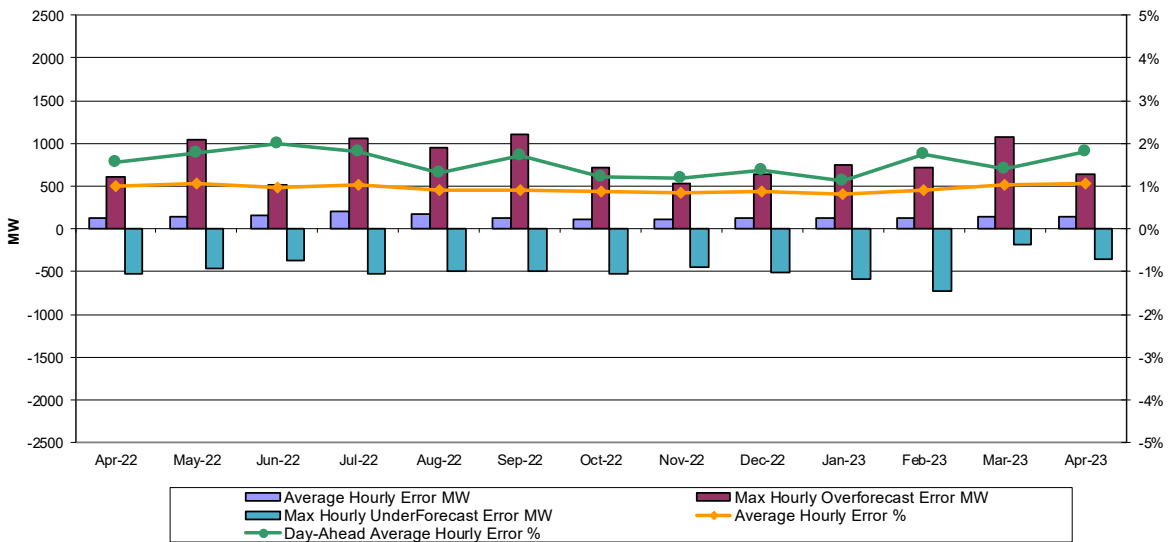
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

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

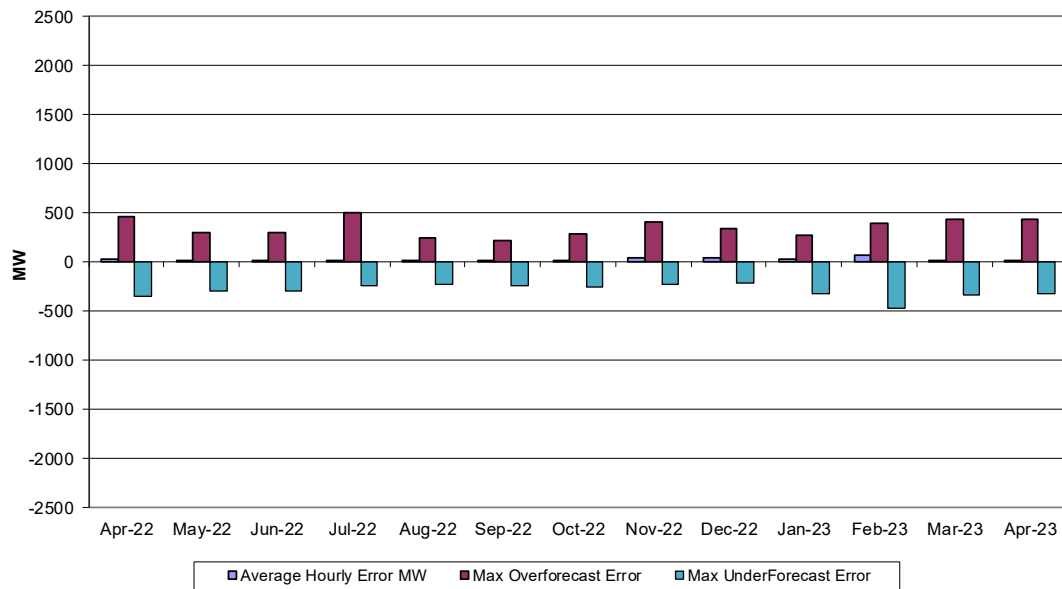


Hourly Error MW - Value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.

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

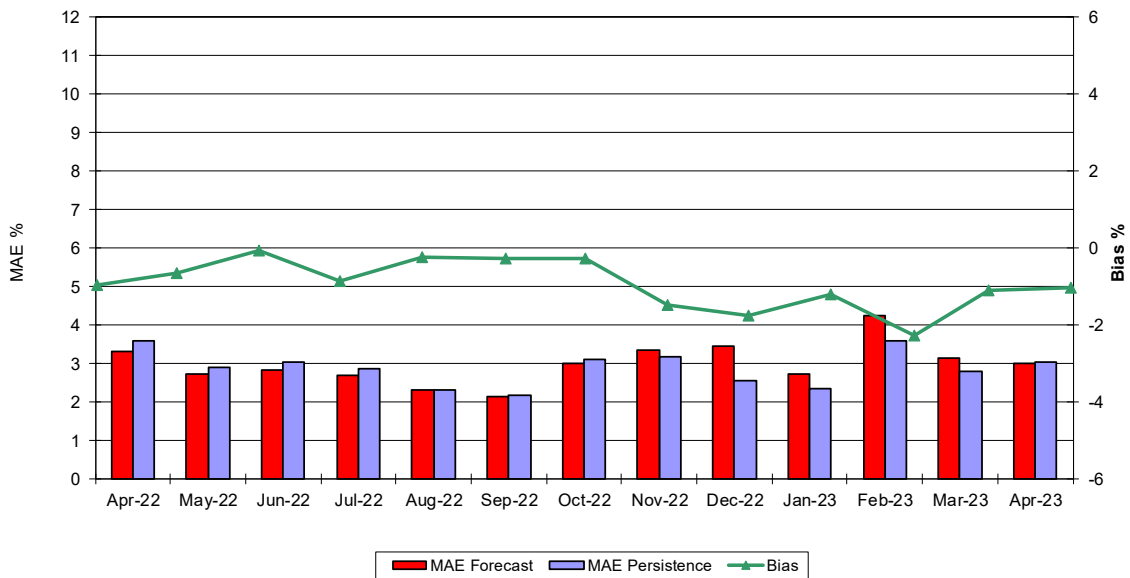
Day-Ahead Average Hourly Error % - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.

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.

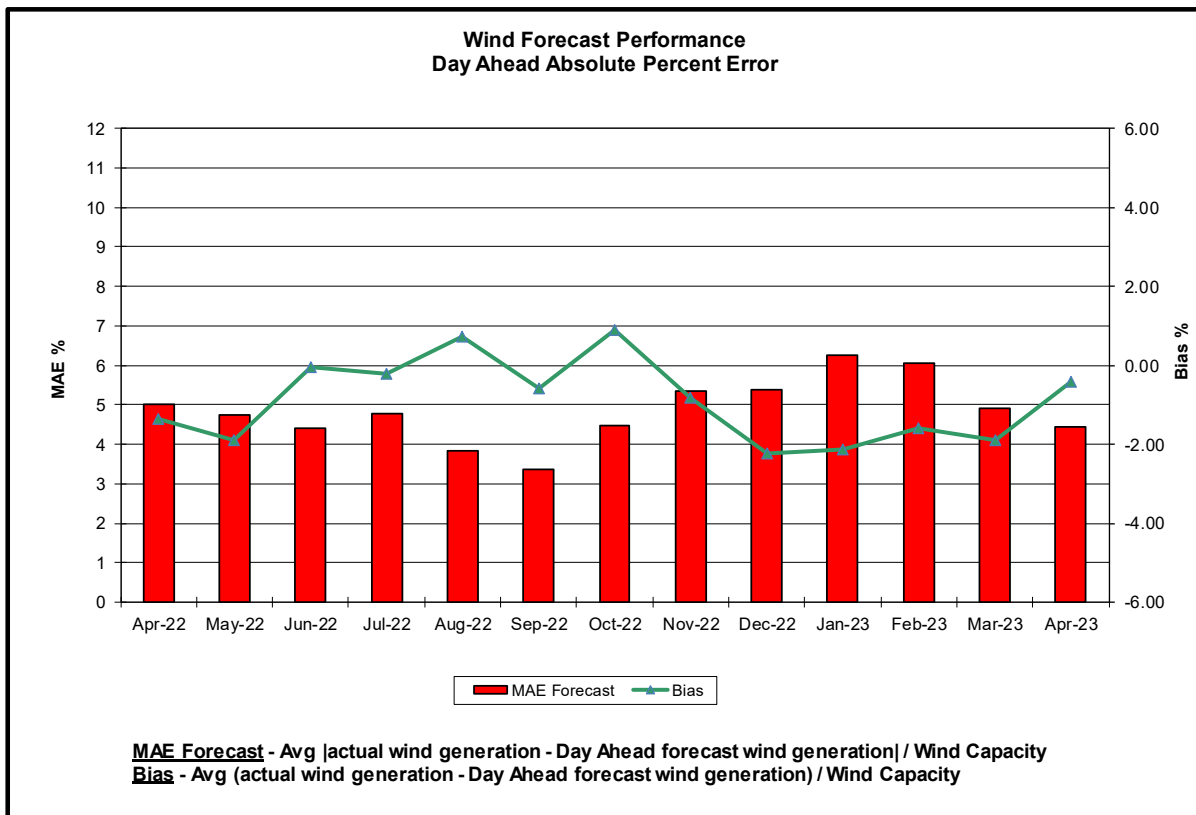
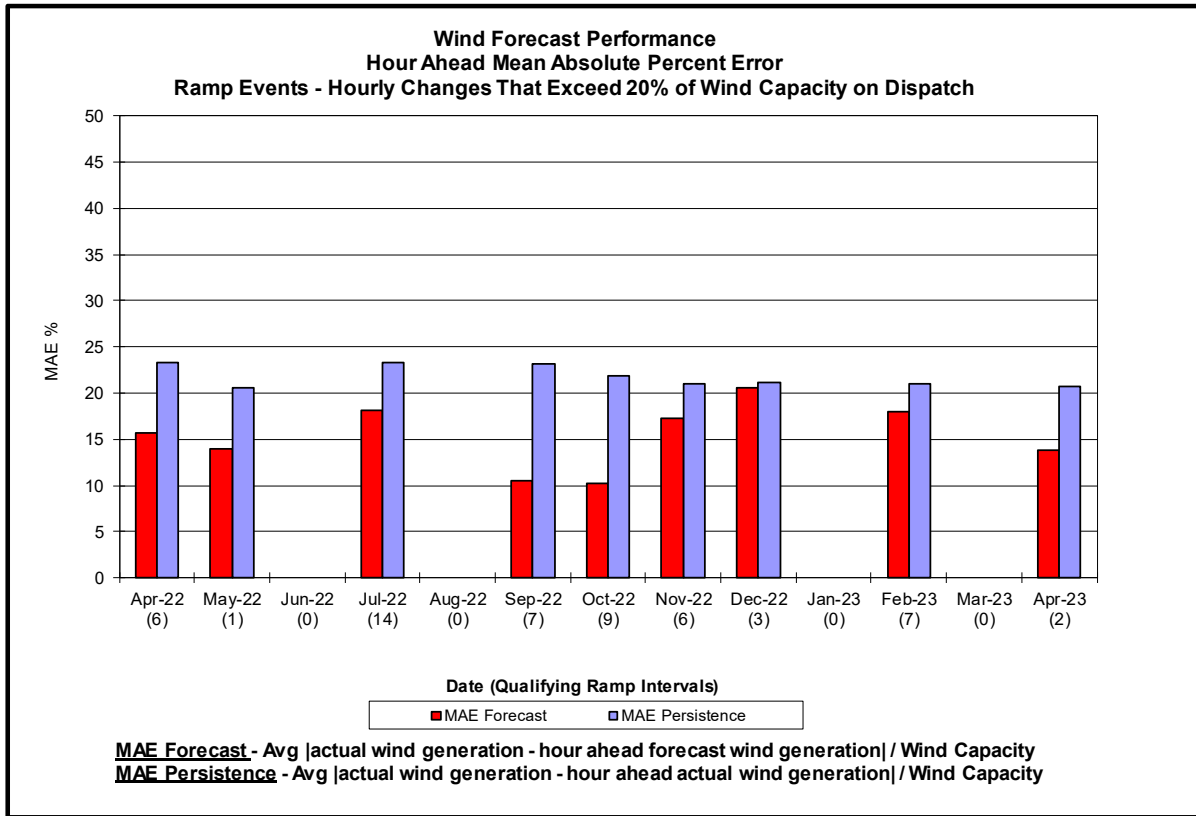
Wind Forecast Performance Hour Ahead Percent Error

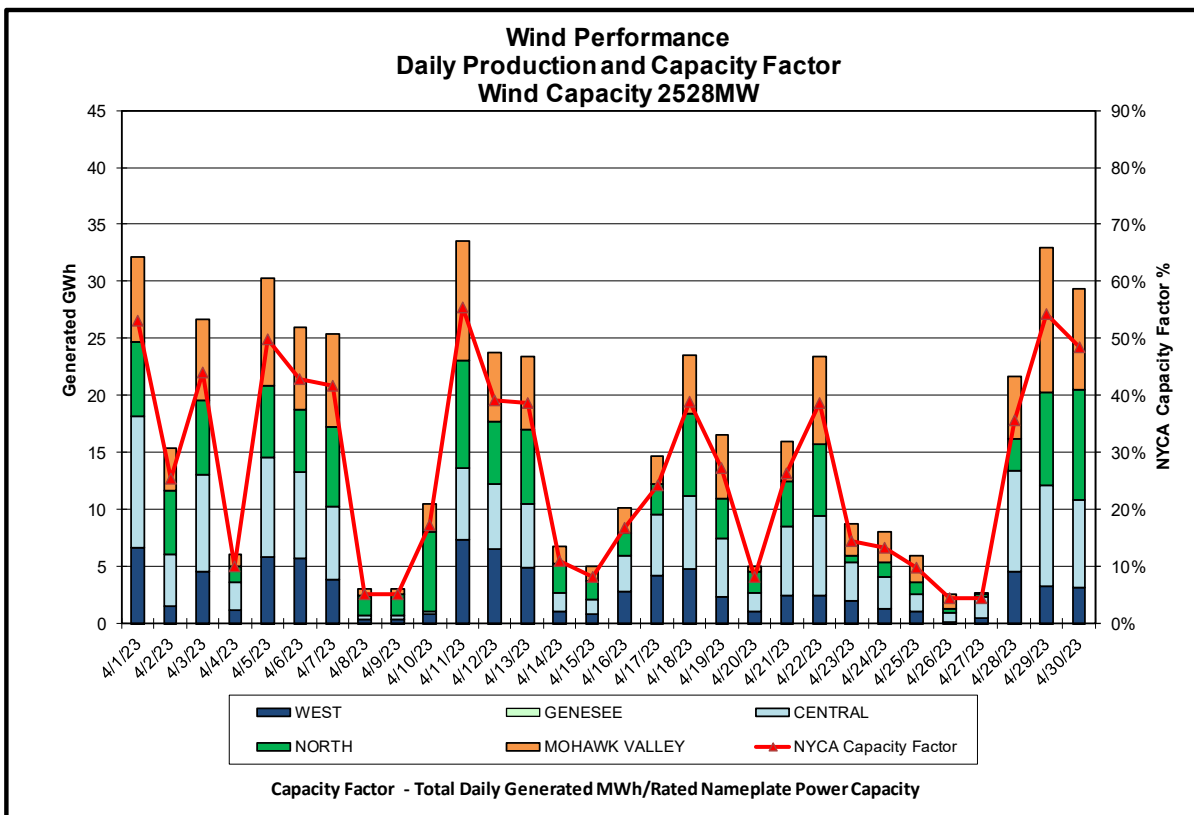
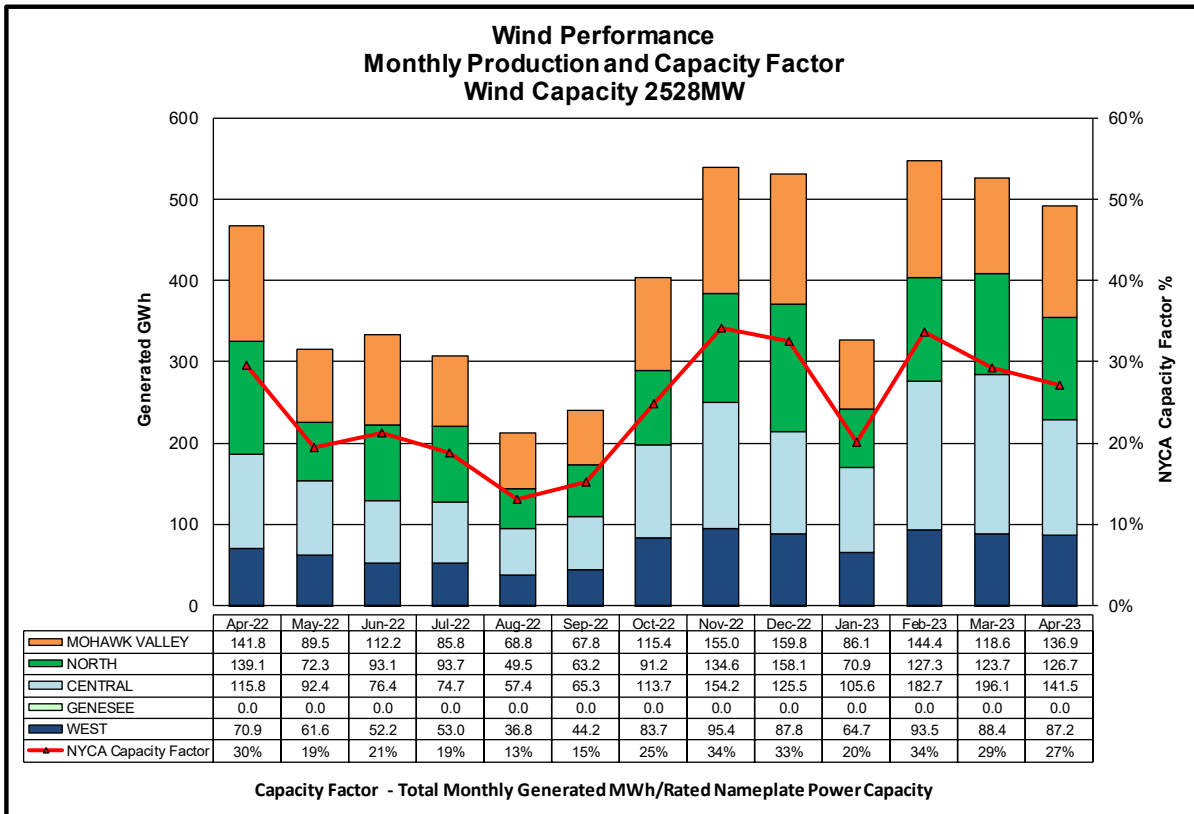


