

Operations Performance Metrics Monthly Report



December 2022 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 January 10, 2023.

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December 2022 Operations Performance Highlights

- December 2022 peak load of 22,004 MW occurred on 12/24/2022 HB 17
- Winter 2022-2023 capability period peak load to date of 22,004MW occurred on 12/24/2022 HB 17
- All-time winter capability period peak load of 25,738 MW occurred on 01/07/2014 HB 18
- 0.06 hours of Thunderstorm Alerts were declared
- 24 hours of NERC TLR level 3 curtailment
- Autumn 2022-2023 January Balance of Period auction clearing price for the January period Central-Capital is 107.75 \$/MWh
- The NYISO purchased emergency energy from ISO-NE and IESO to facilitate energy deliveries to PJM on 12/24, for HB8

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)
2,191 MW	4,255 MW	94 MW	20 MW

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

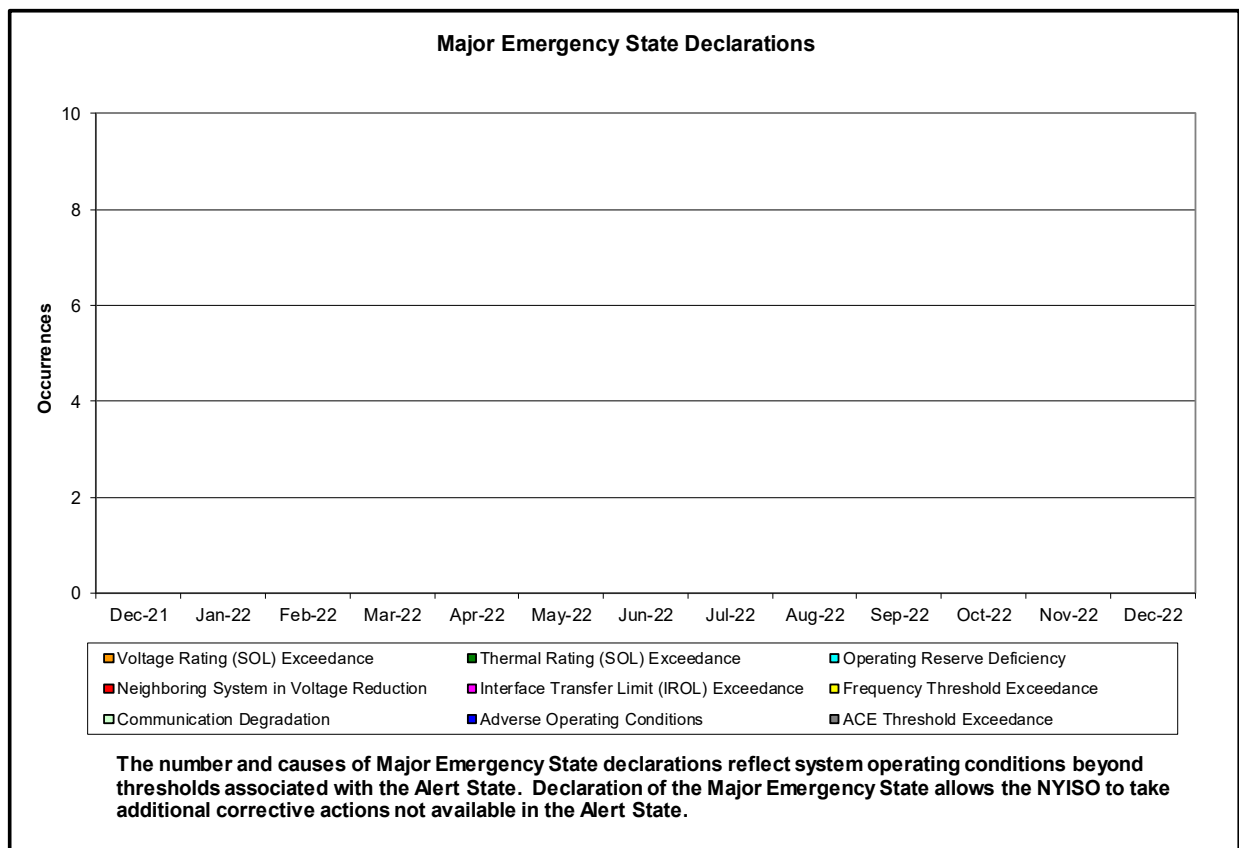
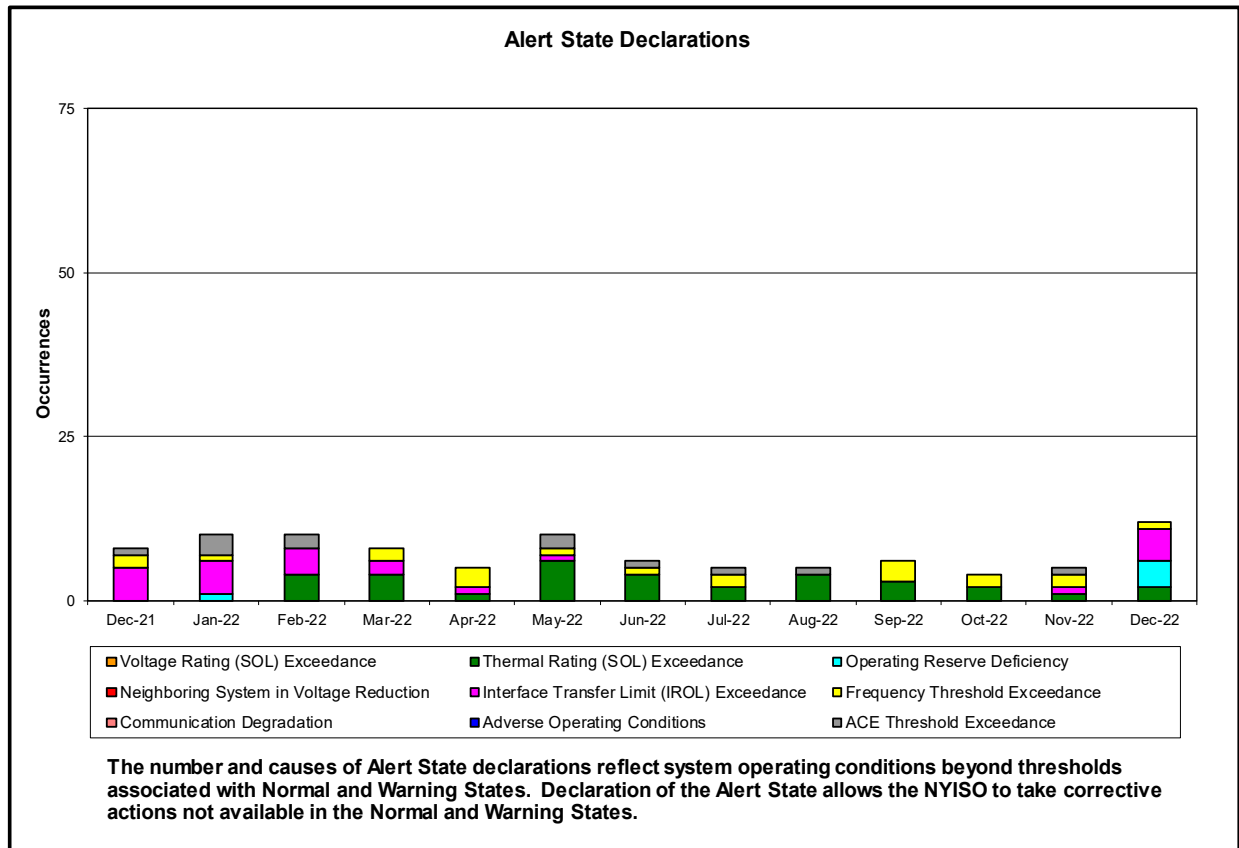
	Current Month Value (\$M)	Year-to-Date Value (\$M)
NY Savings from PJM-NY Congestion Coordination	\$5.06	\$45.81
NY Savings from PJM-NY Coordinated Transaction Scheduling	\$0.92	\$2.45
NY Savings from NE-NY Coordinated Transaction Scheduling	\$0.17	\$8.29
Total NY Savings	\$6.15	\$56.55
Regional Savings from PJM-NY Coordinated Transaction Scheduling	\$0.98	\$7.63
Regional Savings from NE-NY Coordinated Transaction Scheduling	\$0.25	\$3.60
Total Regional Savings	\$1.23	\$11.23

- Statewide uplift cost monthly average was (\$1.02)/MWh.
- The following table identifies the Monthly ICAP spot market prices and the price delta.