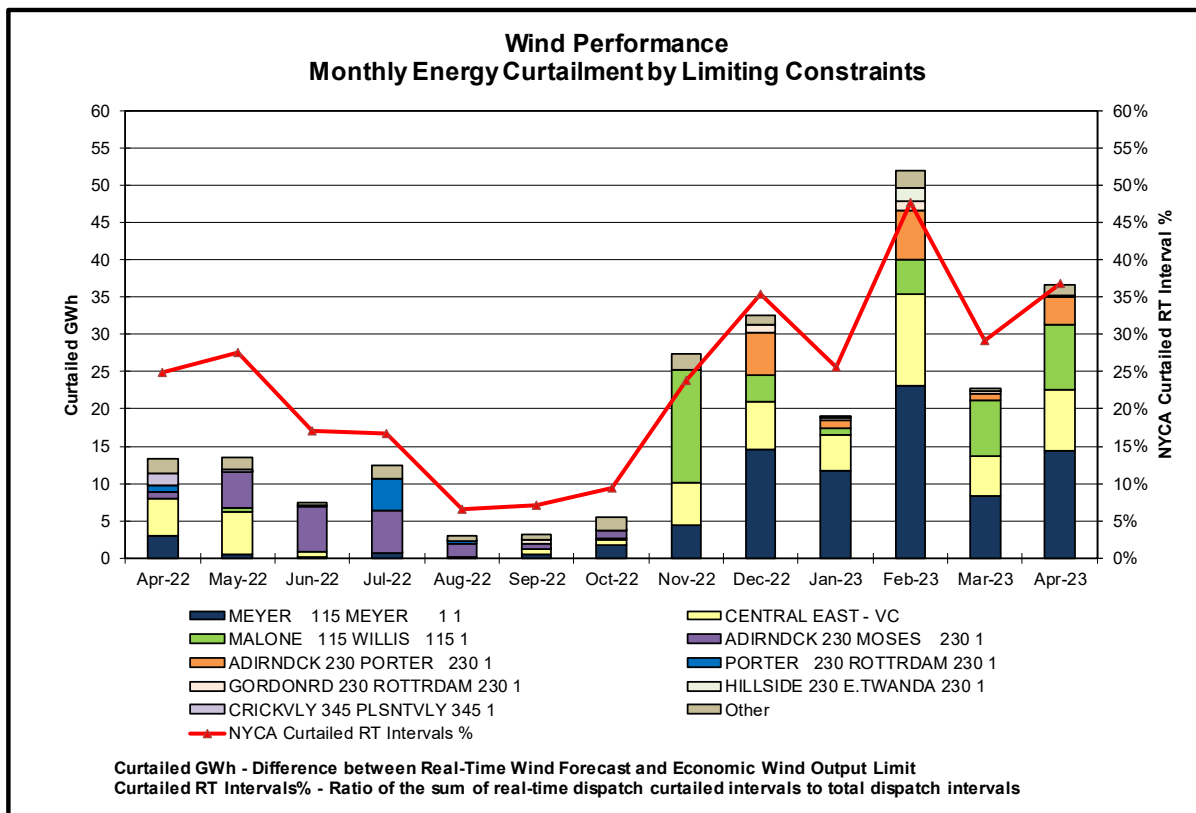
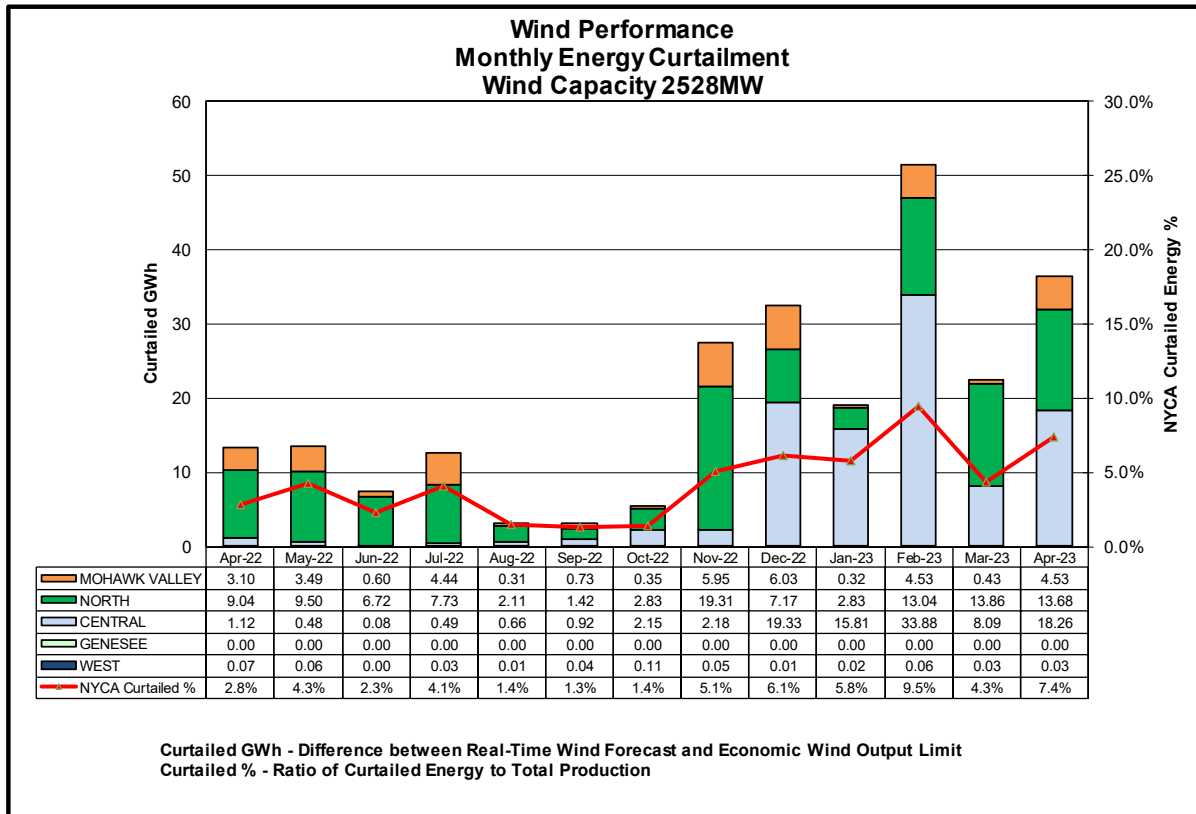
MAE Forecast - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity

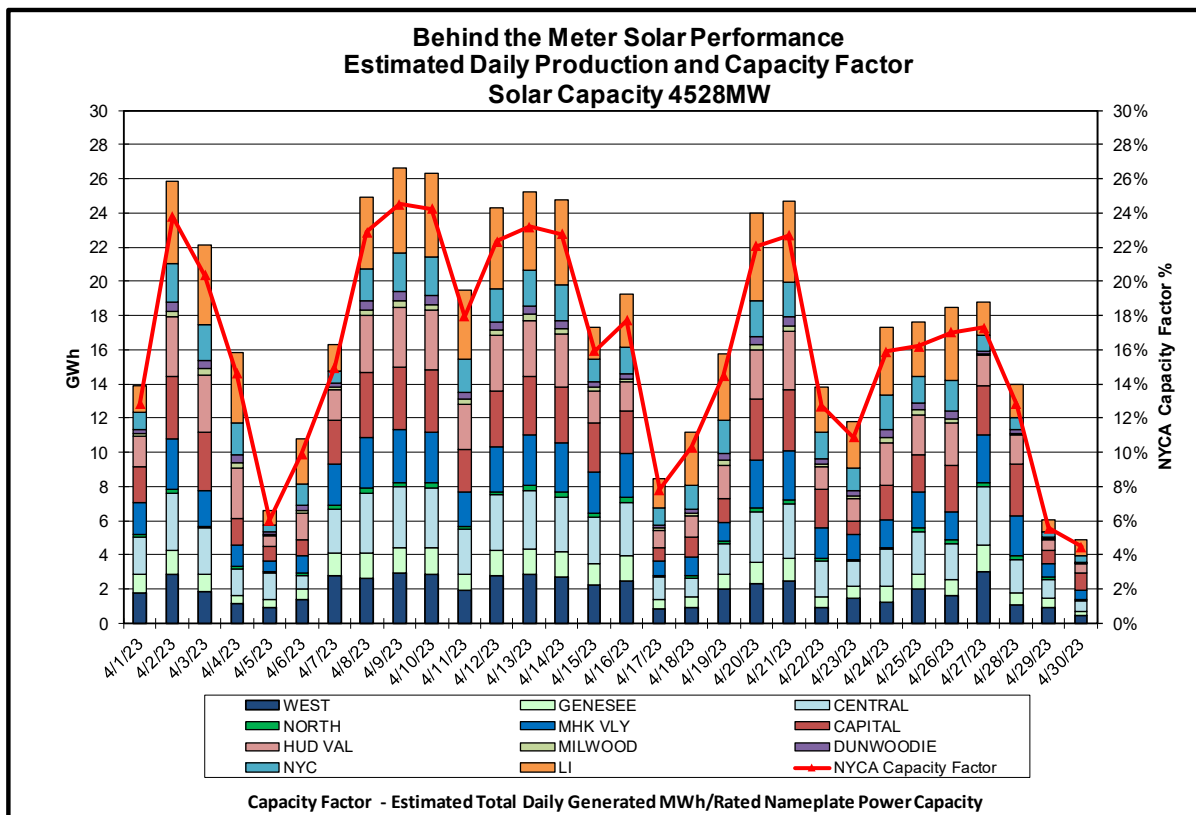
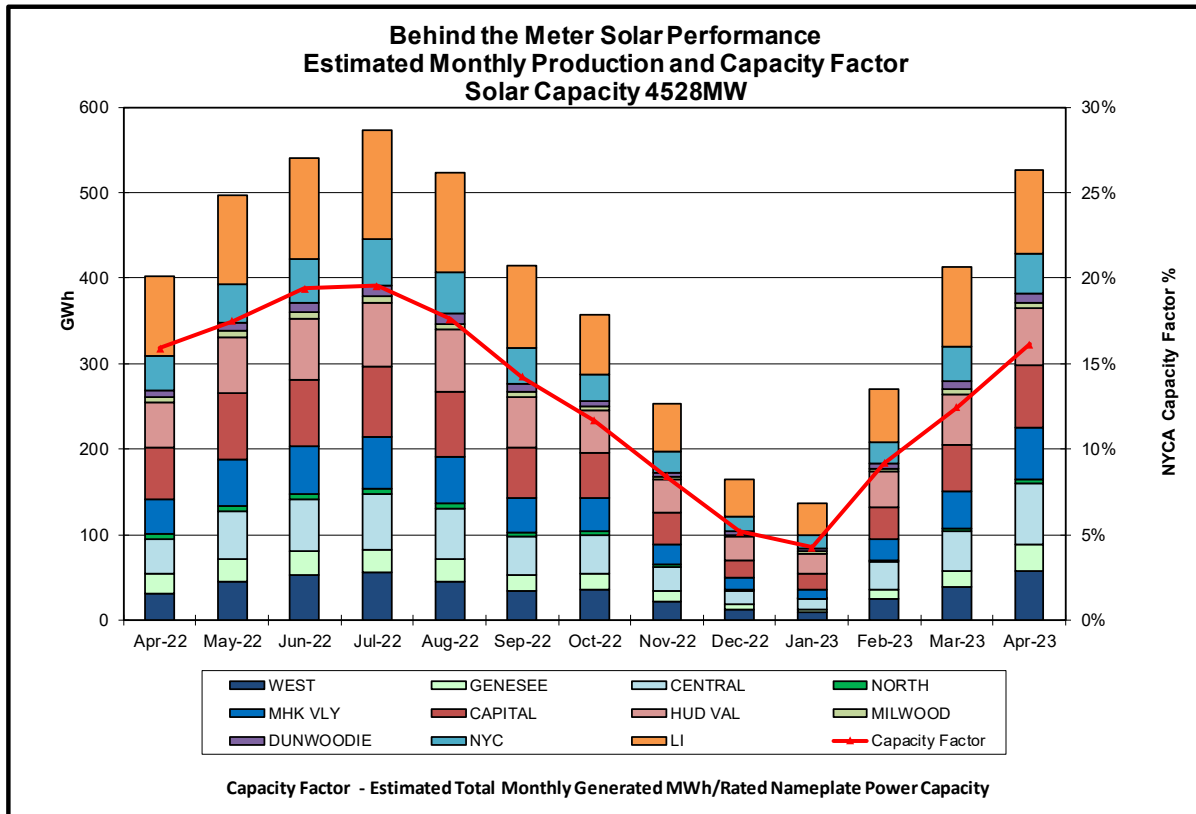
MAE Persistence - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity

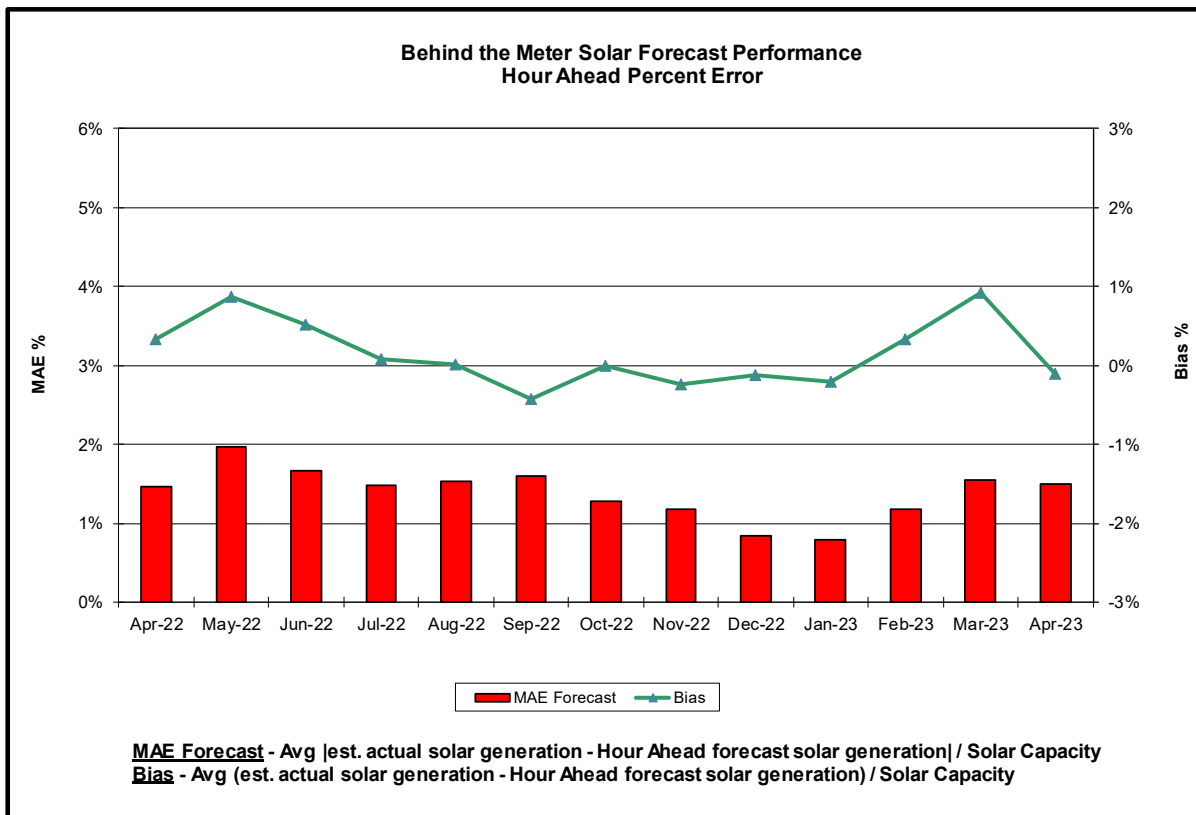
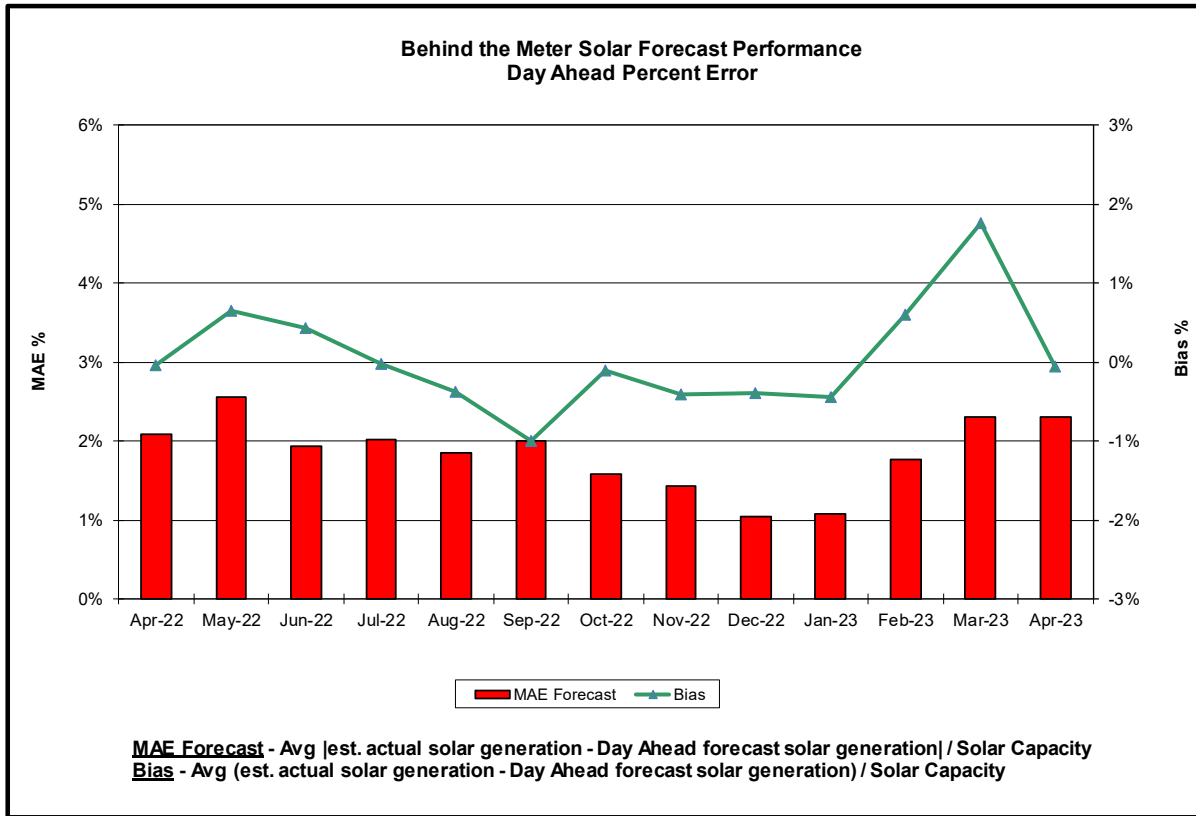
Bias - Avg (actual wind generation - hour ahead forecast wind generation) / Wind Capacity