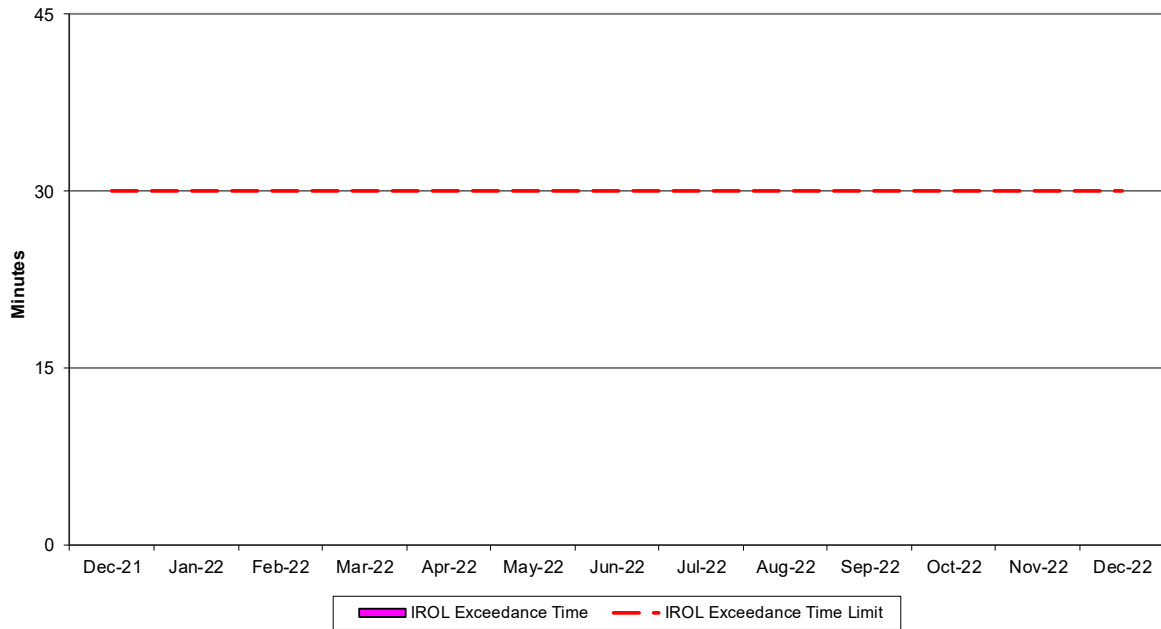
Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
January 2023 Spot Price	\$4.39	\$4.39	\$4.39	\$4.39
December 2022 Spot Price	\$2.06	\$2.06	\$2.06	\$2.06
Delta	\$2.33	\$2.33	\$2.33	\$2.33

- Price increases were driven by a decline in net imports to NYCA

Reliability Performance Metrics

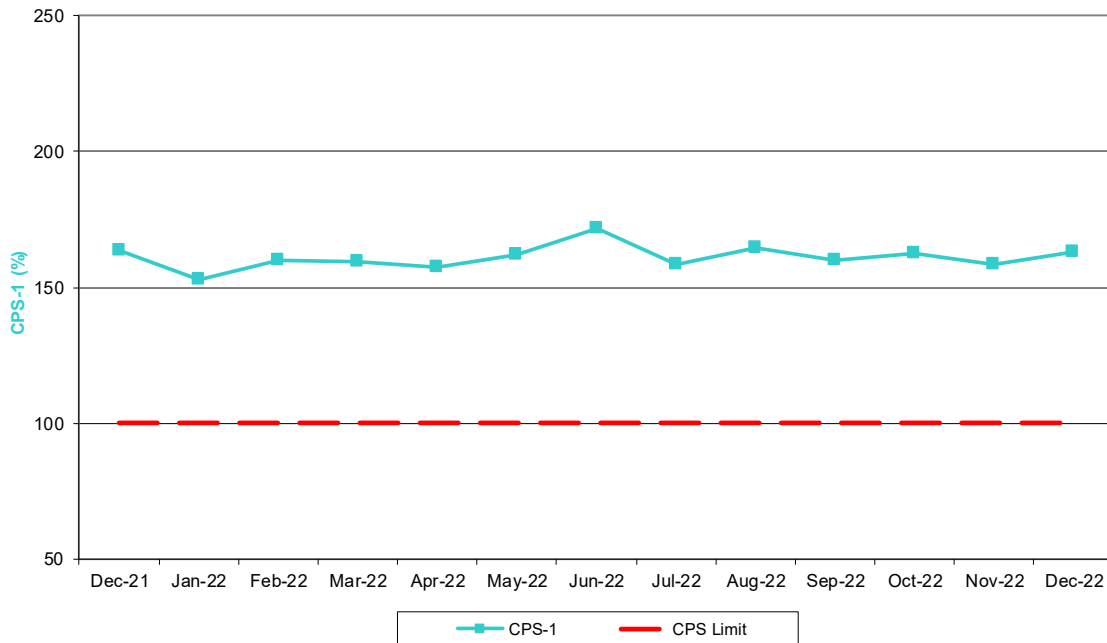


NERC IROL Time Over Limit



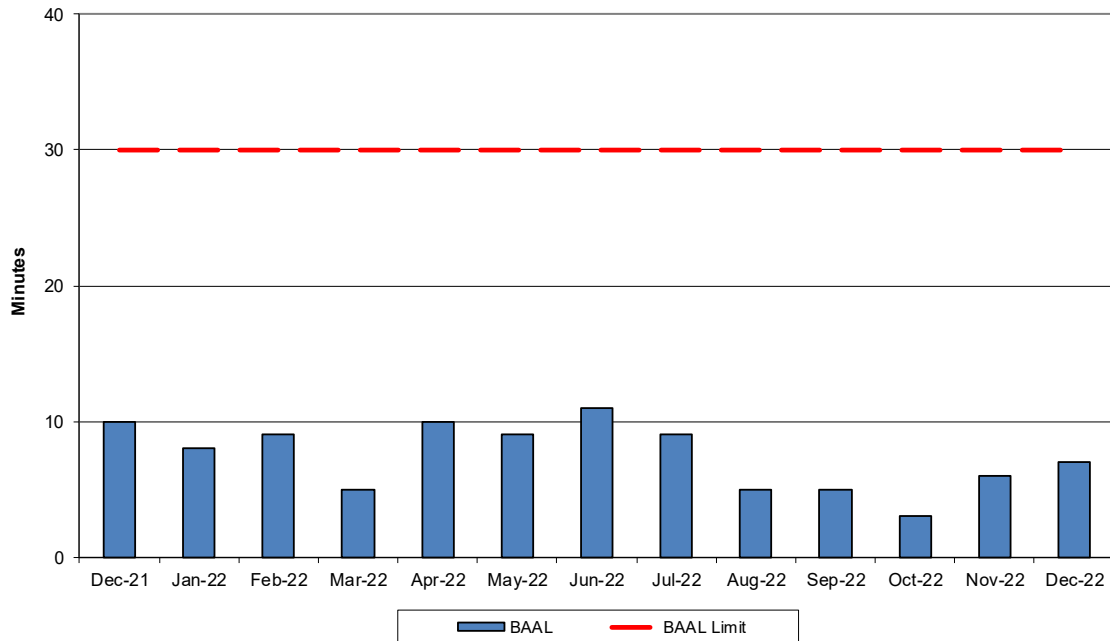
For IROL exceedances leading to Major Emergency State declarations, the maximum IROL exceedance time is identified. IROL exceedances of less than thirty minutes are considered NERC compliant.

NERC Control Performance Standards



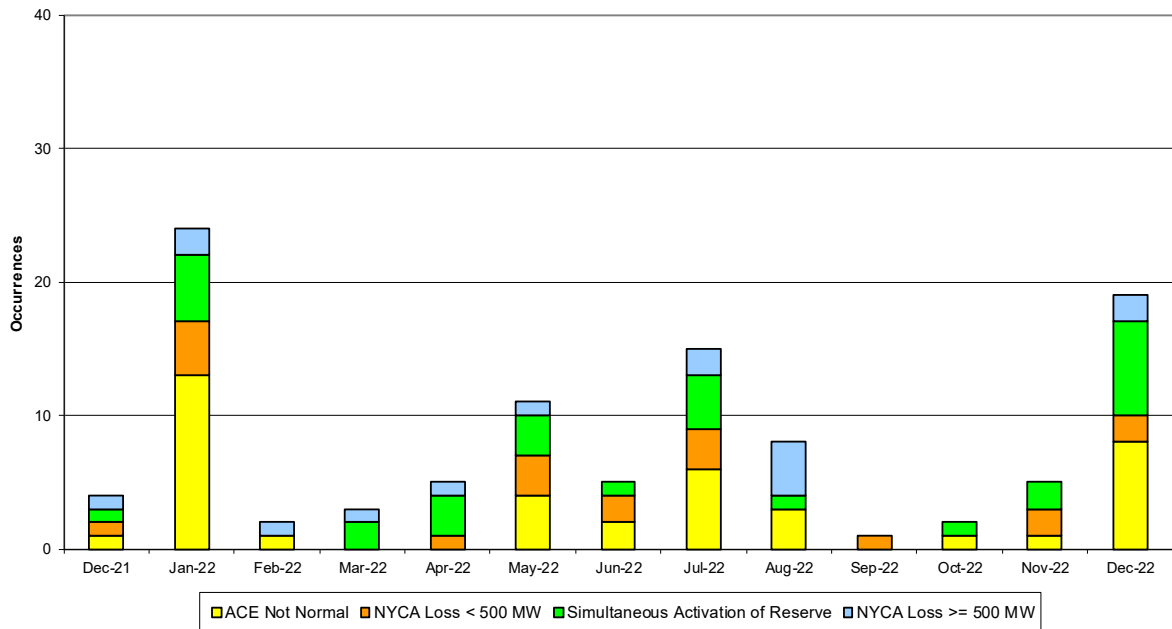
The value of NERC Control Performance Standards (CPS-1) is an indicator of the NYISO Area resource and demand balancing. Values exceeding the identified threshold are NERC compliant.

NERC Balancing Authority ACE Limit Standard



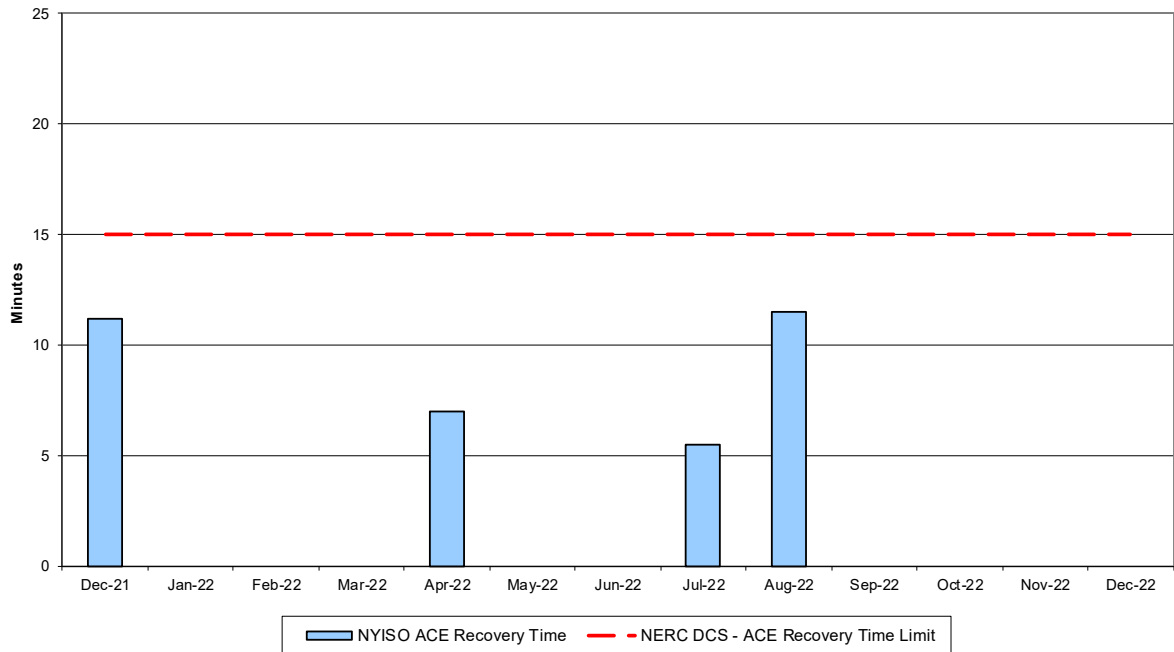
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



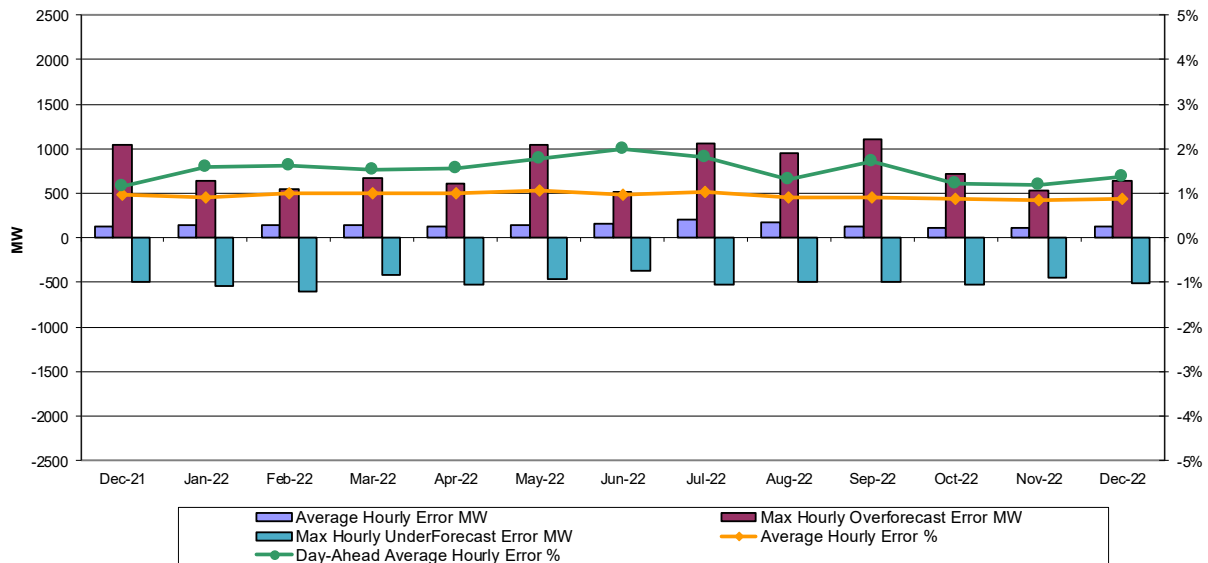
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

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

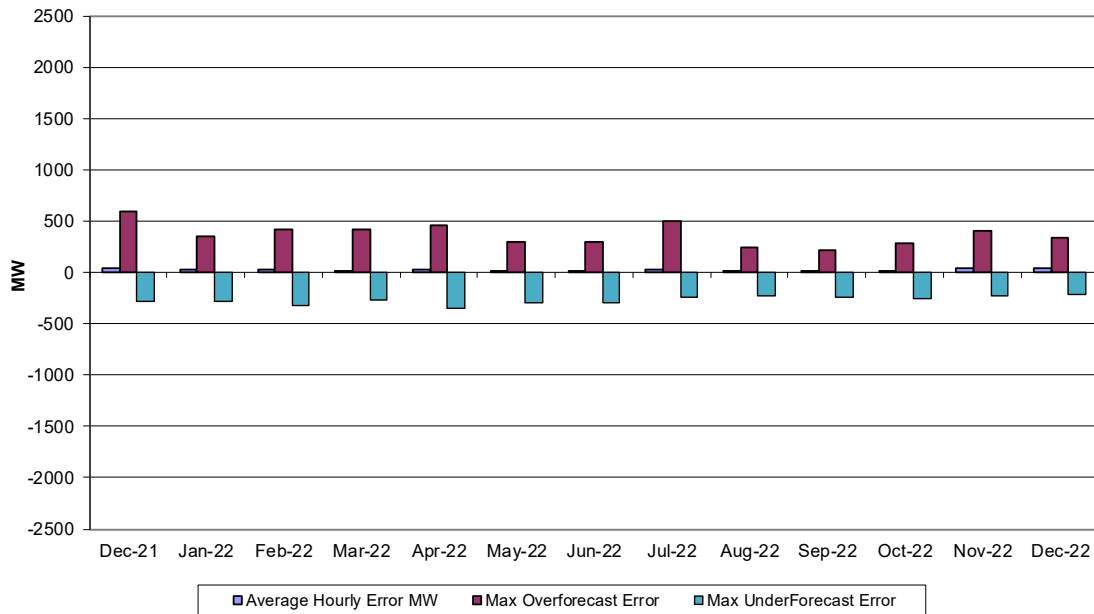


Hourly Error MW - Value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.