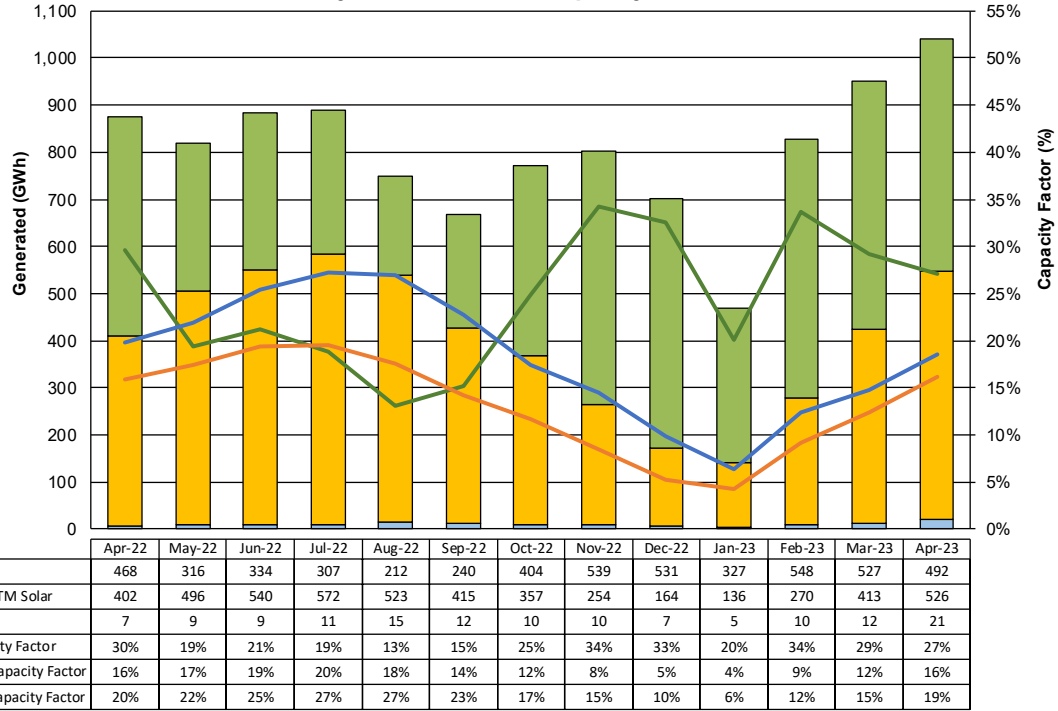






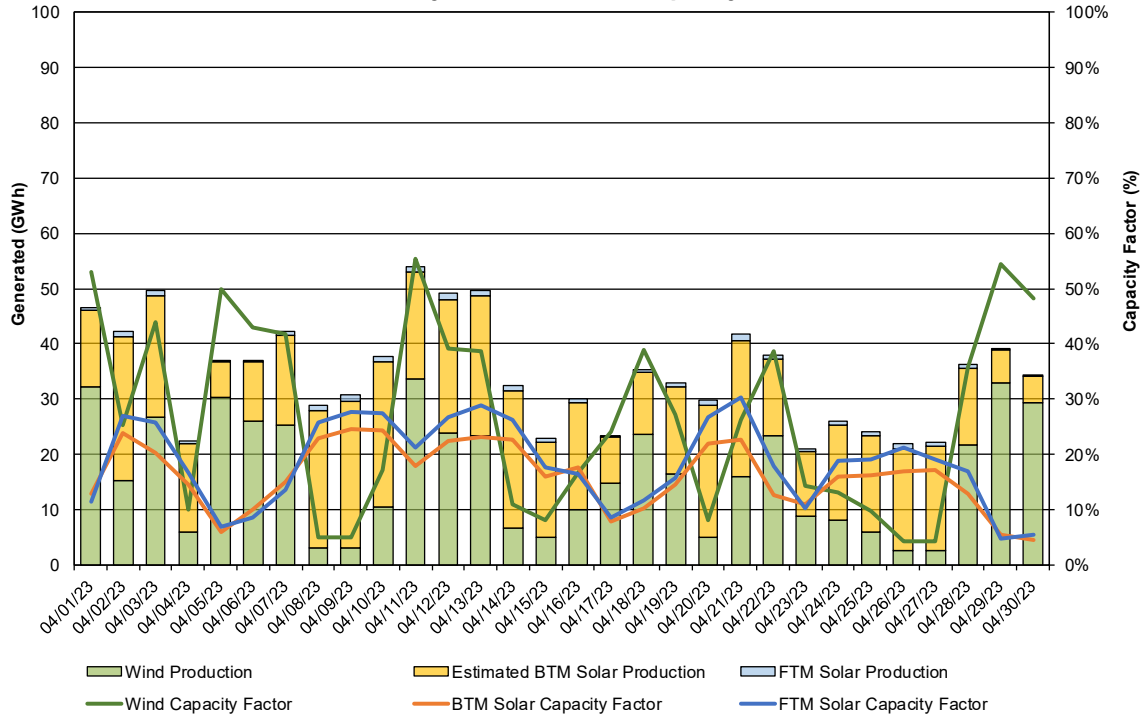


Net Wind and Solar Performance Total Monthly Production and Capacity Factors

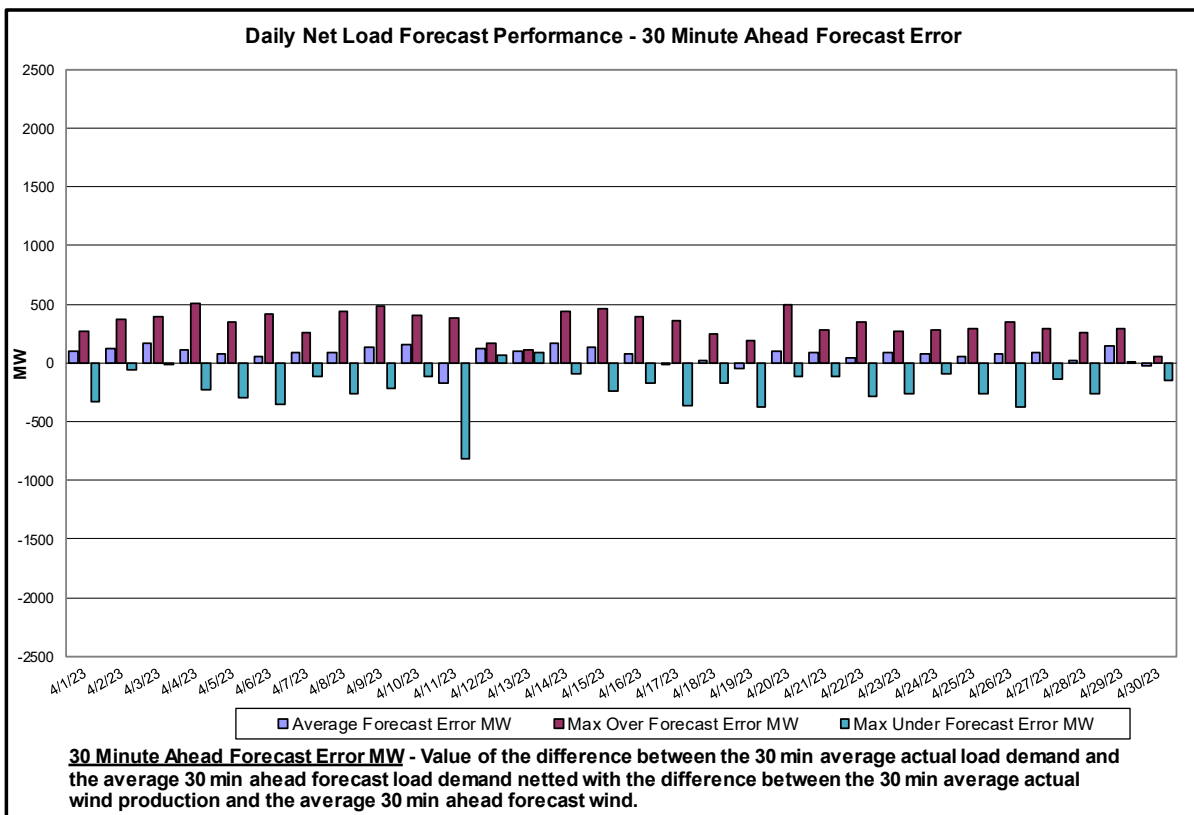
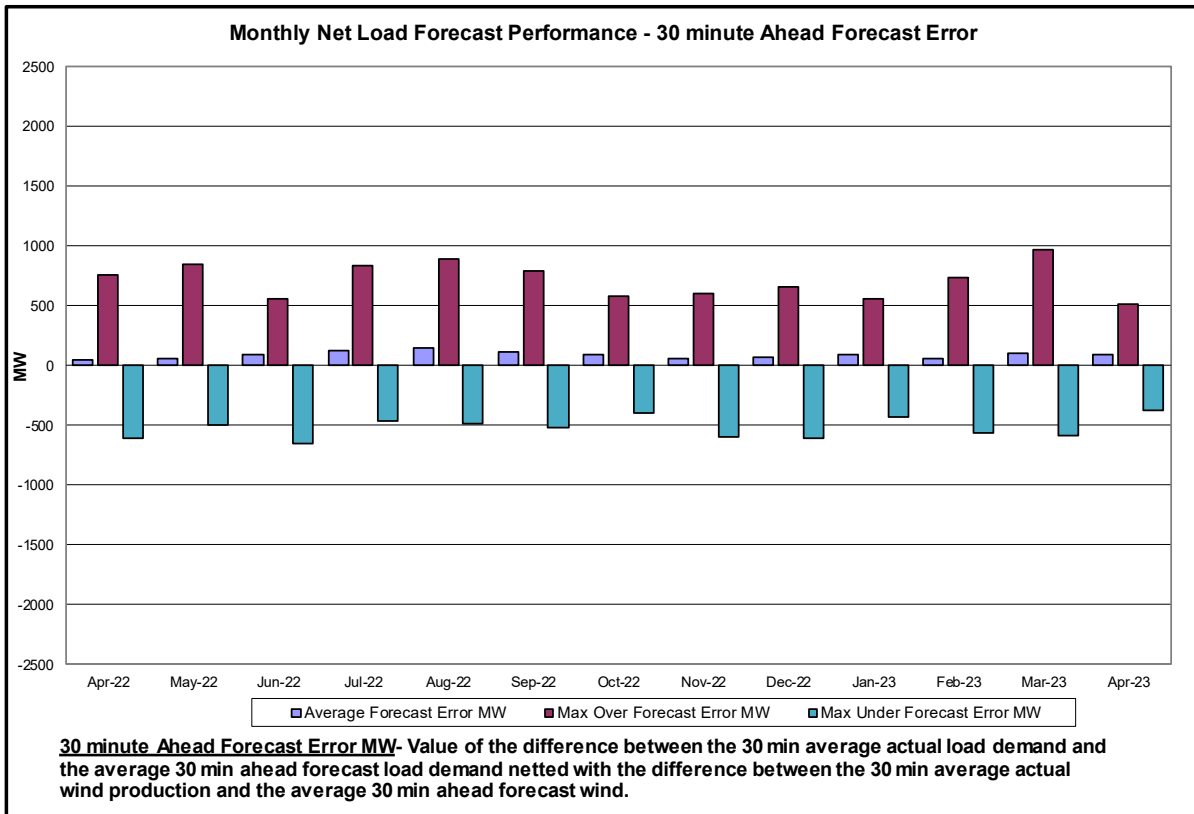


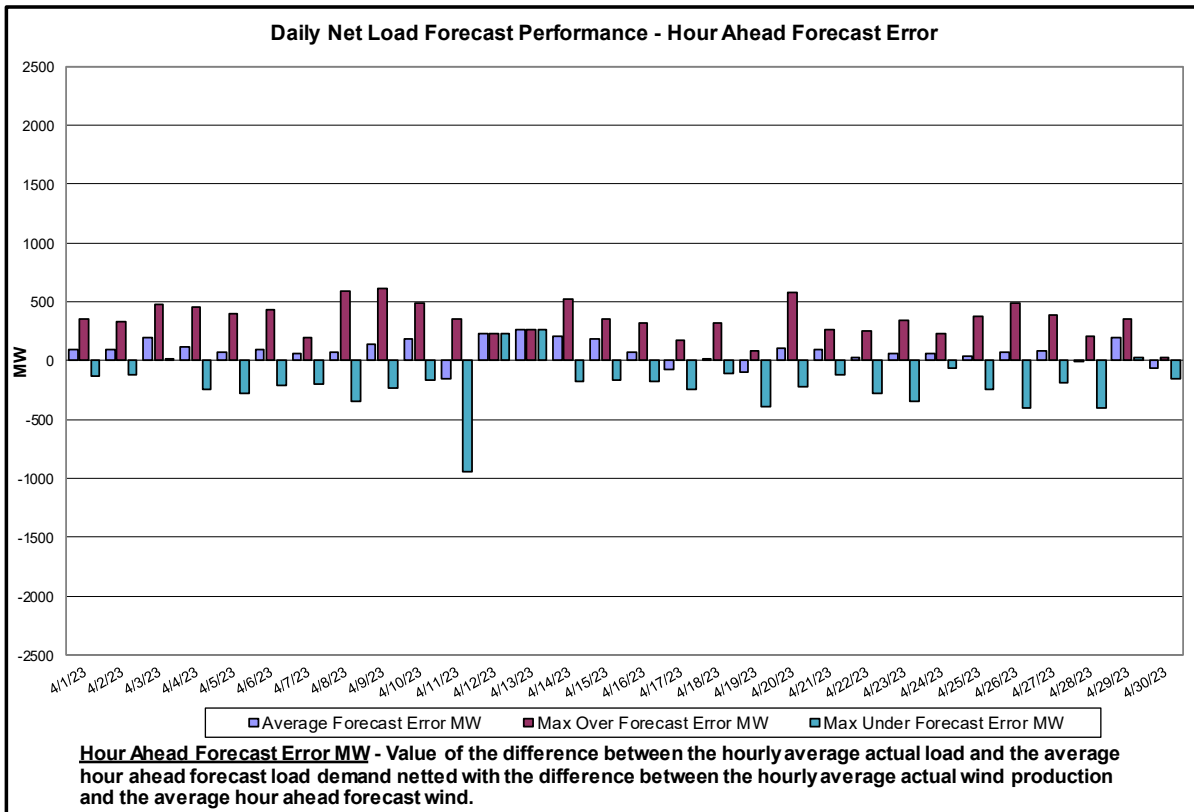
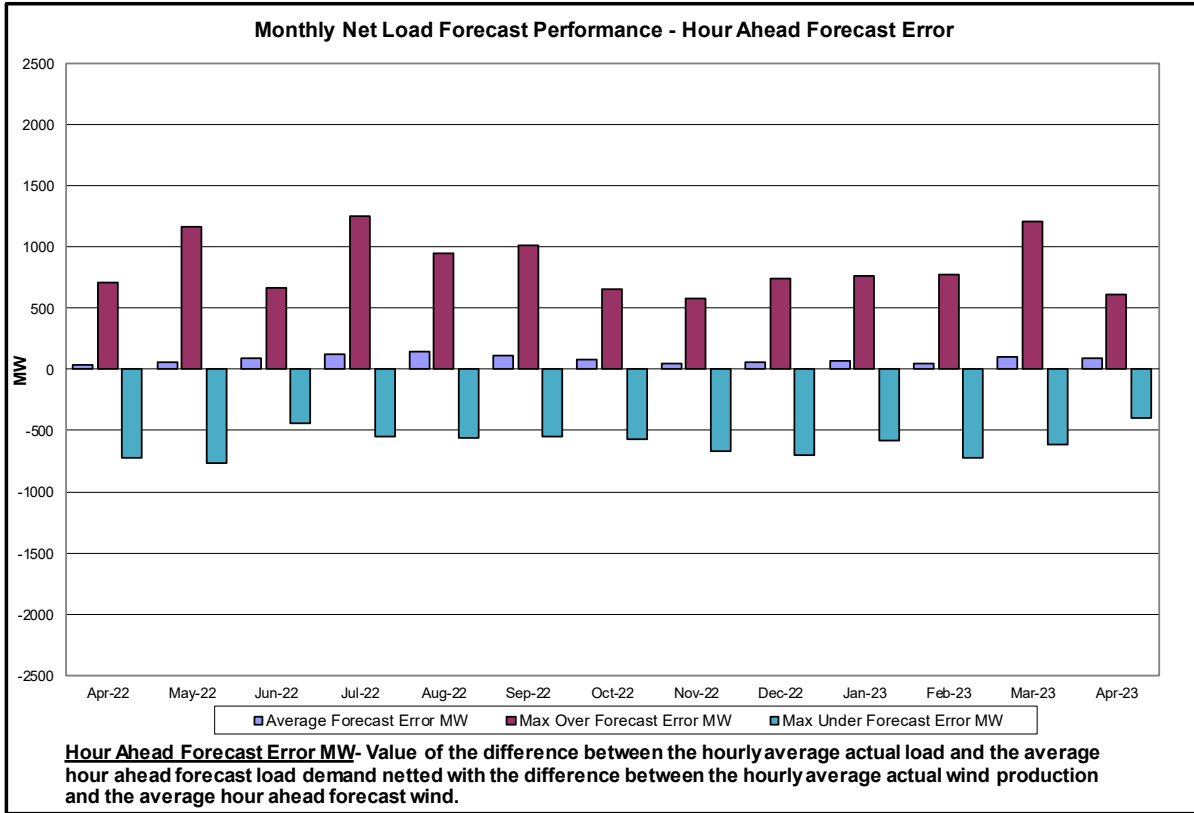
Capacity Factor - Total Monthly Generated MWh/Rated Nameplate Power Capacity

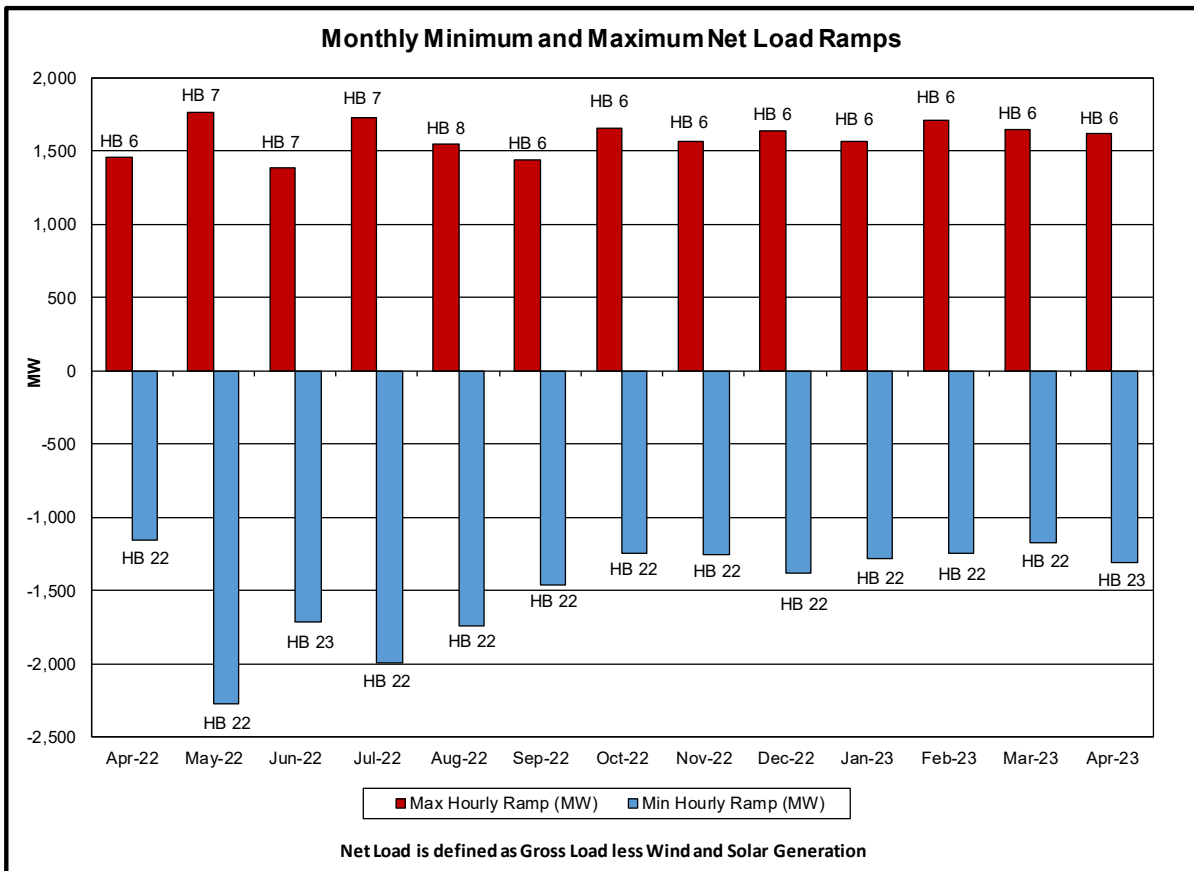
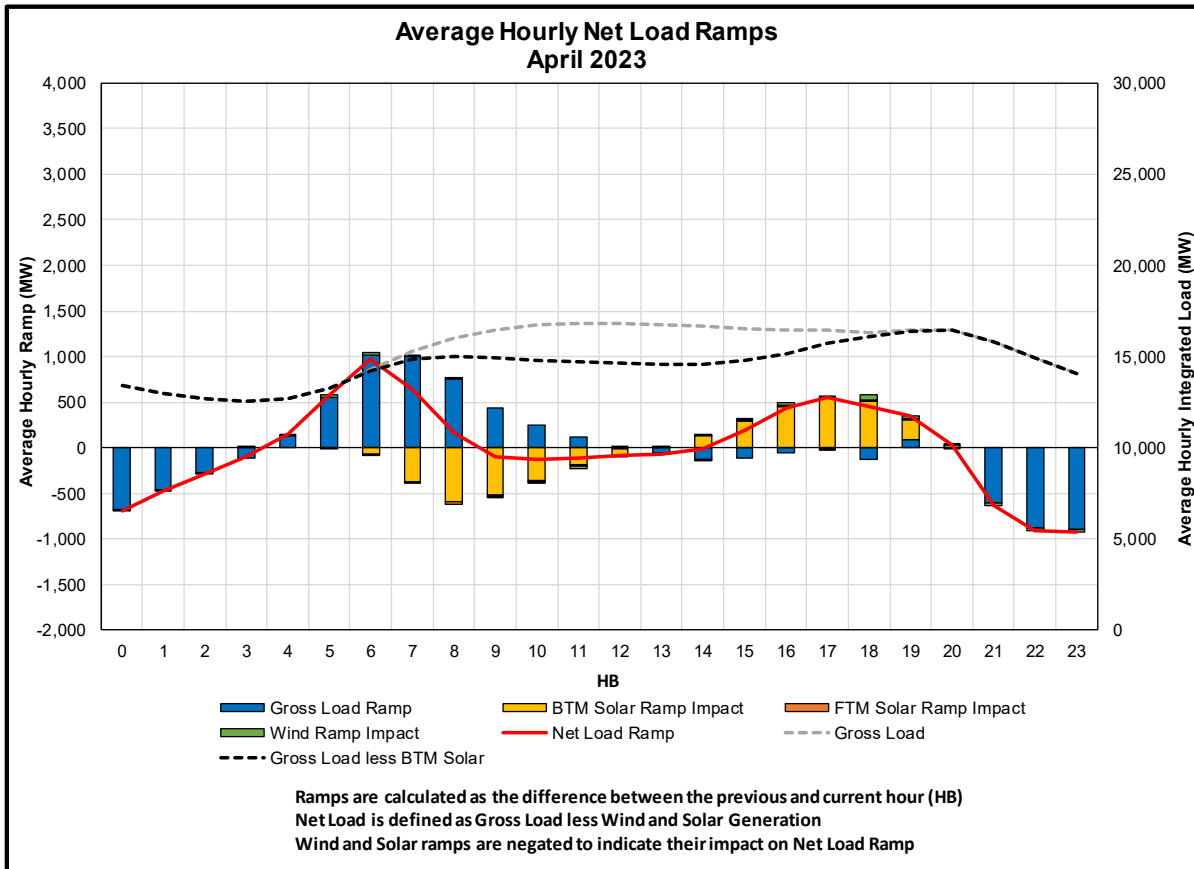
Net Wind and Solar Performance Total Daily Production and Capacity Factors



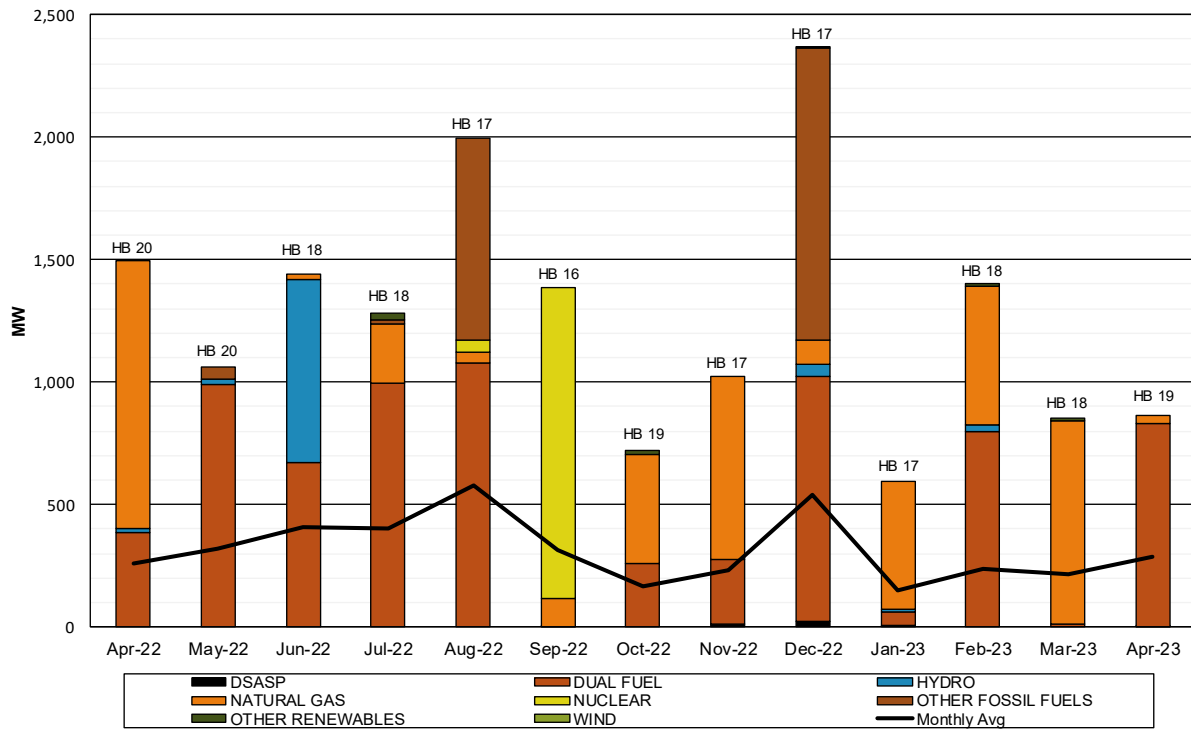
Capacity Factor - Total Monthly Generated MWh/Rated Nameplate Power Capacity







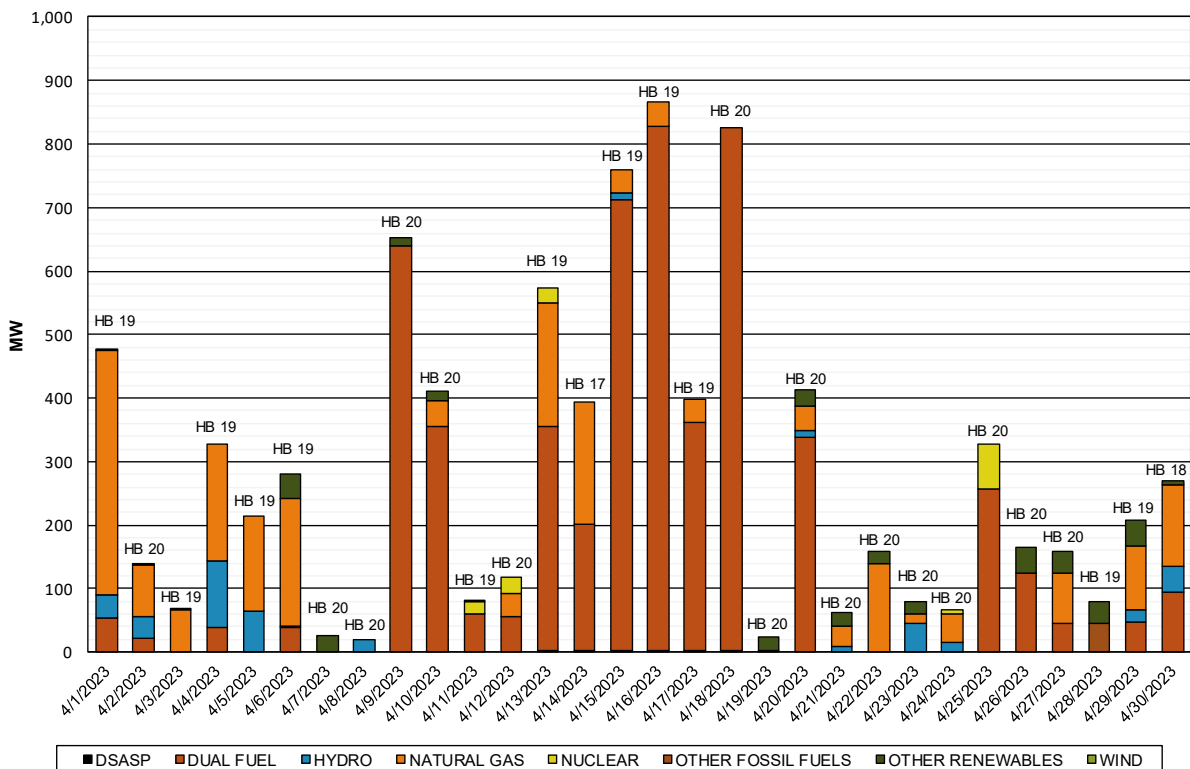
Monthly Maximum Day-Ahead Market Capacity Unavailable In Real Time



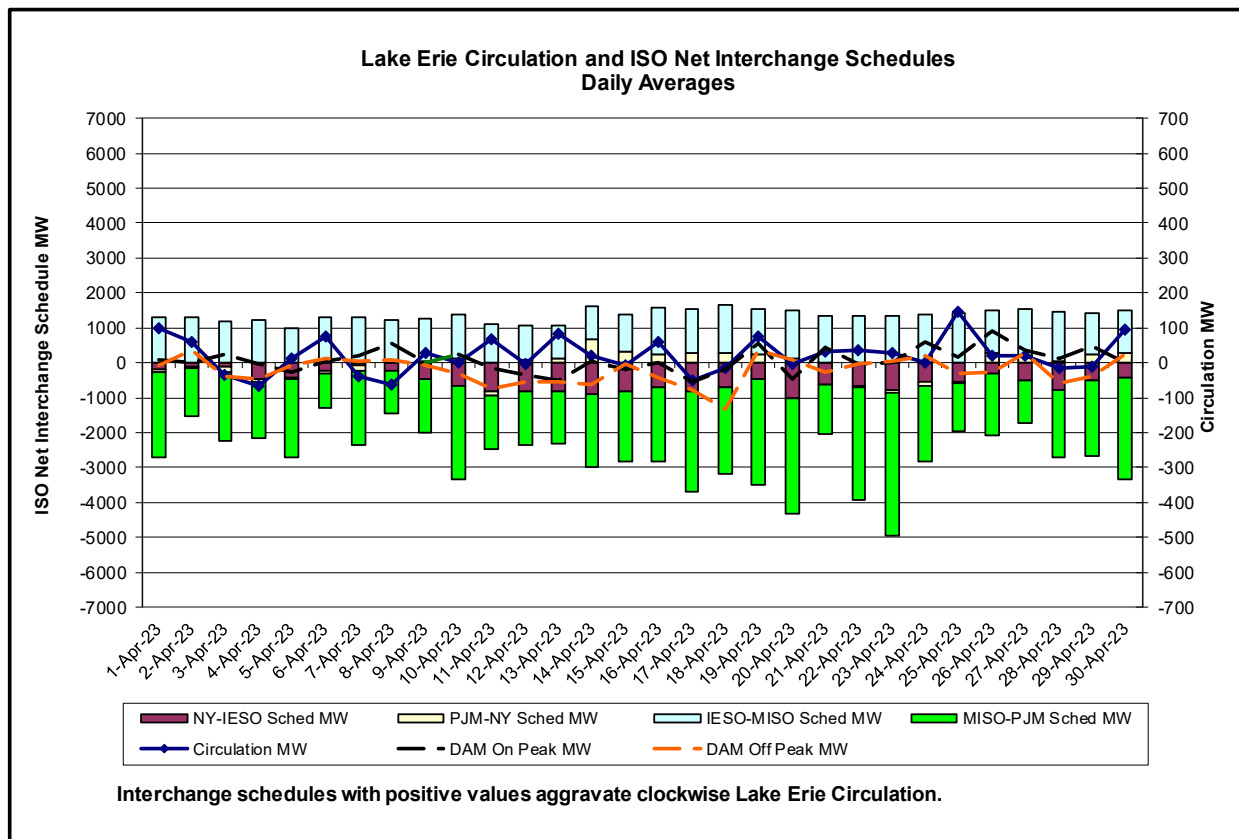
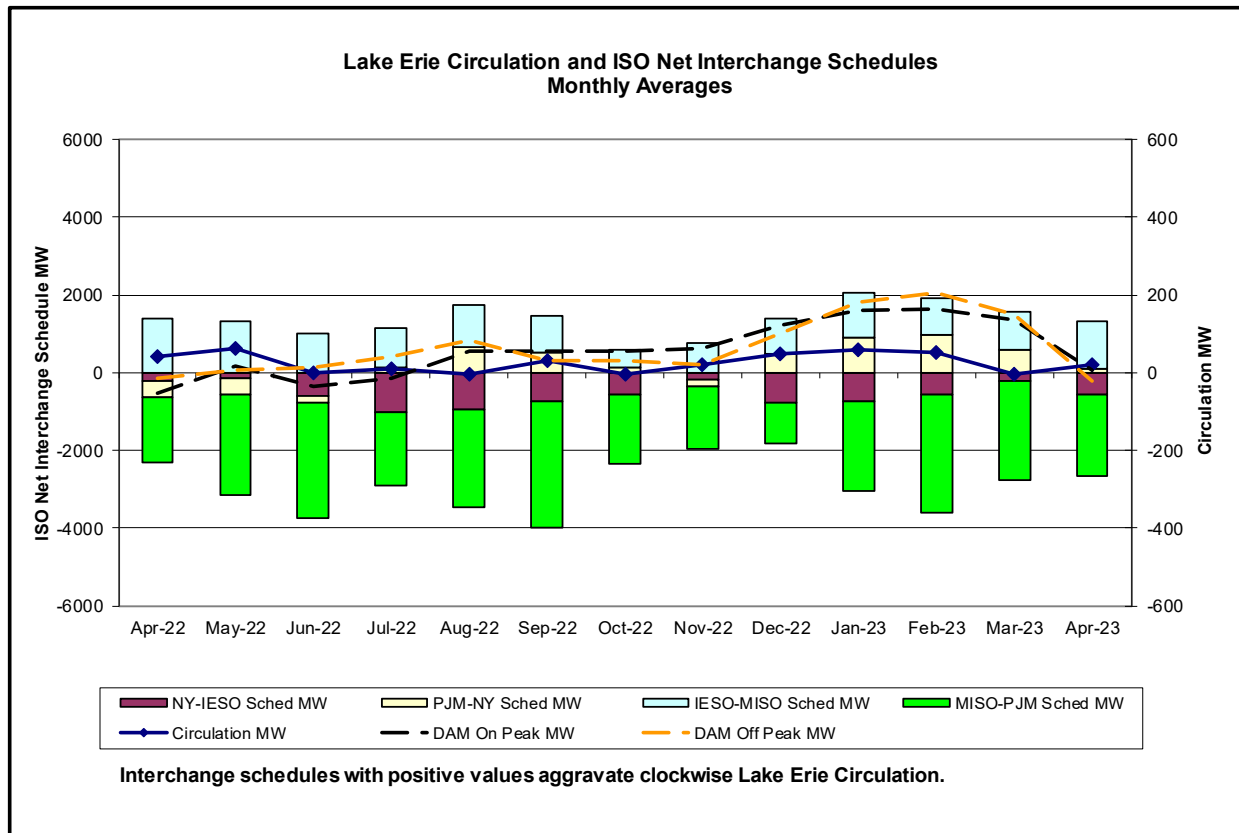
Unavailable Capacity is calculated as the difference of Day-Ahead Market (DAM) capacity relative to Real-Time (RT) capacity during RT peak load hour.