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

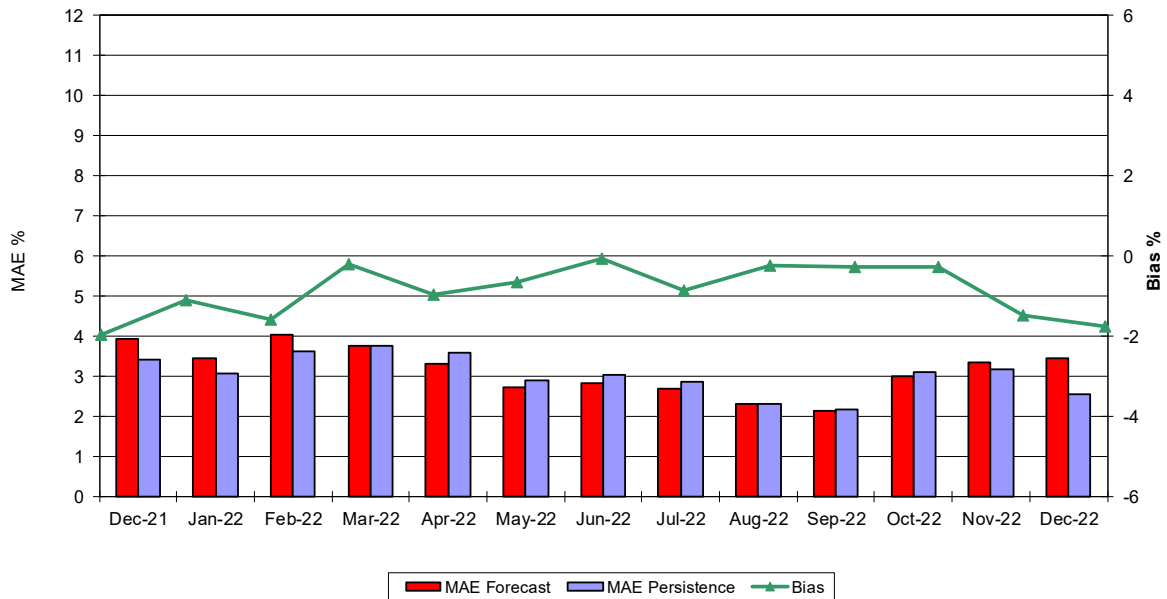
Day-Ahead Average Hourly Error % - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.

Wind Forecast Performance Hour Ahead MW Error

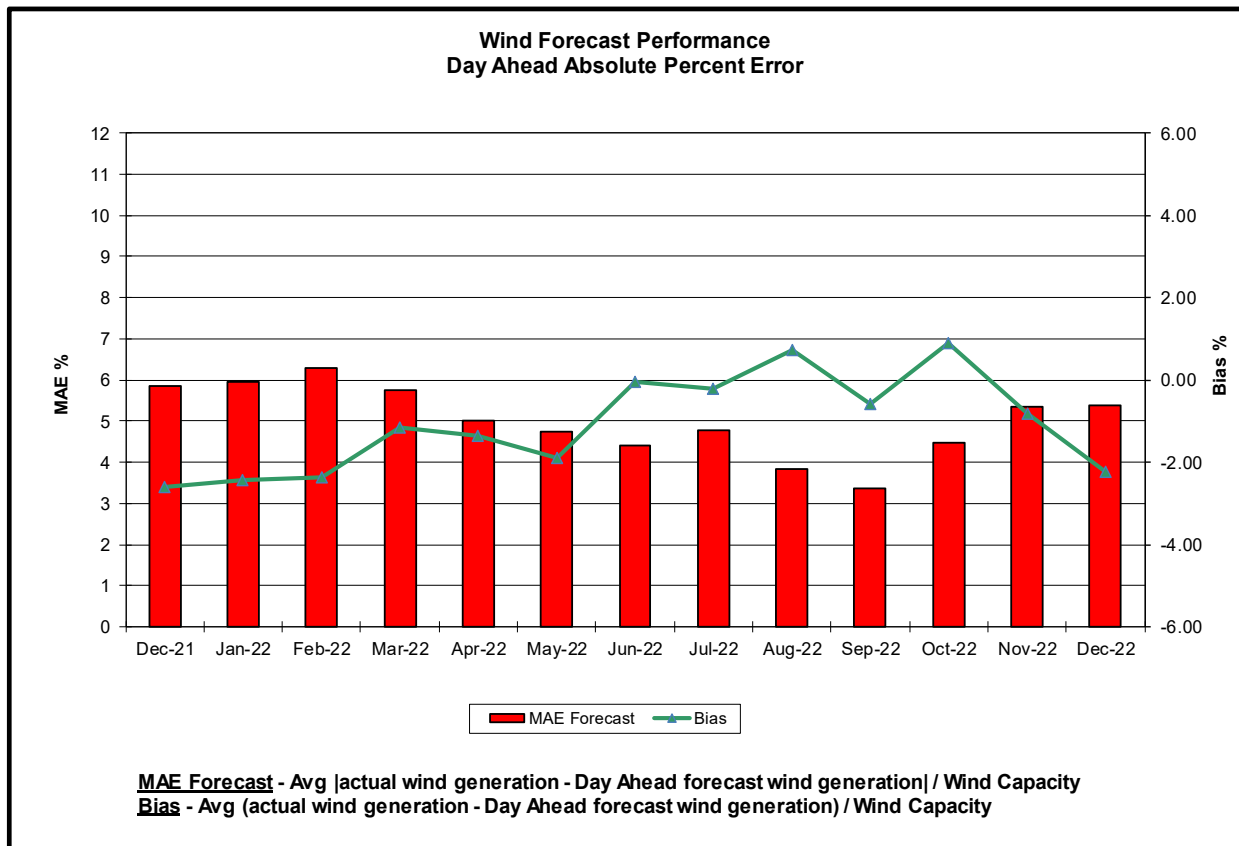
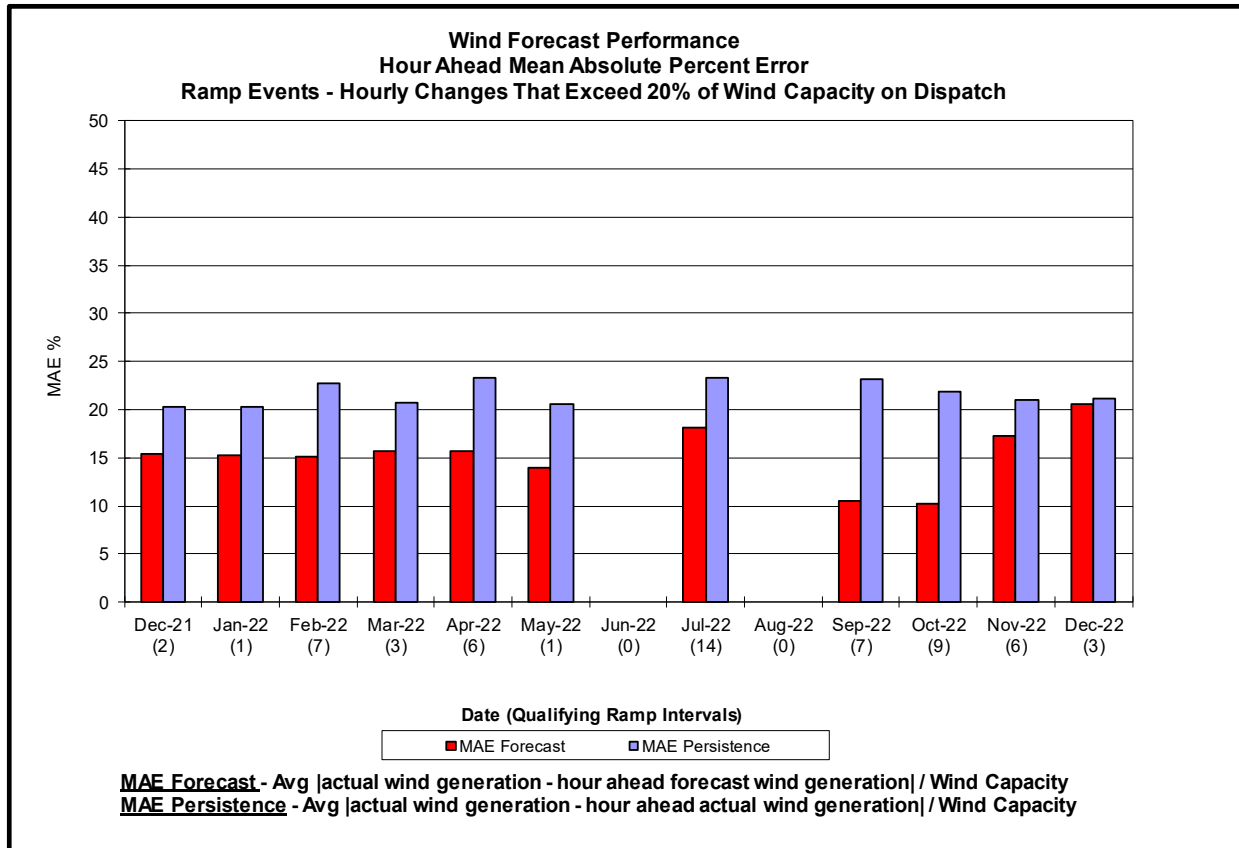