The Monthly Maximum is the day with the largest observed deficit during RT peak load hour.

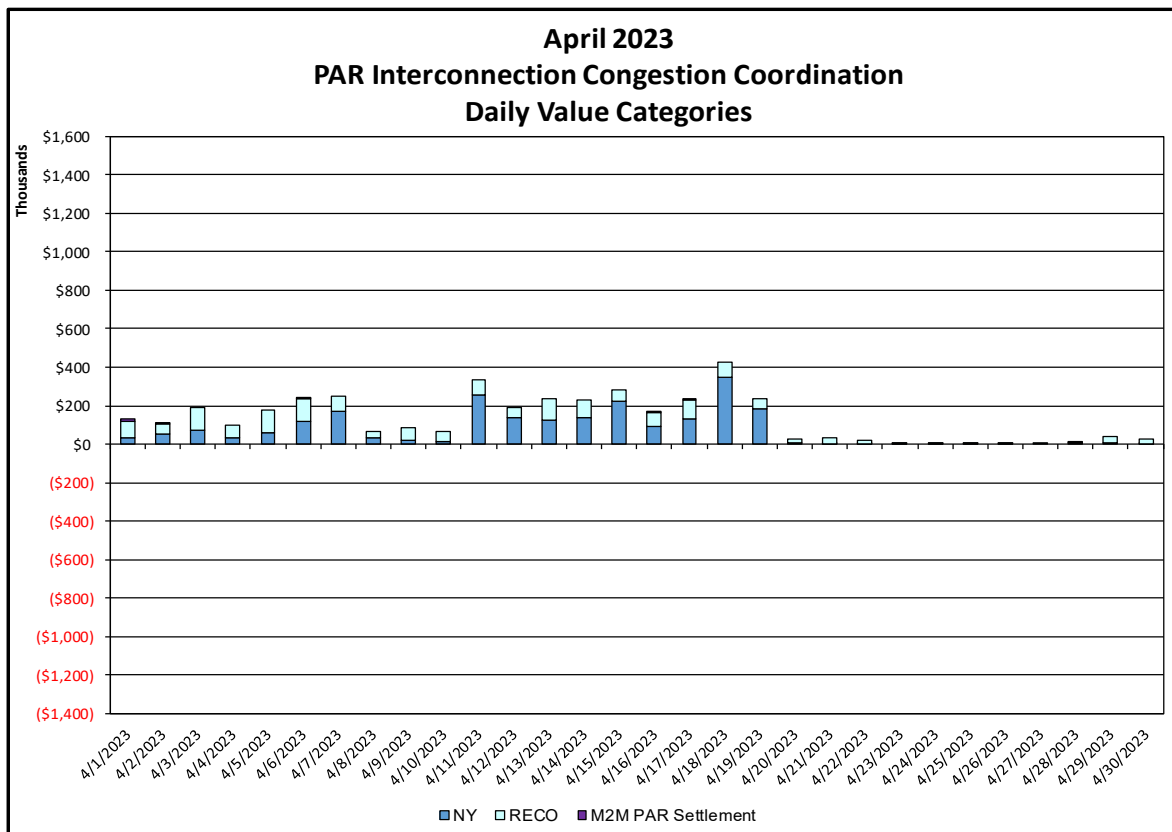
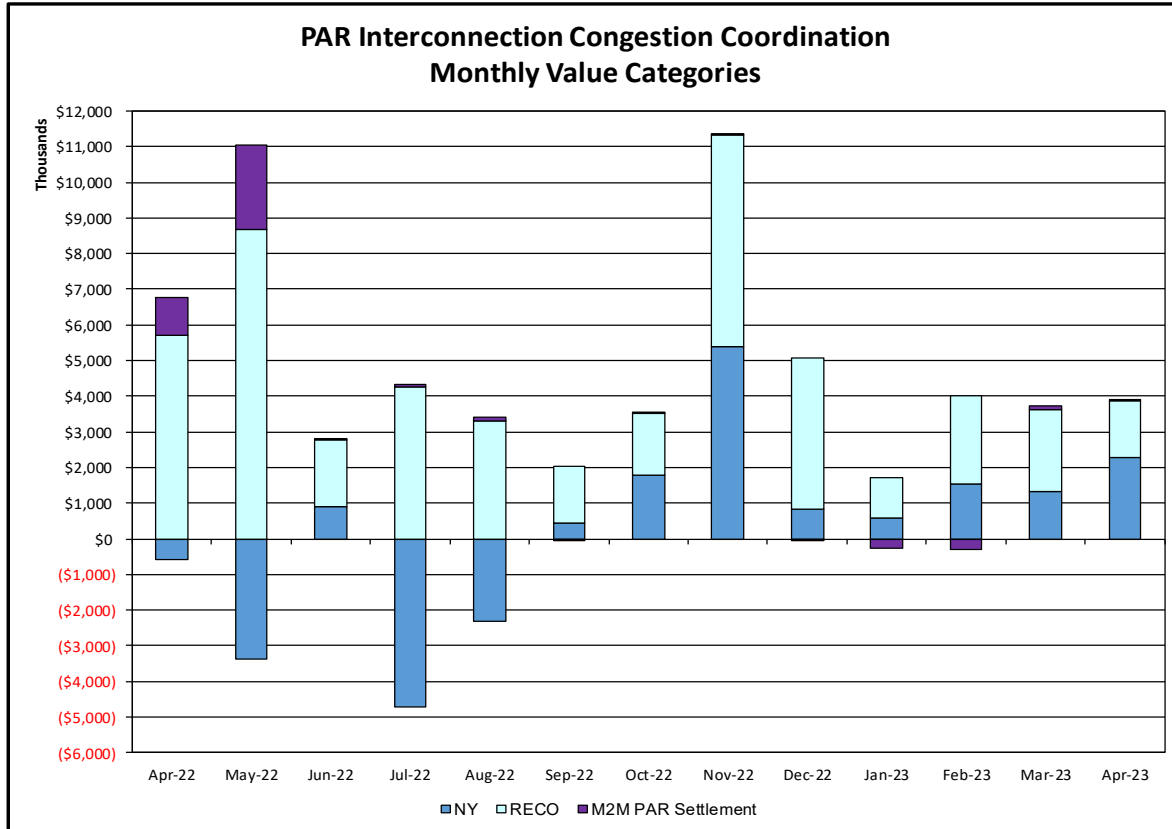
Daily Day-Ahead Market Capacity Unavailable In Real Time



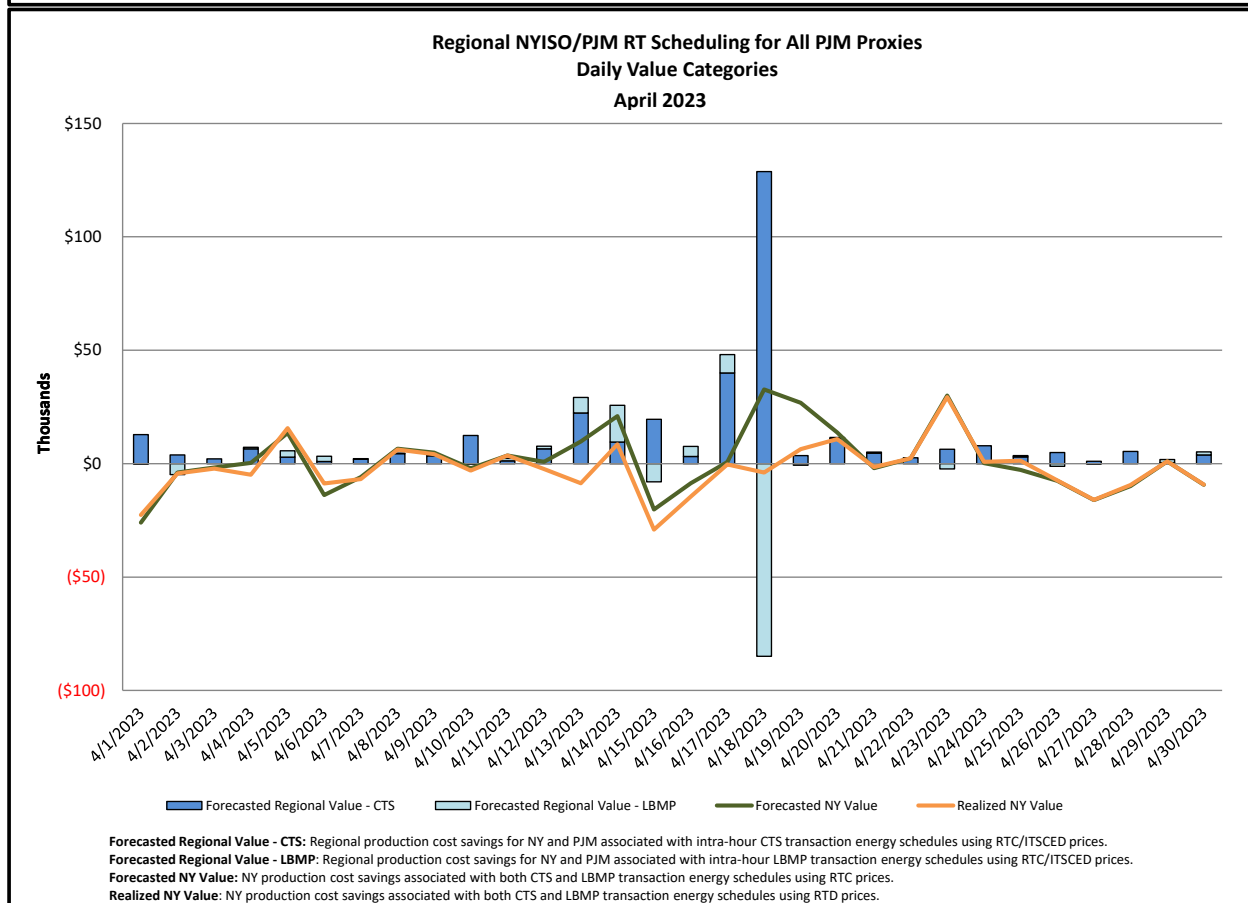
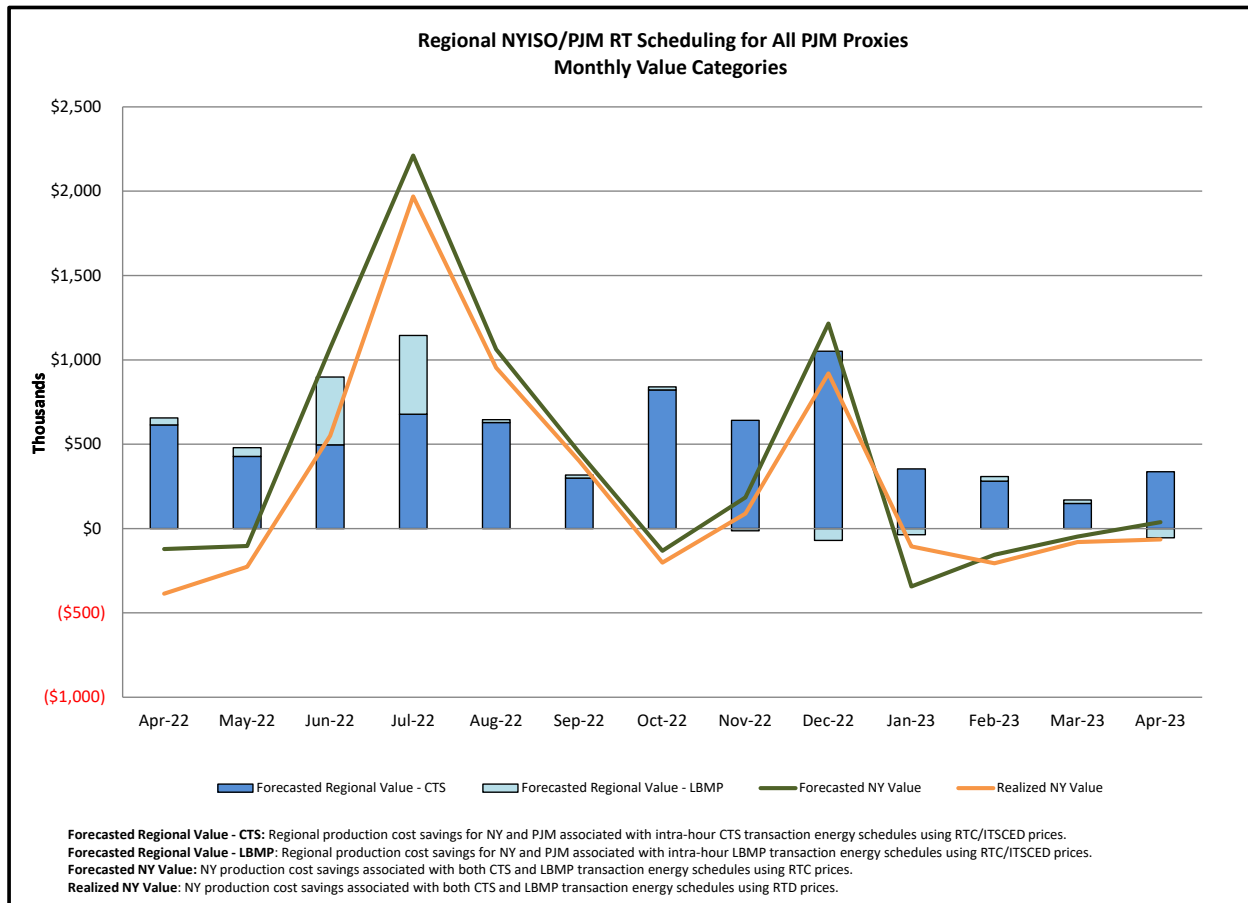
Unavailable Capacity is calculated as the difference of Day-Ahead Market (DAM) capacity relative to Real-Time (RT) capacity during RT peak load hour.



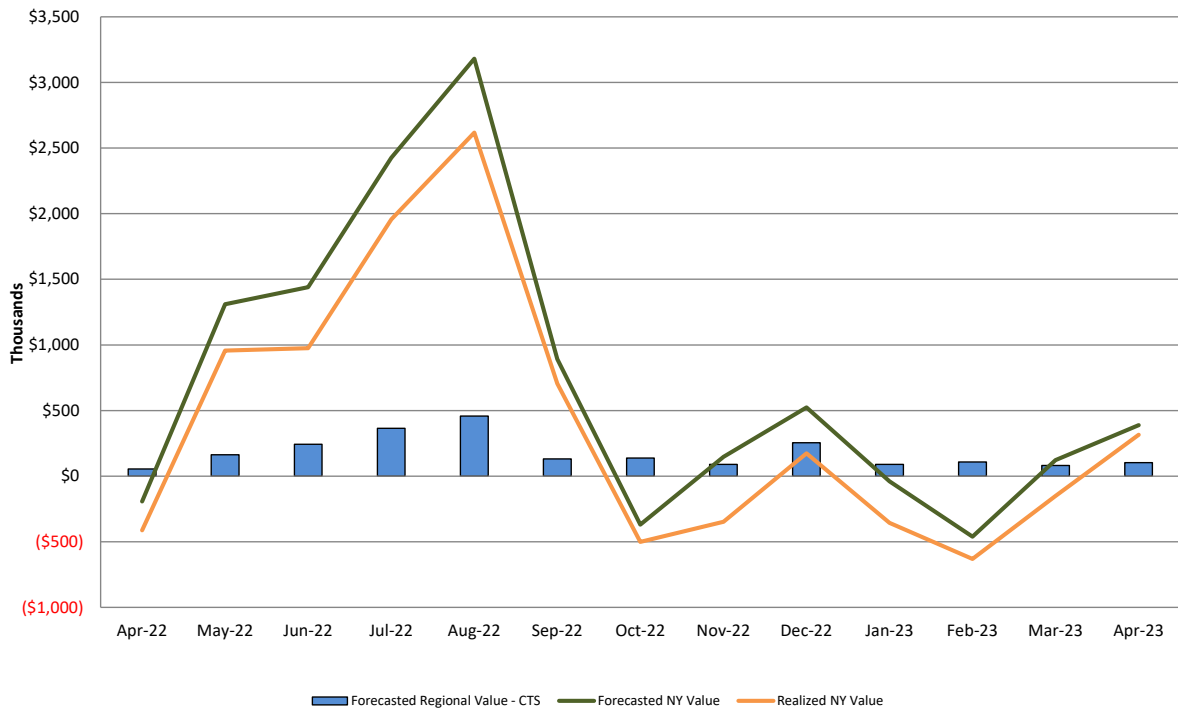
Broader Regional Market Performance Metrics



<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.

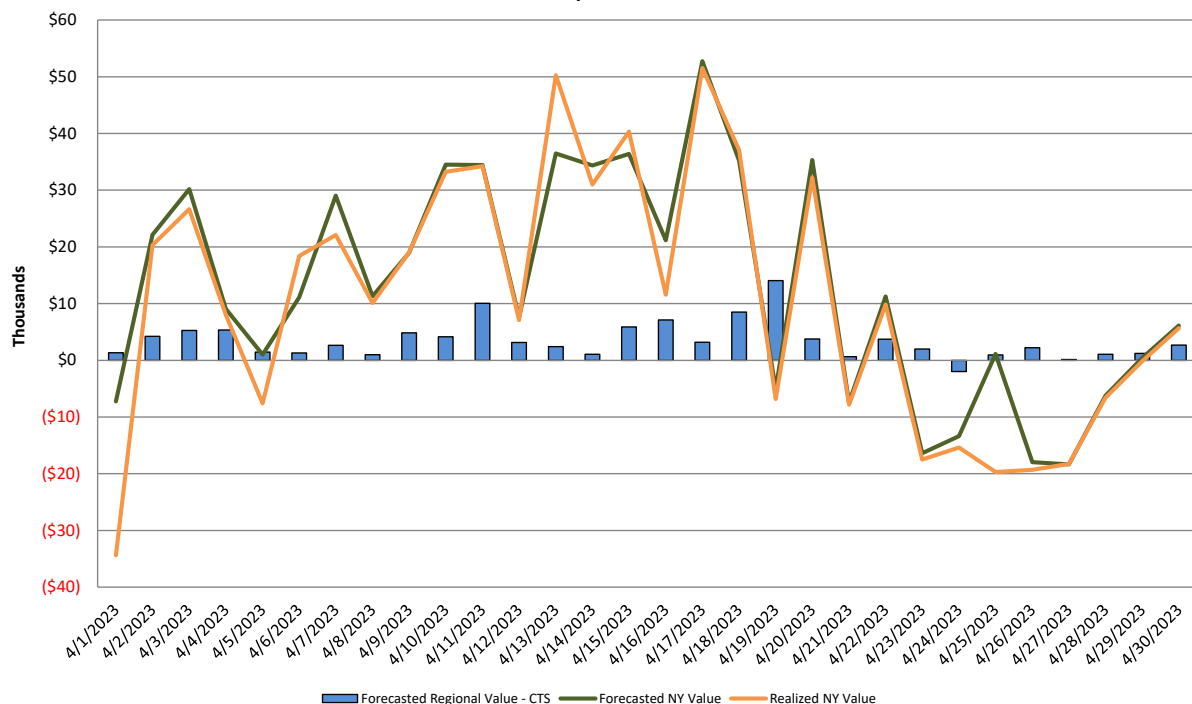


Regional NYISO/NE RT Scheduling for ISO-NE AC Monthly Value Categories



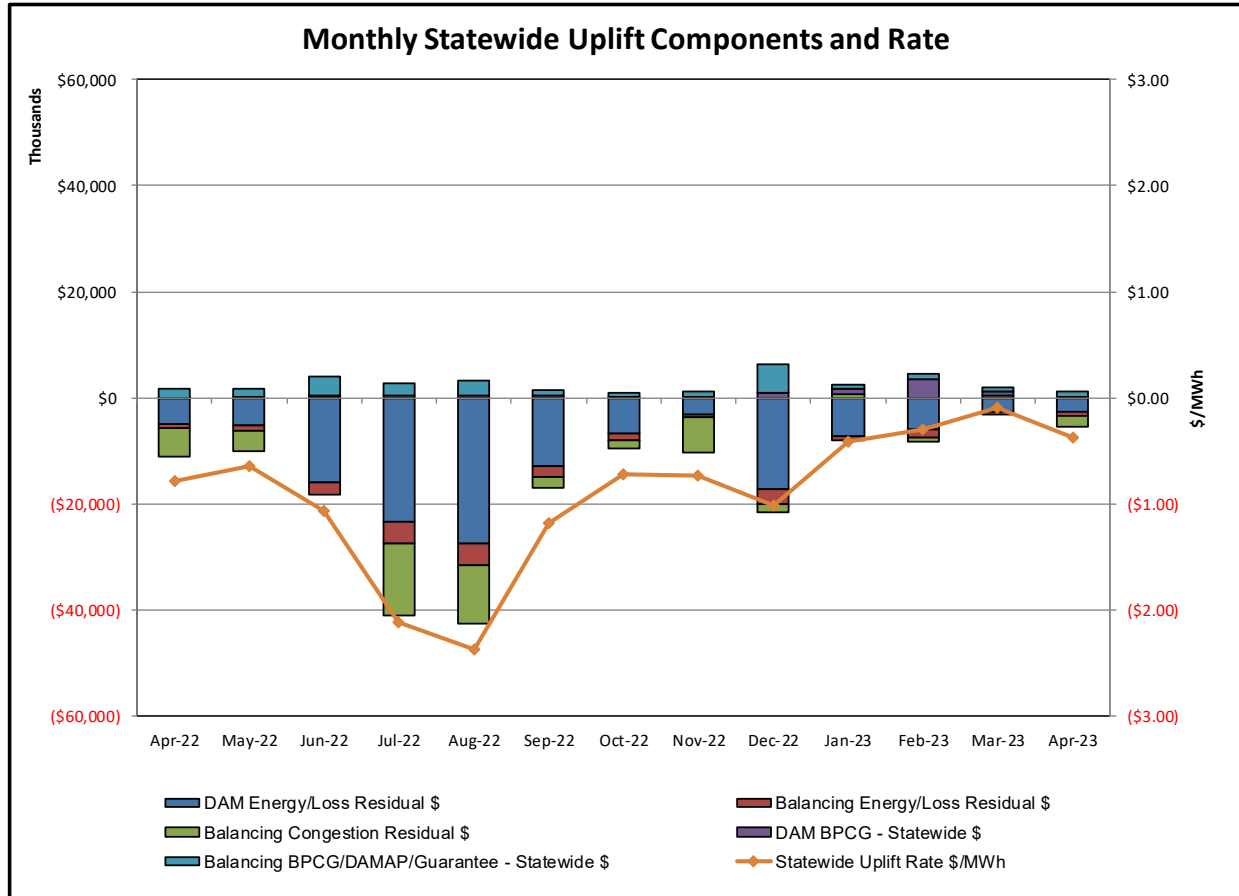
Forecasted Regional Value - CTS: Regional production cost savings for NY and NE associated with intra-hour CTS transaction energy schedules using RTC prices and NE forecasted prices.
Forecasted NY Value: NY production cost savings associated with CTS transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with CTS transaction energy schedules using RTD prices.

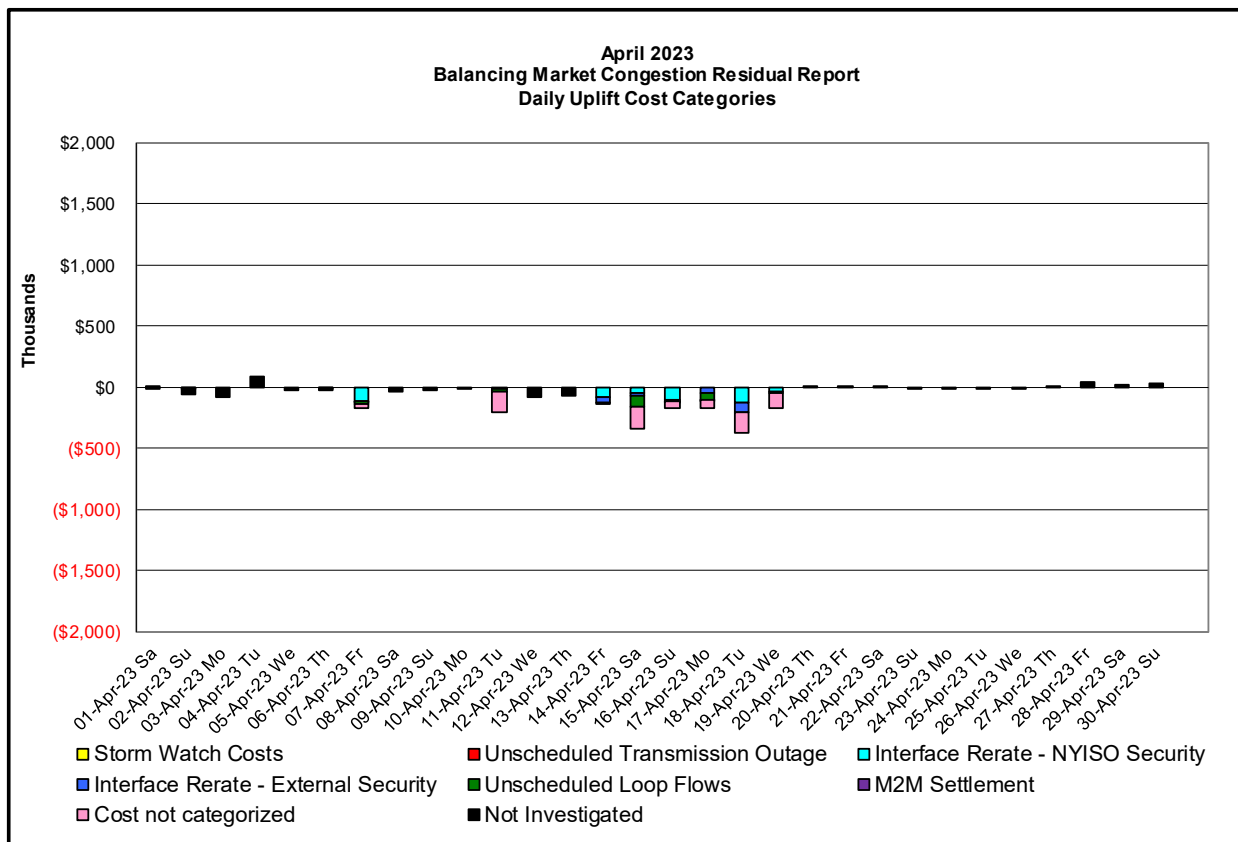
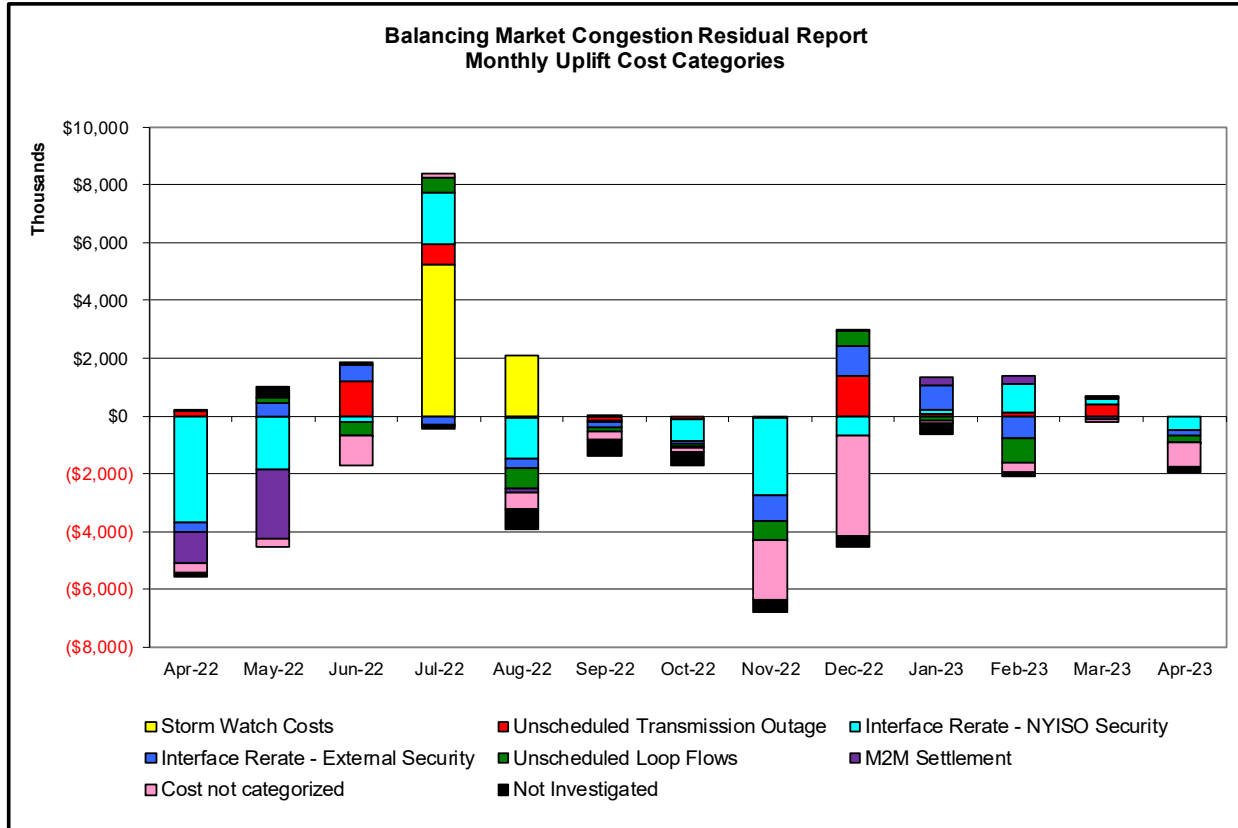
Regional NYISO/NE RT Scheduling for ISO-NE AC Daily Value Categories April 2023



Forecasted Regional Value - CTS: Regional production cost savings for NY and NE associated with intra-hour CTS transaction energy schedules using RTC prices and NE forecasted prices.
Forecasted NY Value: NY production cost savings associated with CTS transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with CTS transaction energy schedules using RTD prices.

Market Performance Metrics





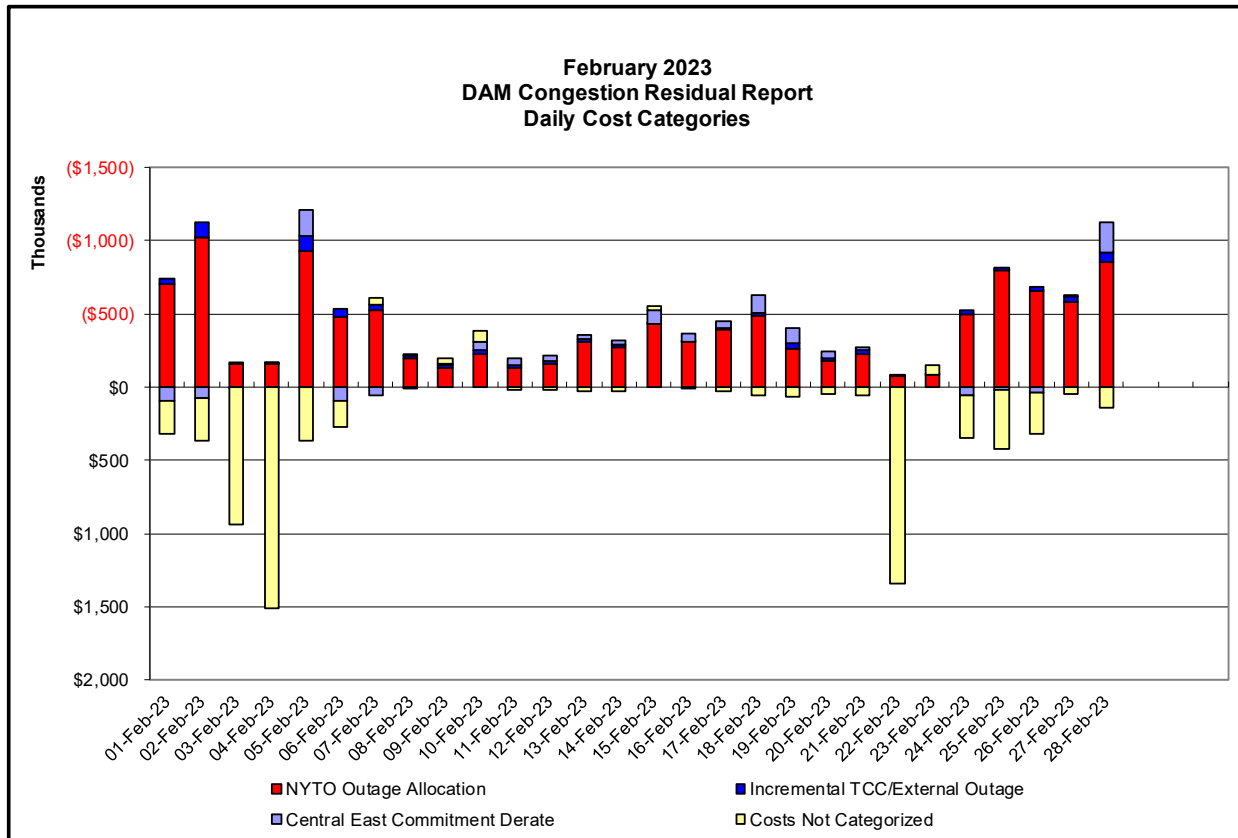
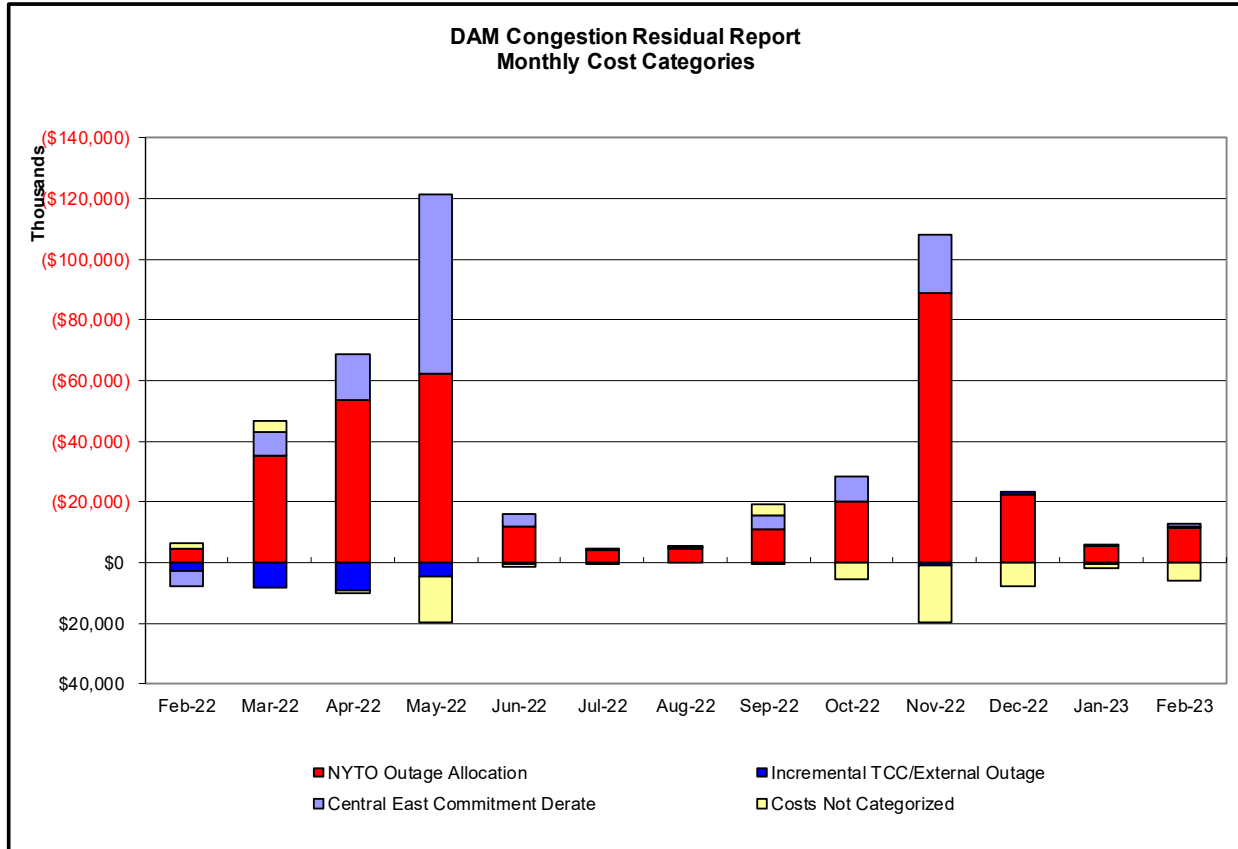
Day's investigated in April: 7, 11, 14, 15, 16, 17, 18, 19		
Event	Description	April Dates
	Derate Adirondack-Porter 230kV (#12) I/o SIN:MSU1&7040& HQ GN&LD PROXY	11
	Derate Carl Place-East Garden City 138kV (#361) I/o EGRDNCTY-ROSLYN 138 362	18, 19
	Derate Central East	11, 15
	Derate East Garden City-New Bridge 138kV #462	14
	Derate Foxhills-Greenwood 138kV (#29232) I/o SCB:GOWANUS(2):41&42231&R4	18
	Derate Malone-Willis 115kV (#1-910) I/o TWR:MOSES MW2 & MAL4	11
	NYCA DNI Ramp Limit	7, 15, 18
	Uprate Central East	7, 11, 14-16, 18, 19
	HQ CHAT - NY Scheduling Limit	14
	IESO AC ACTIVE DNI Ramp Limit	15
	NE AC ACTIVE DNI Ramp Limit	17
	NE AC-NY Scheduling Limit	15
	NE NNC1385 - NY Scheduling Limit	14, 17, 18
	PJM AC-NY DNI Ramp Limit	7
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East	7, 11, 15-17, 19
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West	11, 17, 19