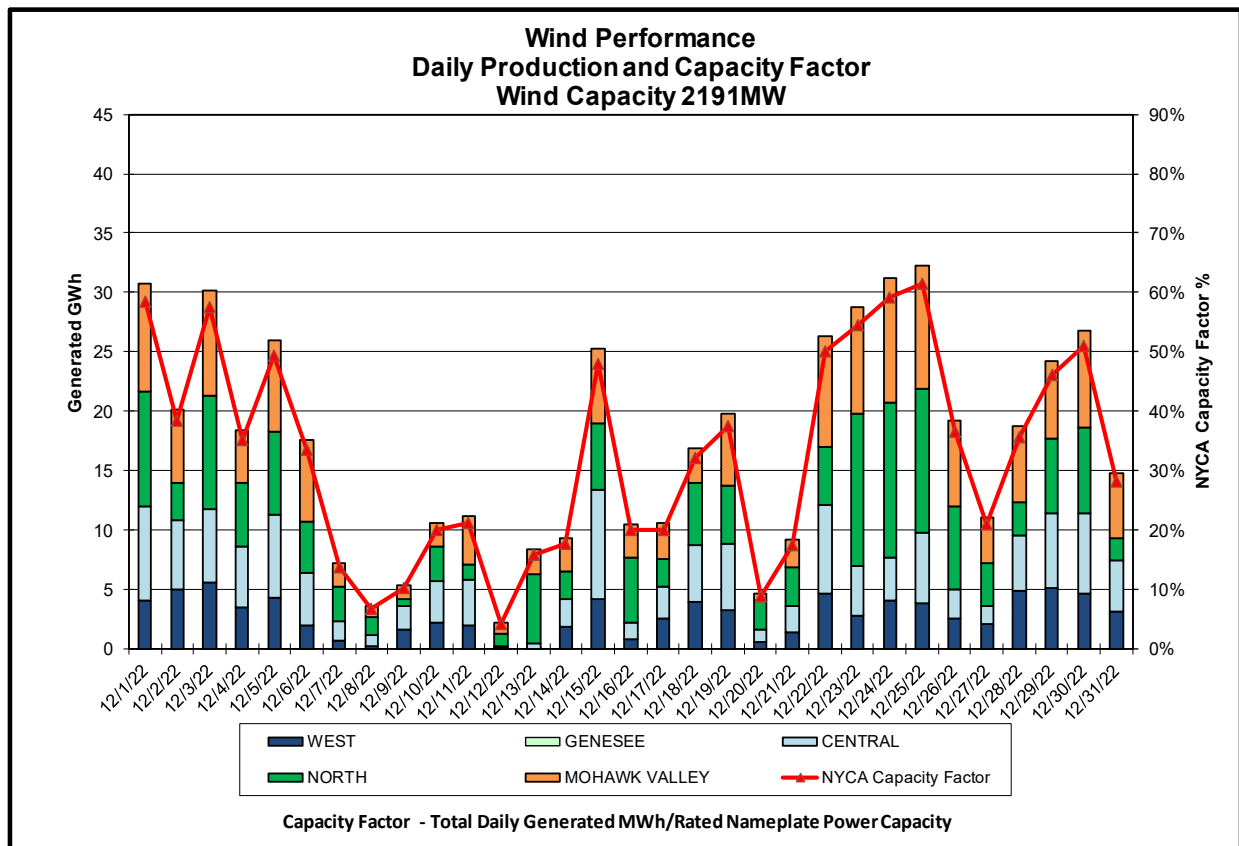
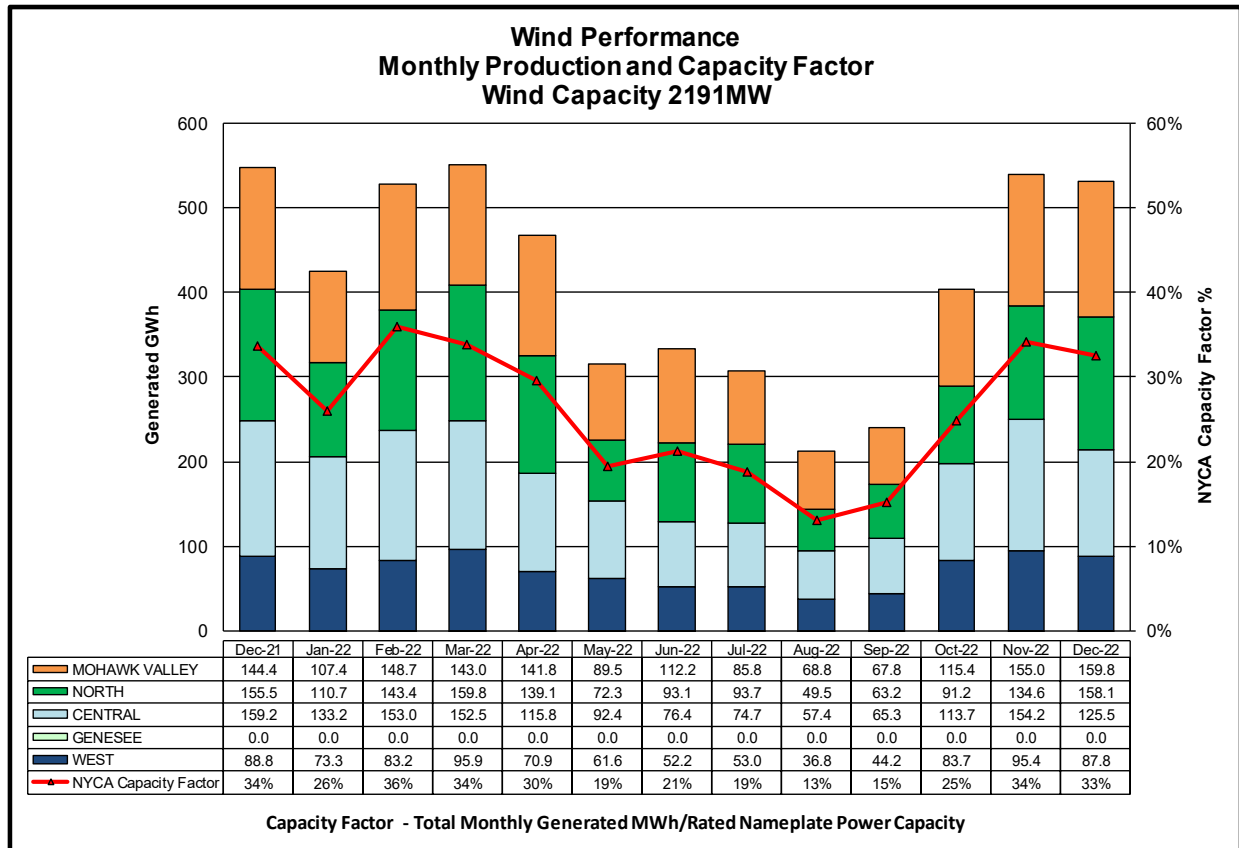
Hourly Error MW - Value of the difference between the hourly average actual wind generation and the average hour ahead forecast wind generation.

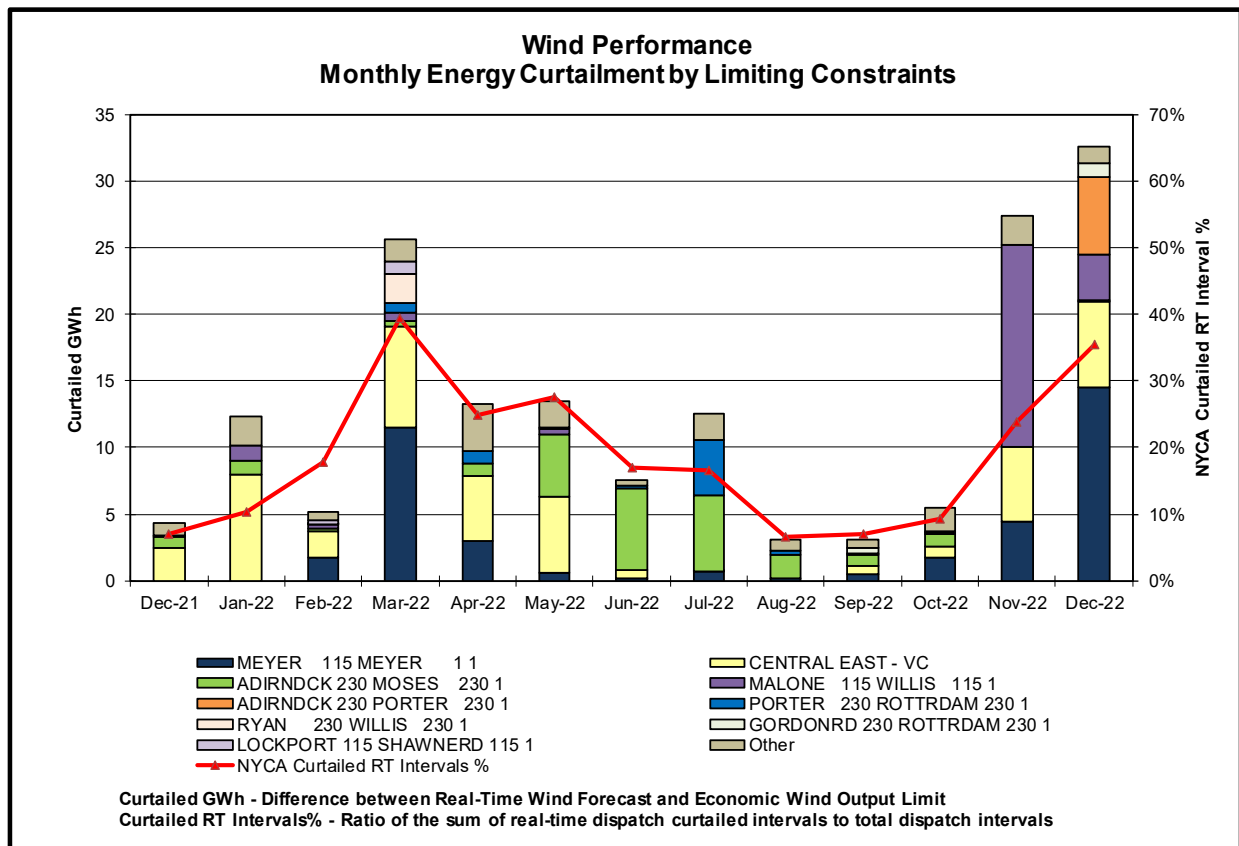
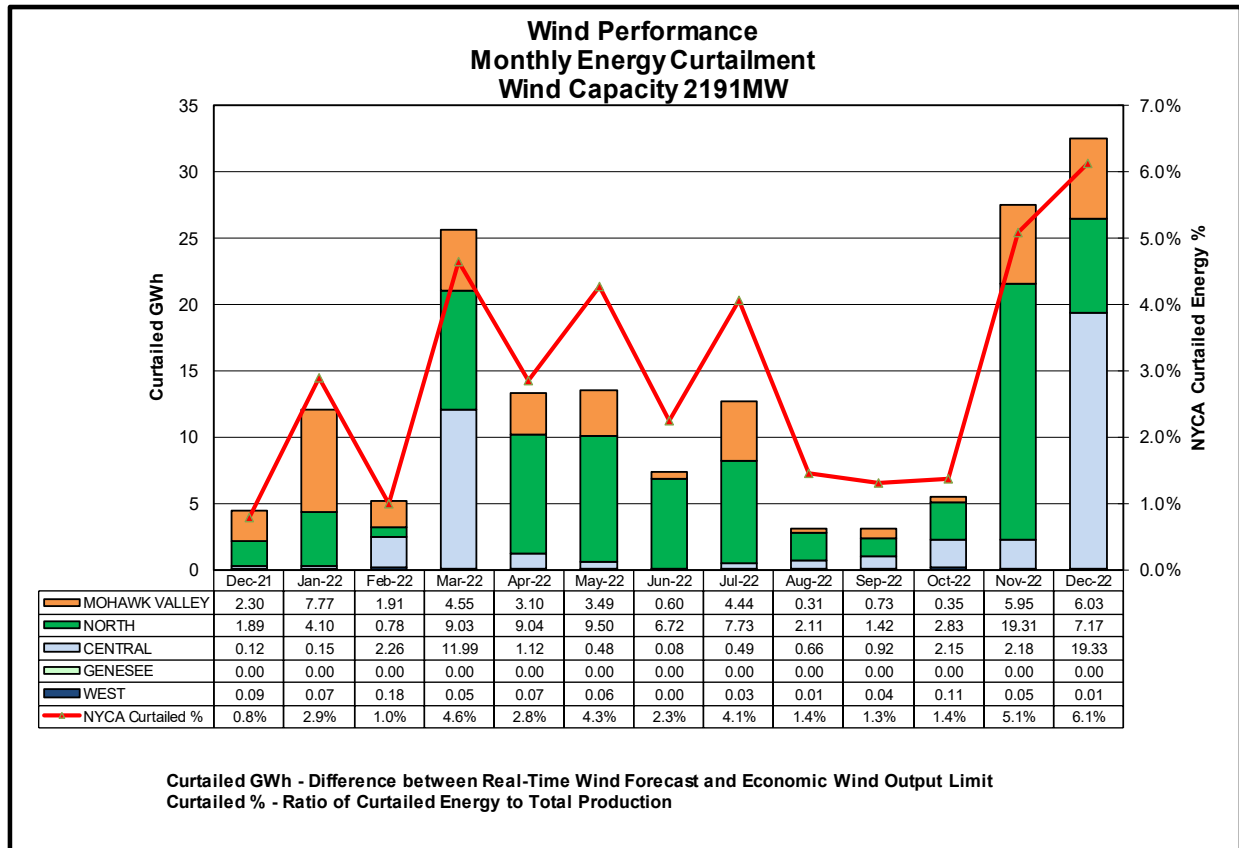
Wind Forecast Performance Hour Ahead Percent Error