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	

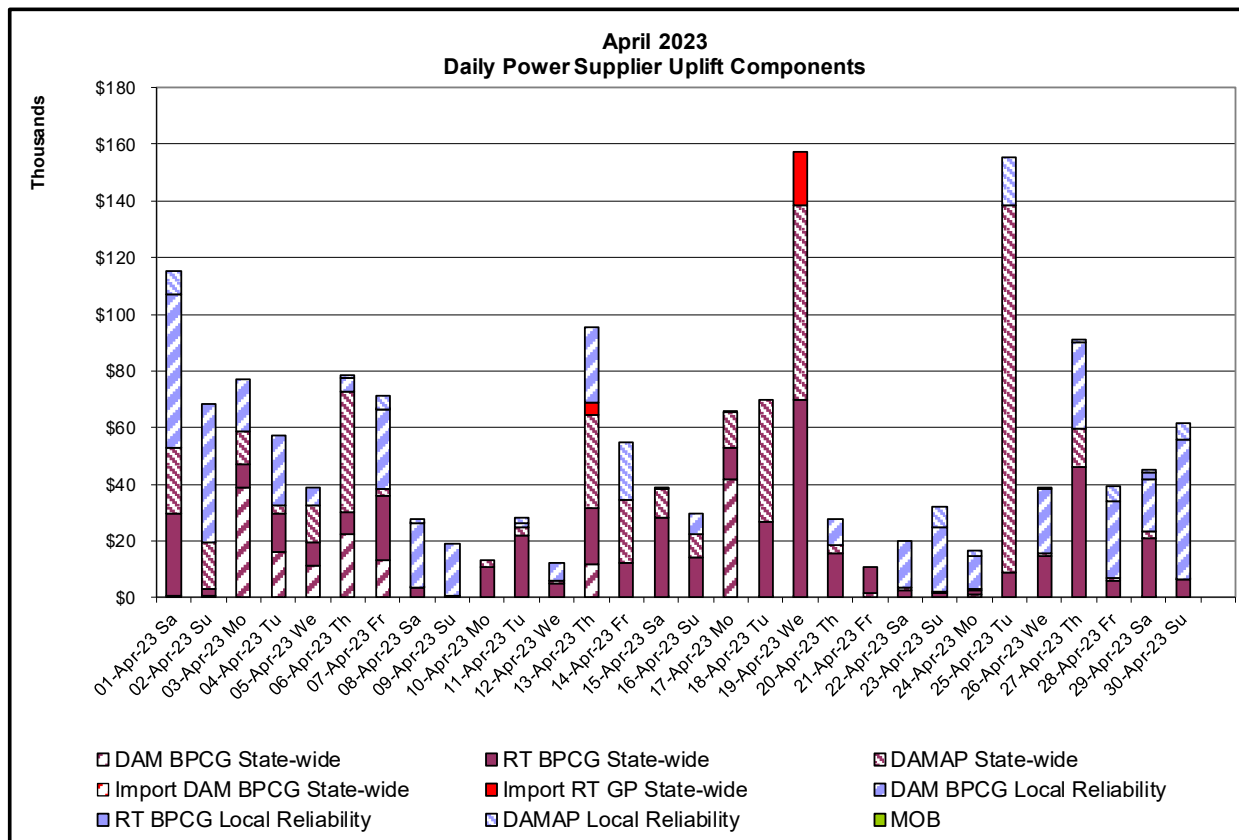
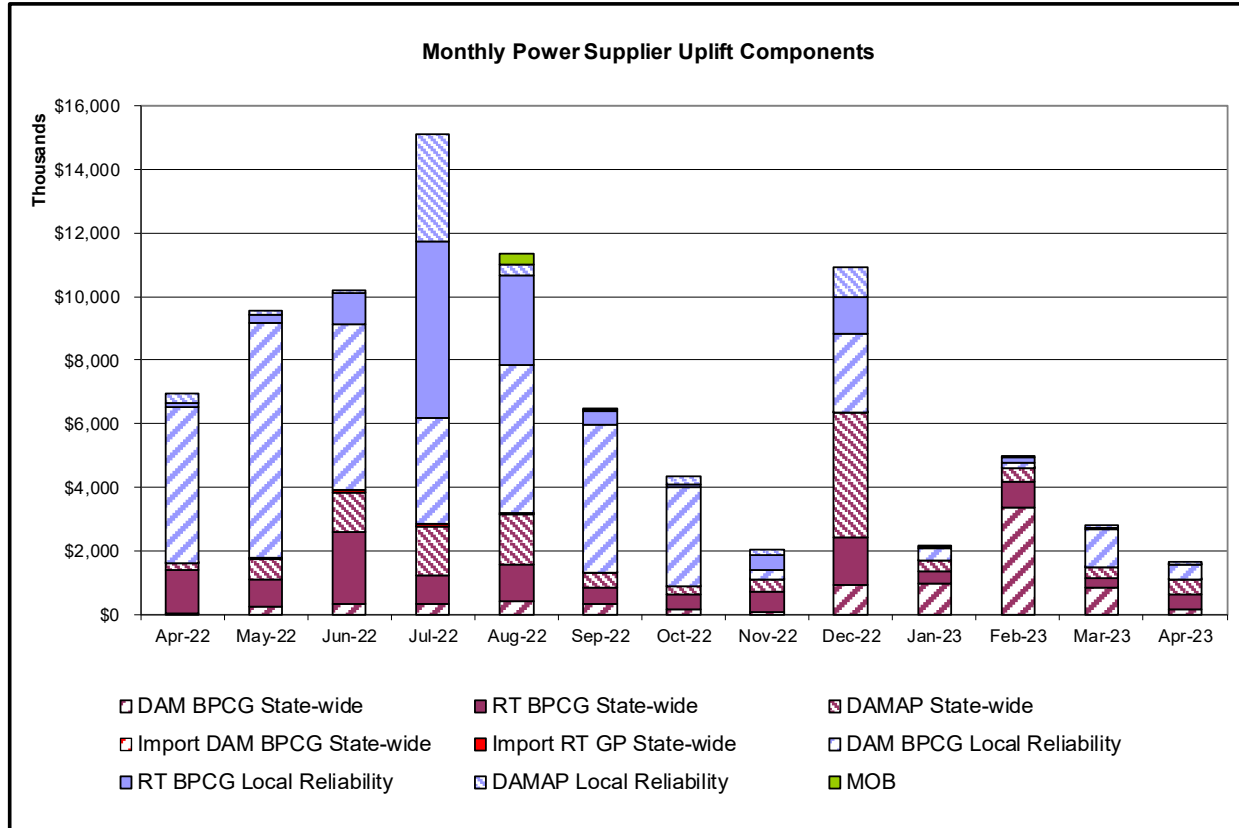
Monthly Balancing Market Congestion Report Assumptions/Notes

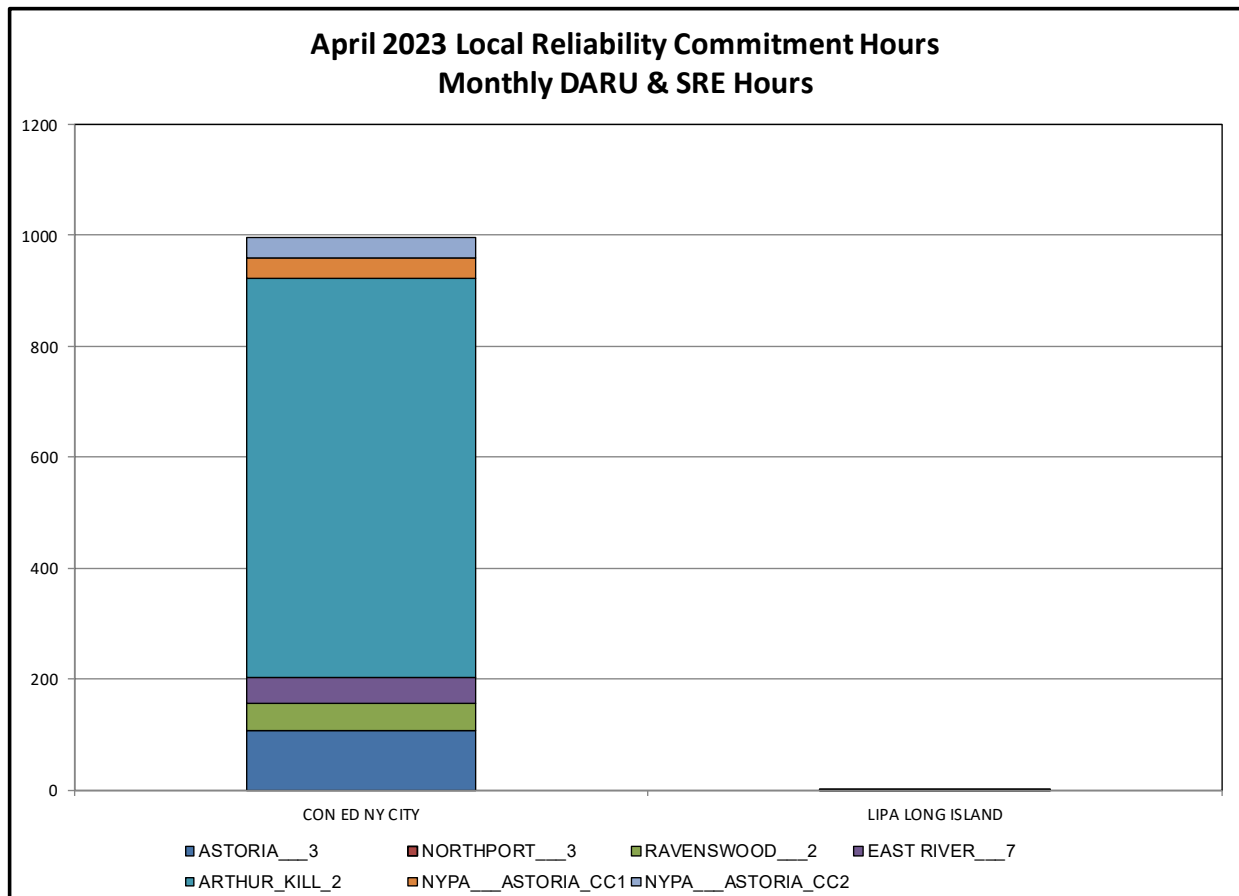
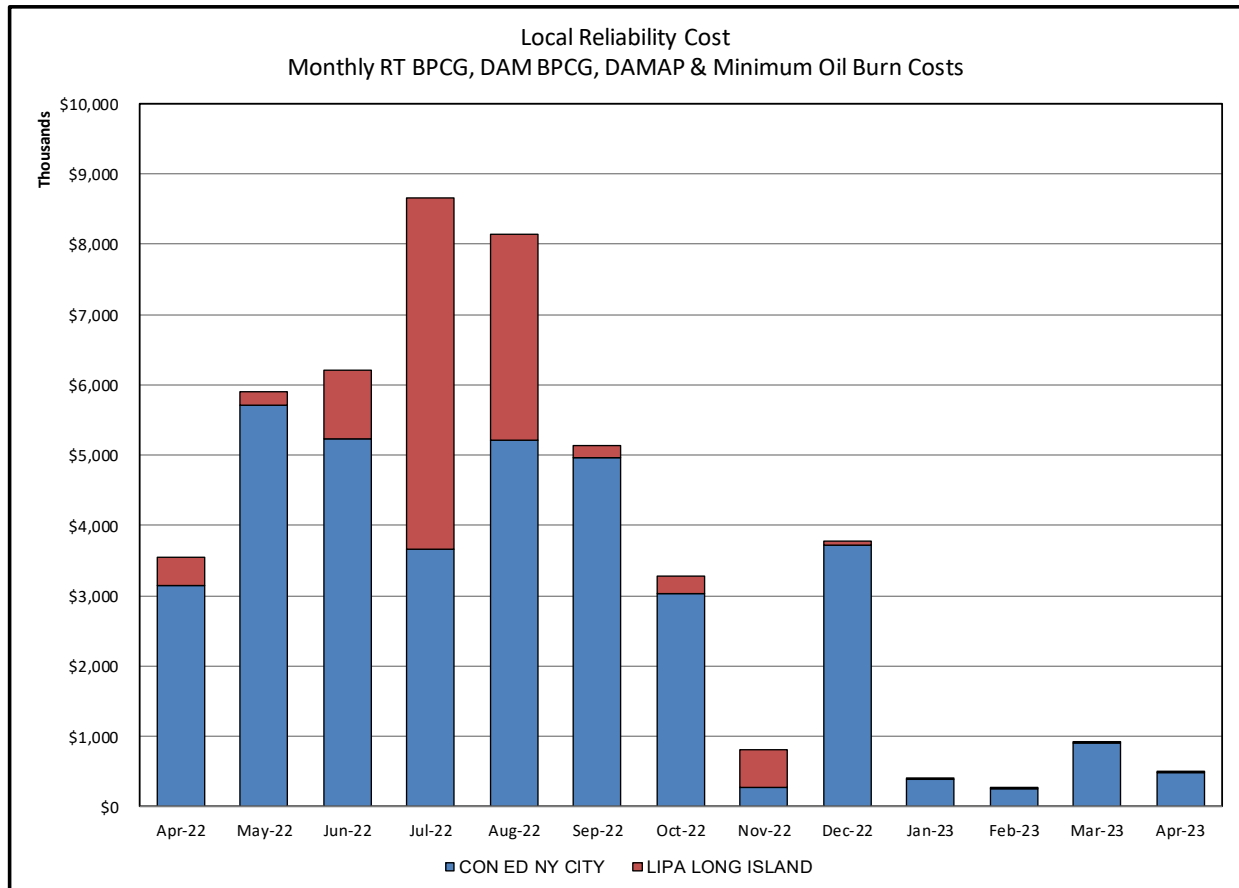
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