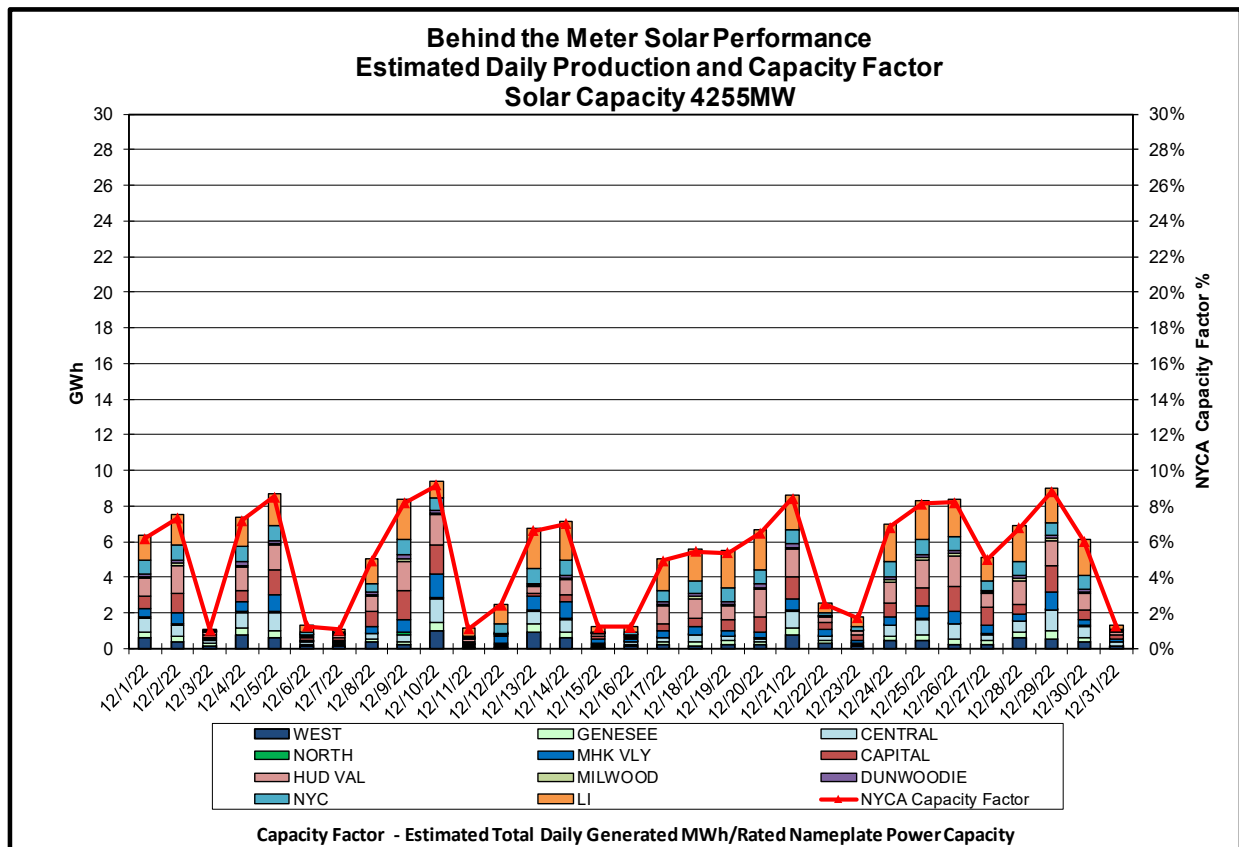
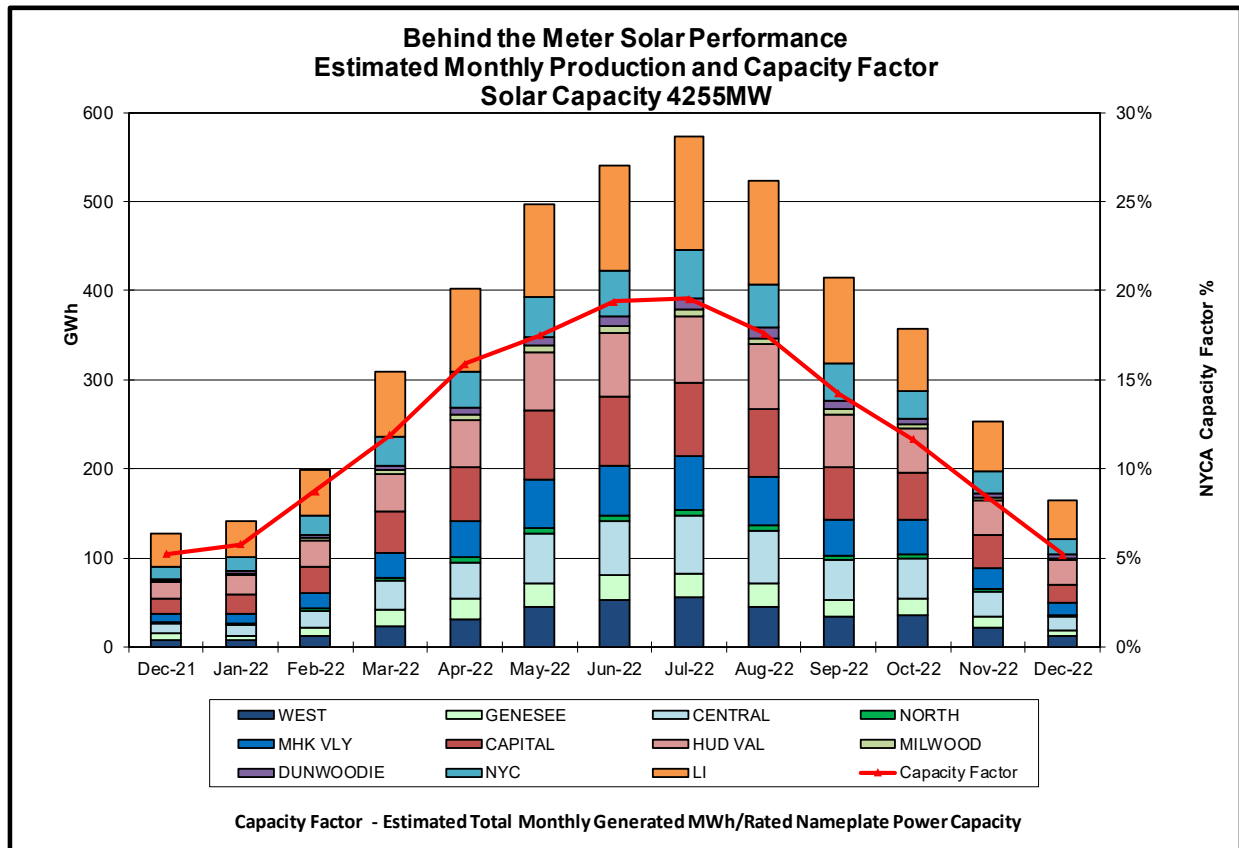


MAE Forecast - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity
MAE Persistence - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity
Bias - Avg (actual wind generation - hour ahead forecast wind generation) / Wind Capacity