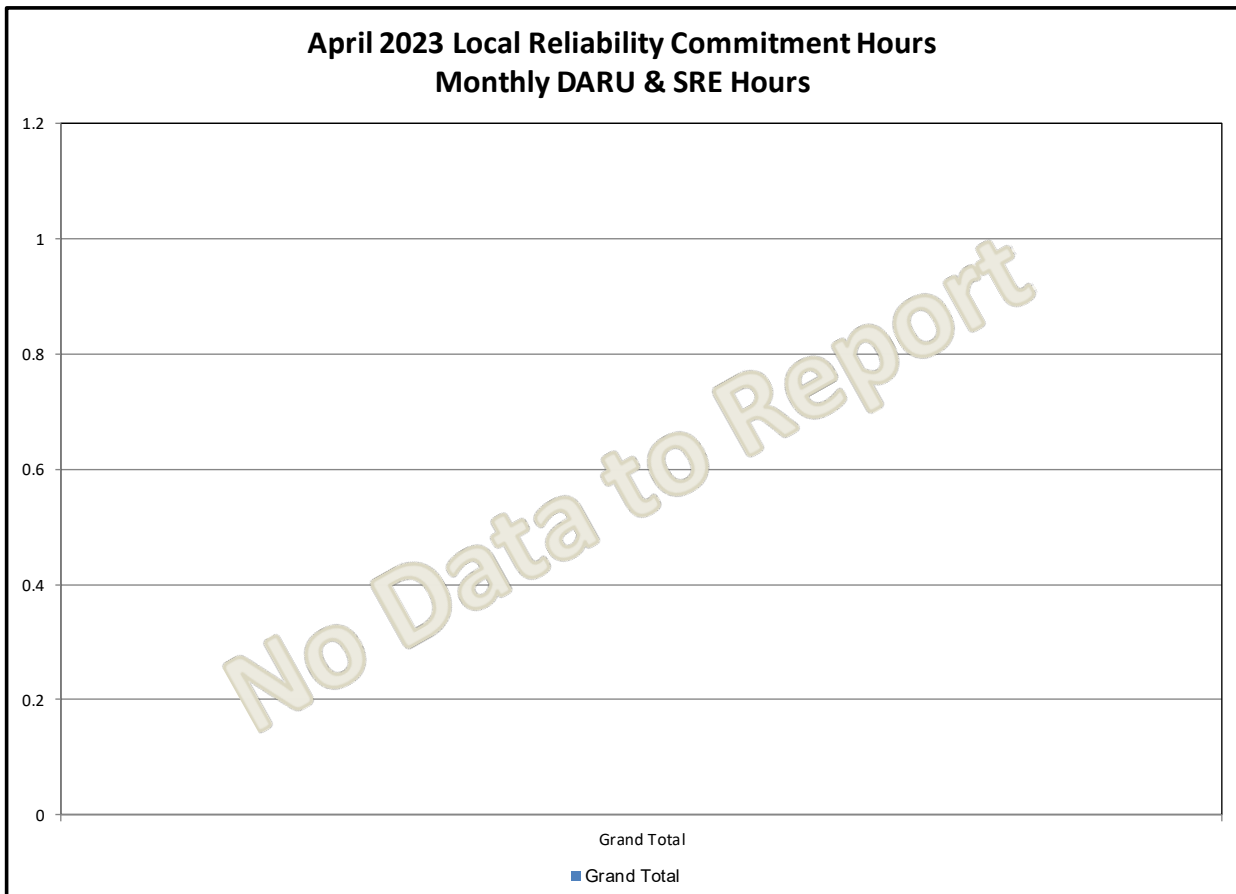
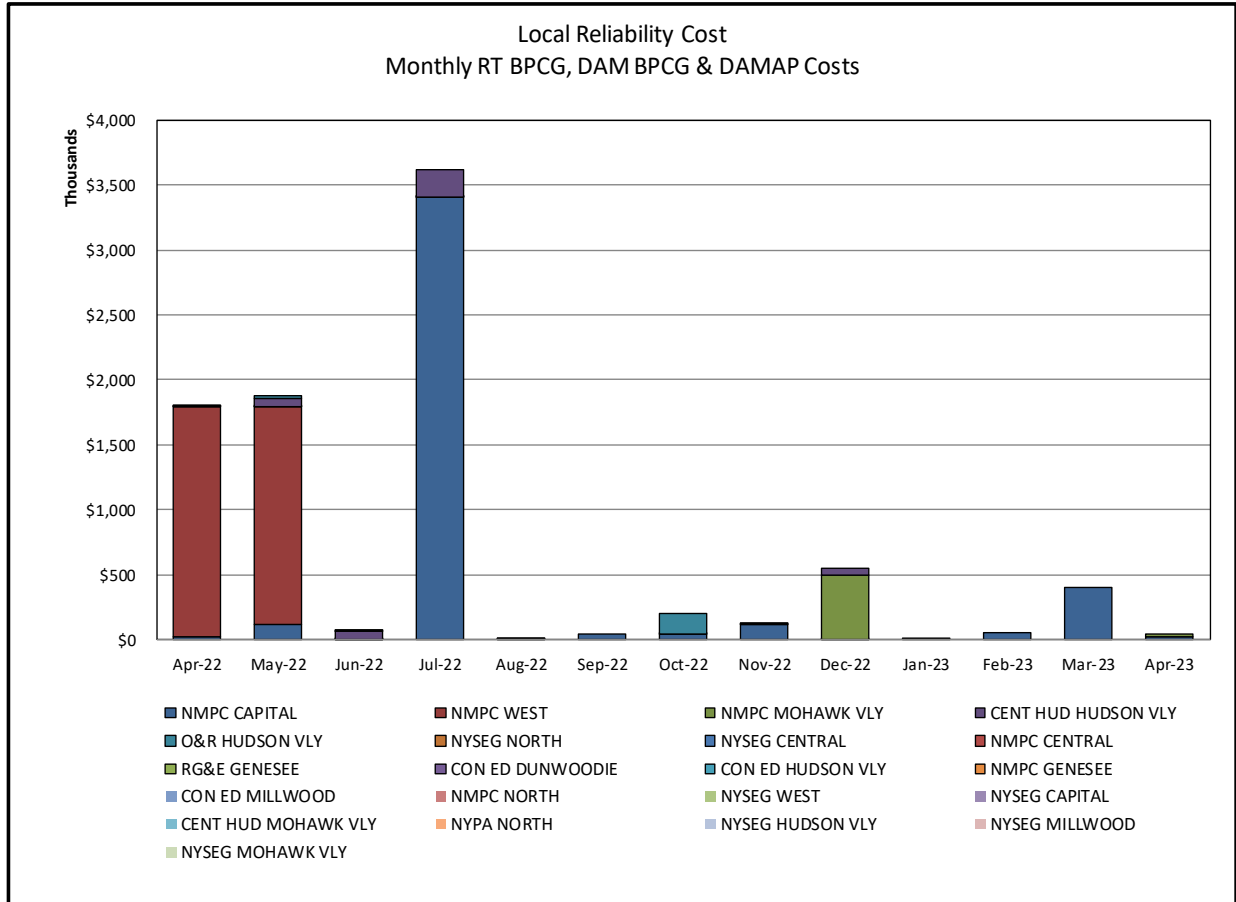


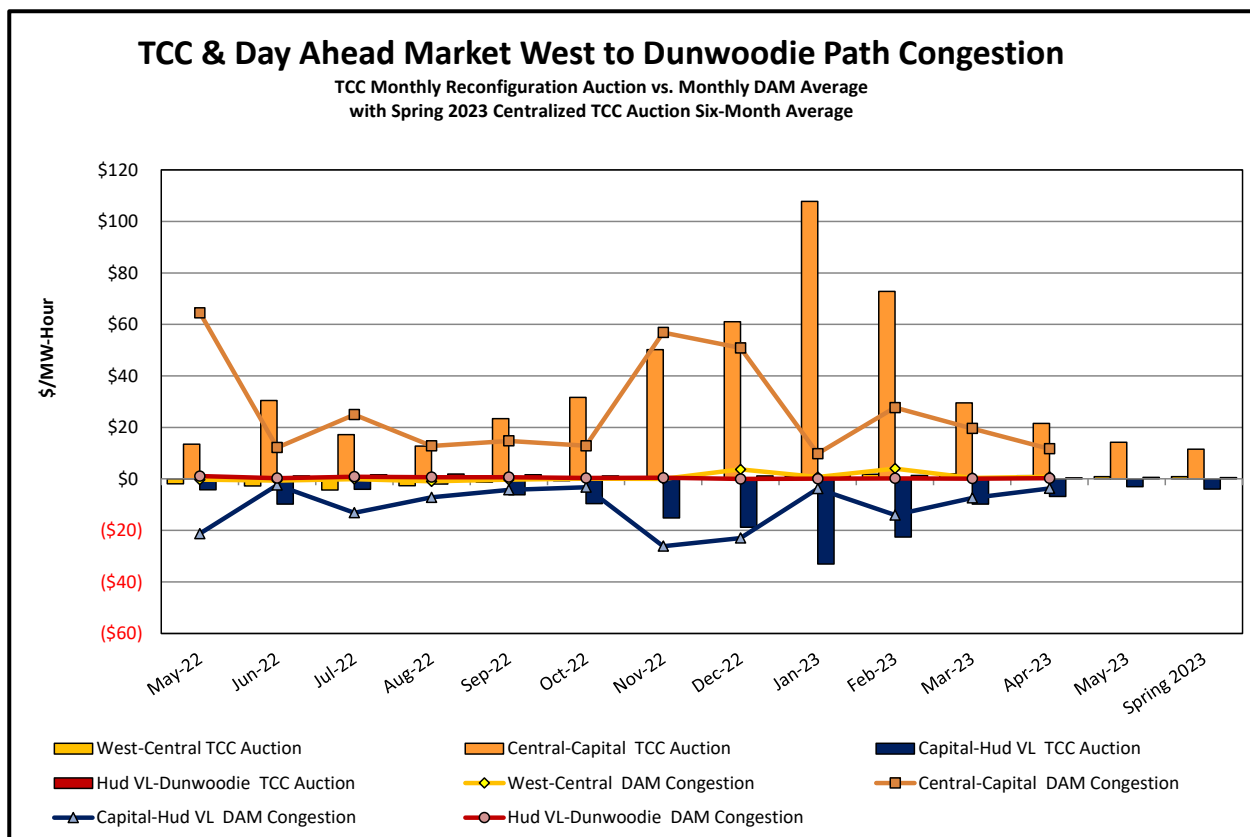
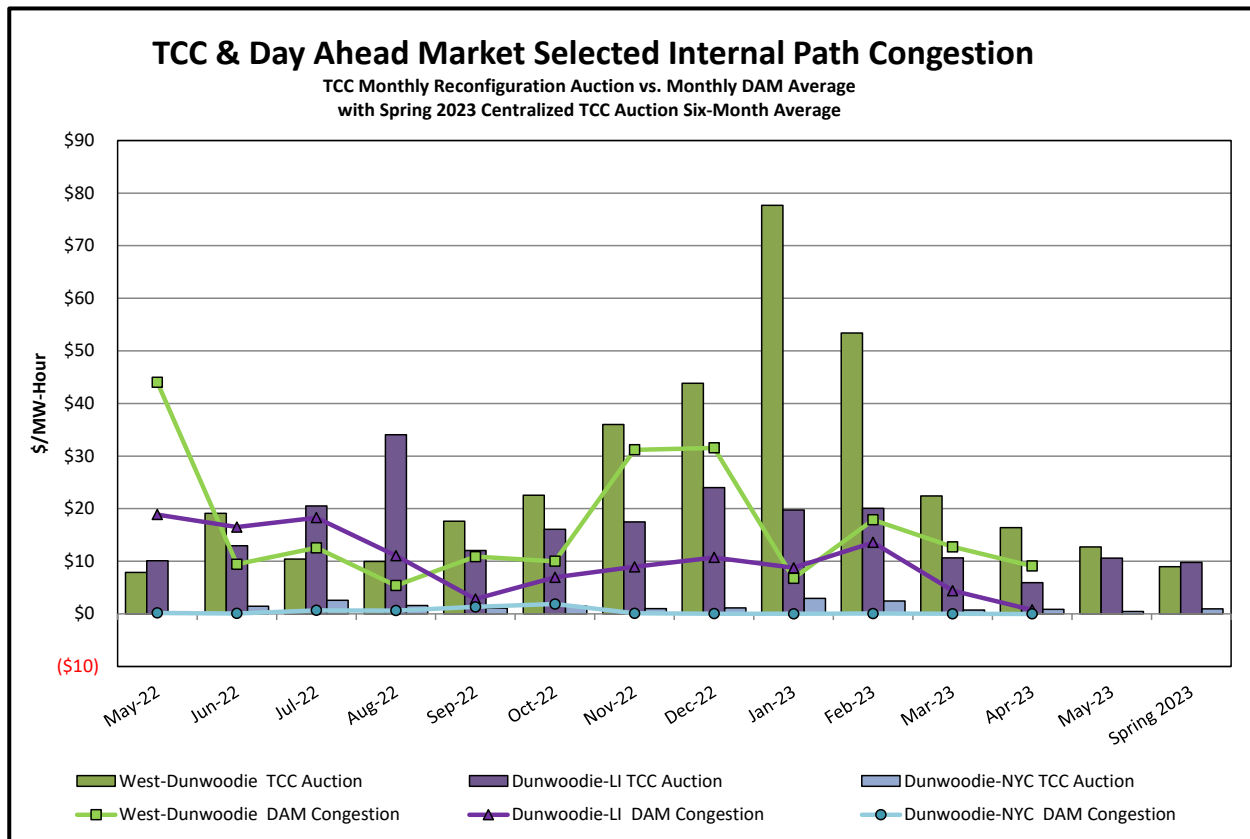
Day-Ahead Market Congestion Residual Categories

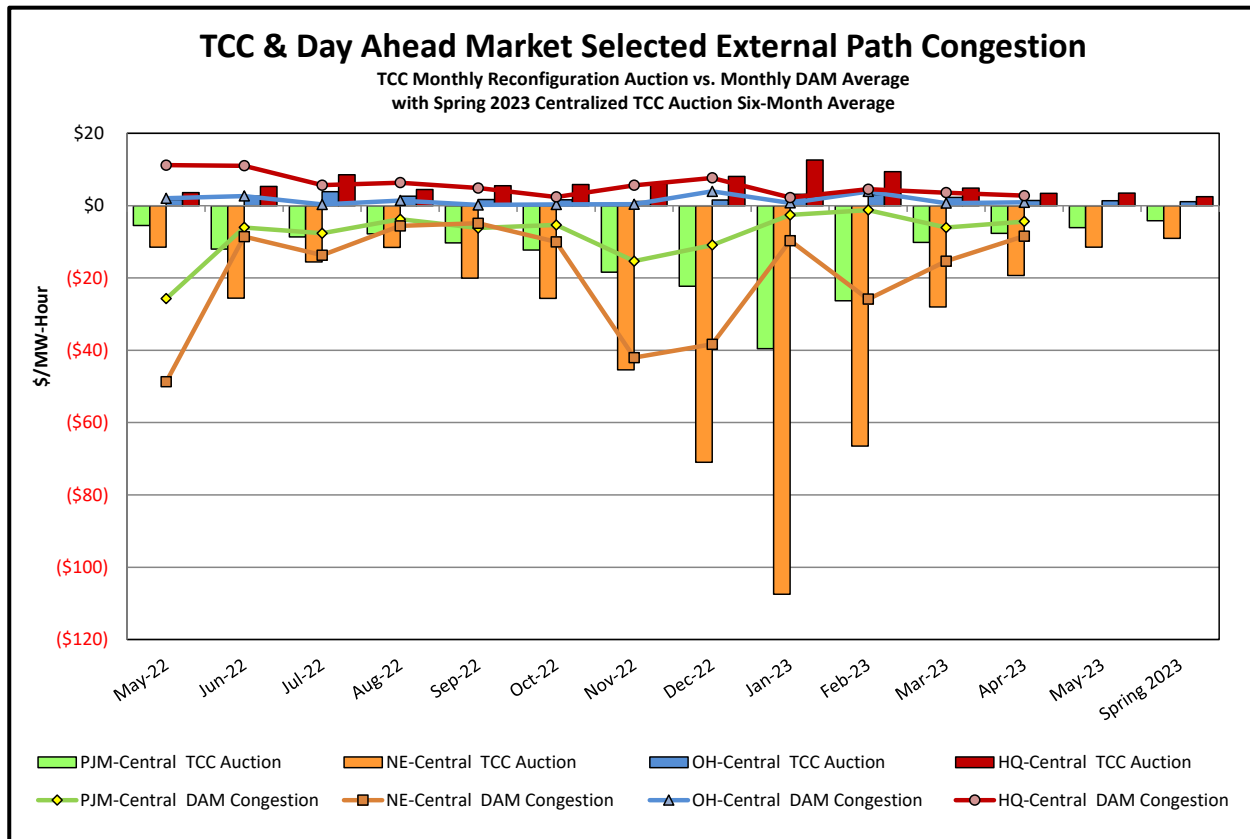
<u>Category</u>	<u>Cost Assignment</u>	<u>Events Types</u>	<u>Event Examples</u>
NYTO Outage Allocation	Responsible TO	Direct allocation to NYTO's responsible for transmission equipment status change.	DAM scheduled outage for equipment modeled in-service for the TCC Auction.
Incremental TCC/External 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.	



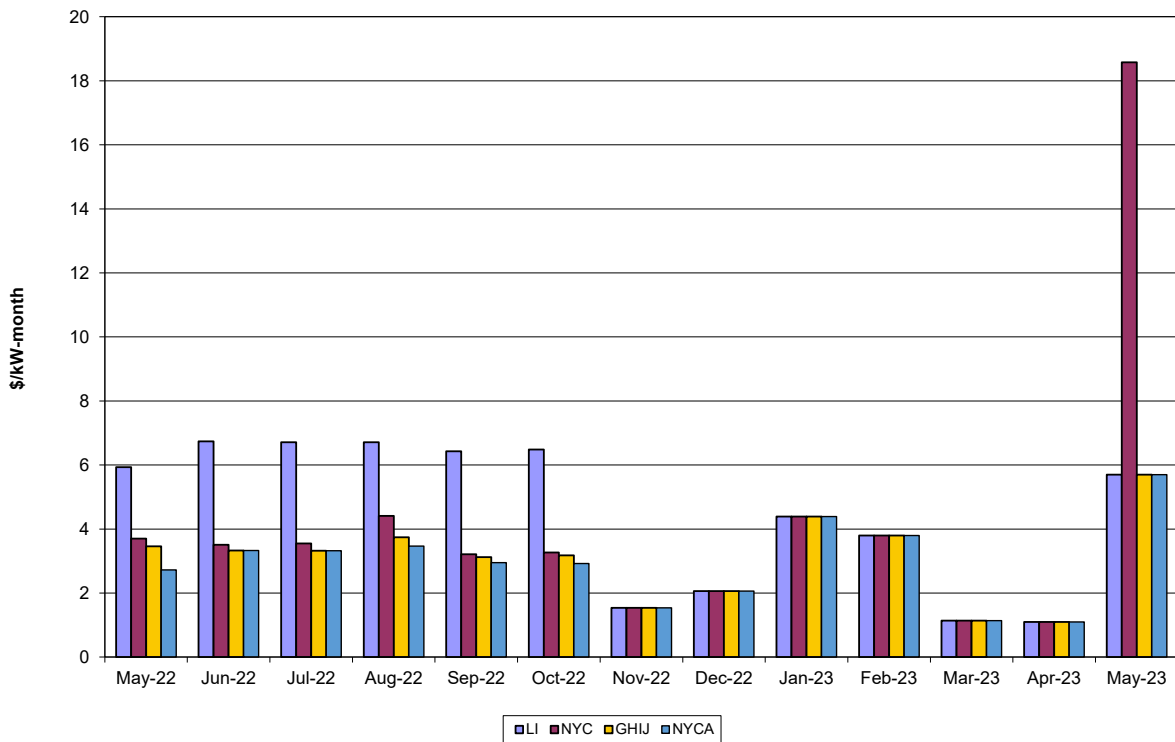








ICAP Spot Market Clearing Price



UCAP Sales