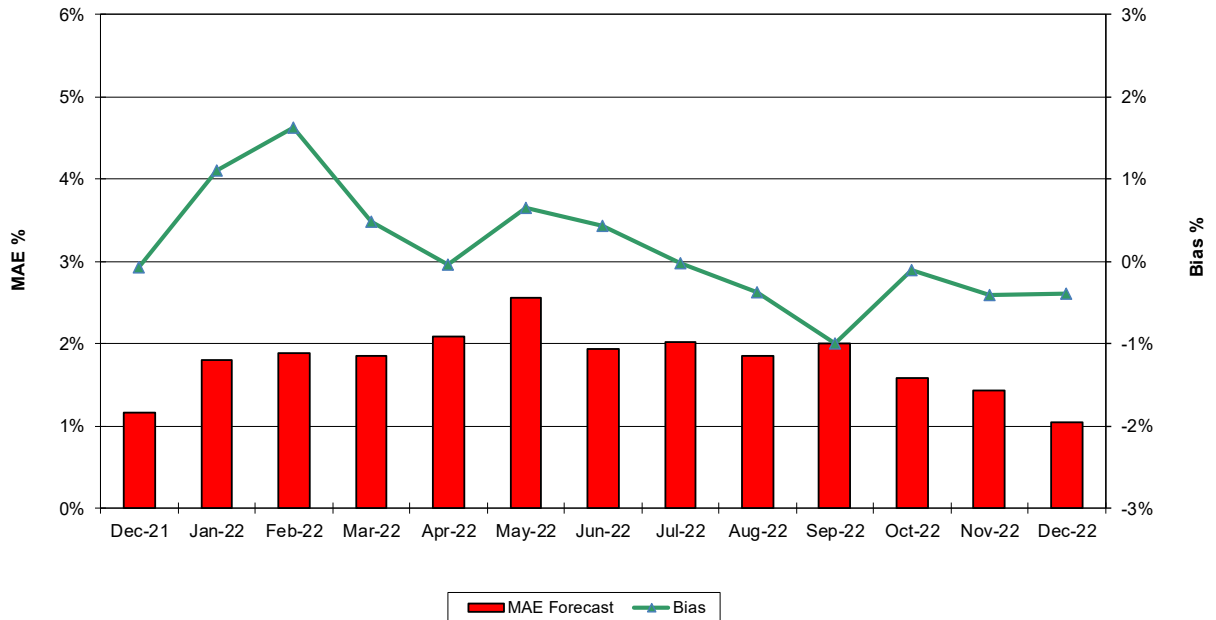






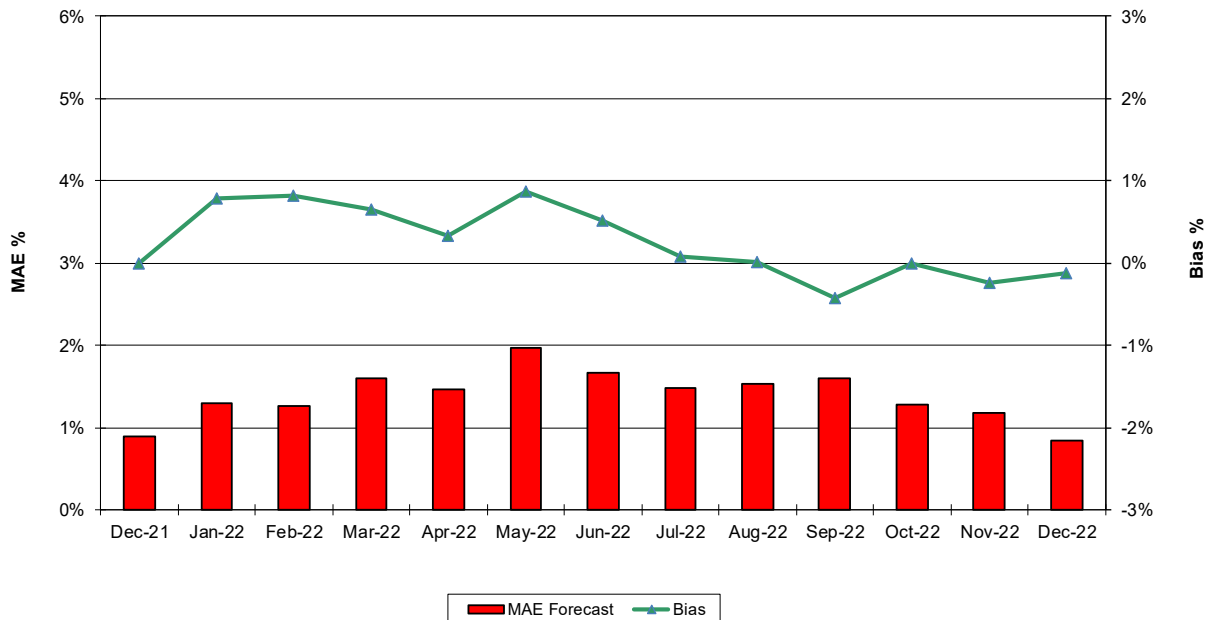


Behind the Meter Solar Forecast Performance Day Ahead Percent Error

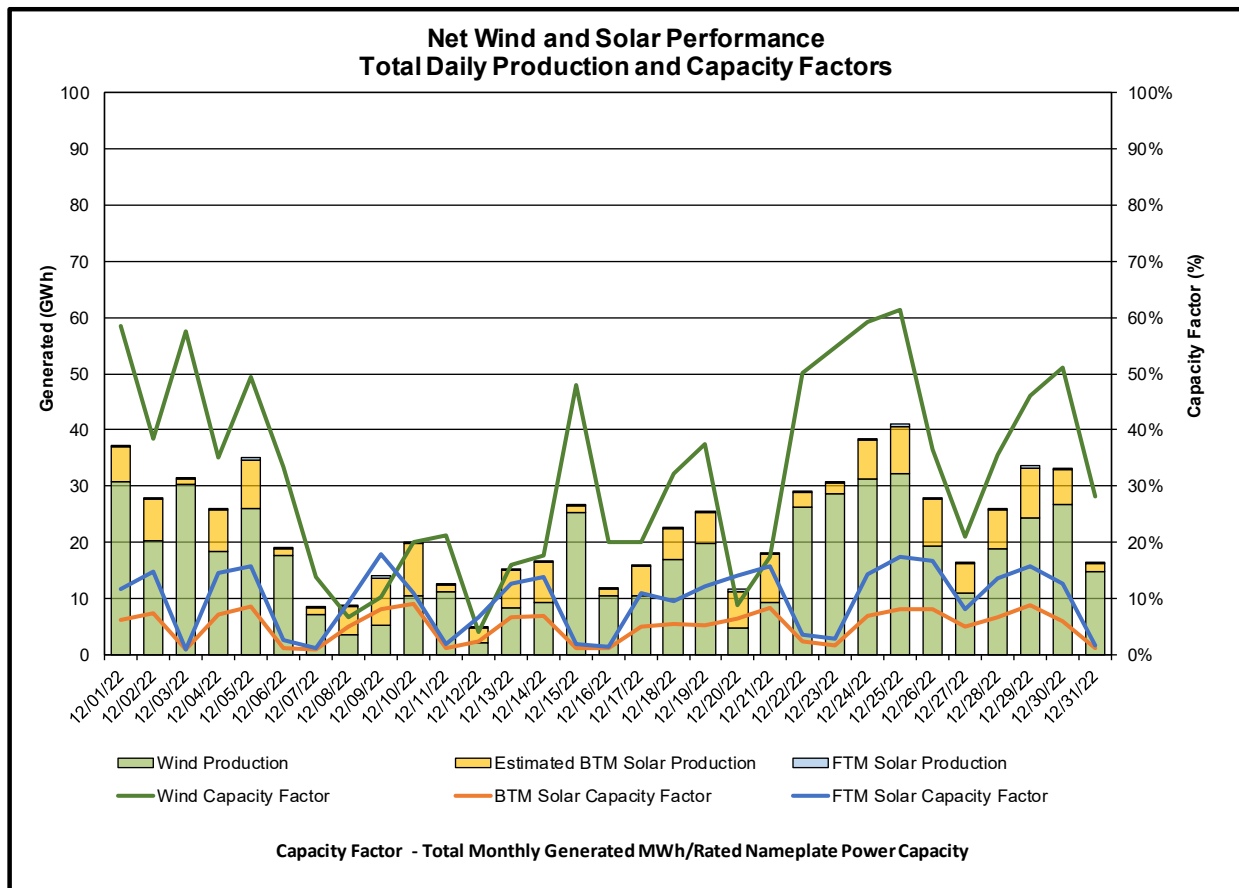
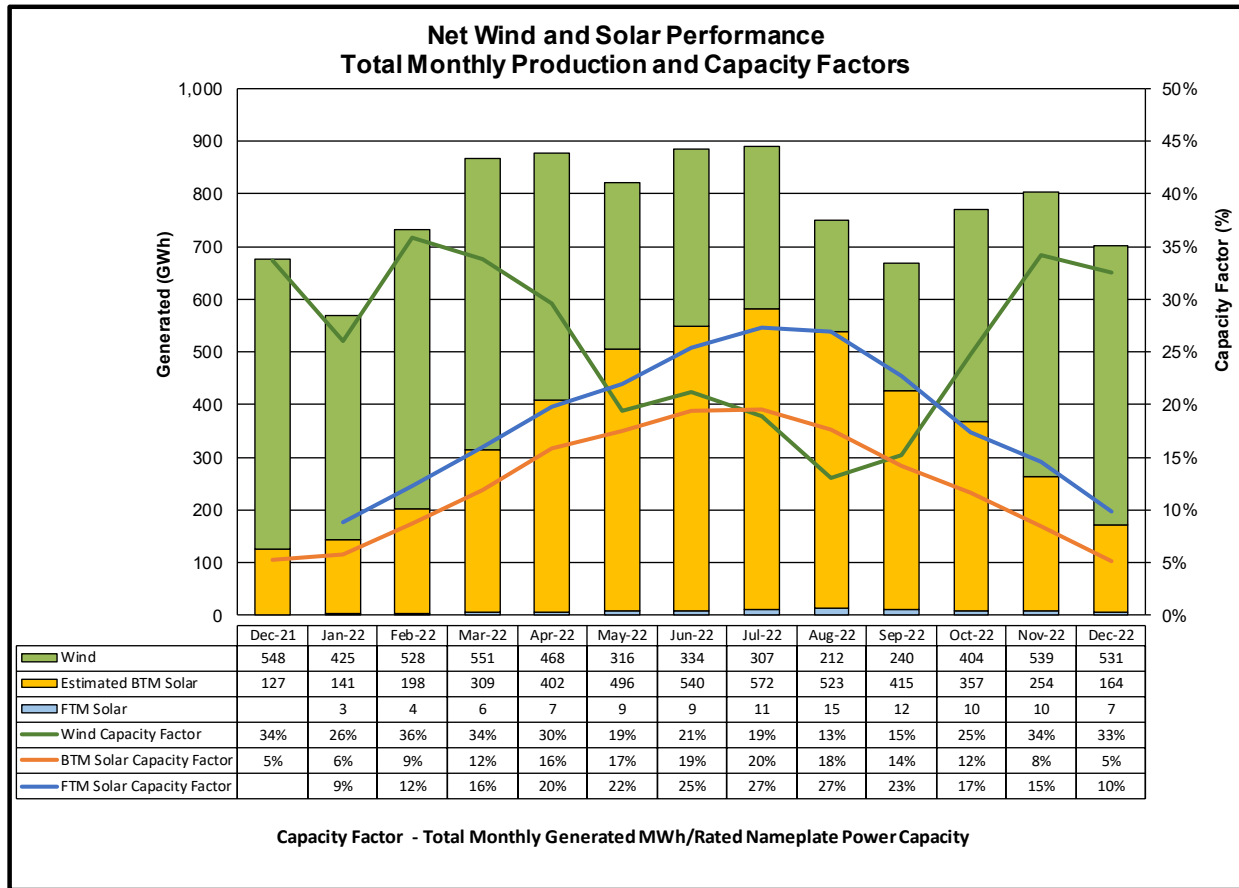


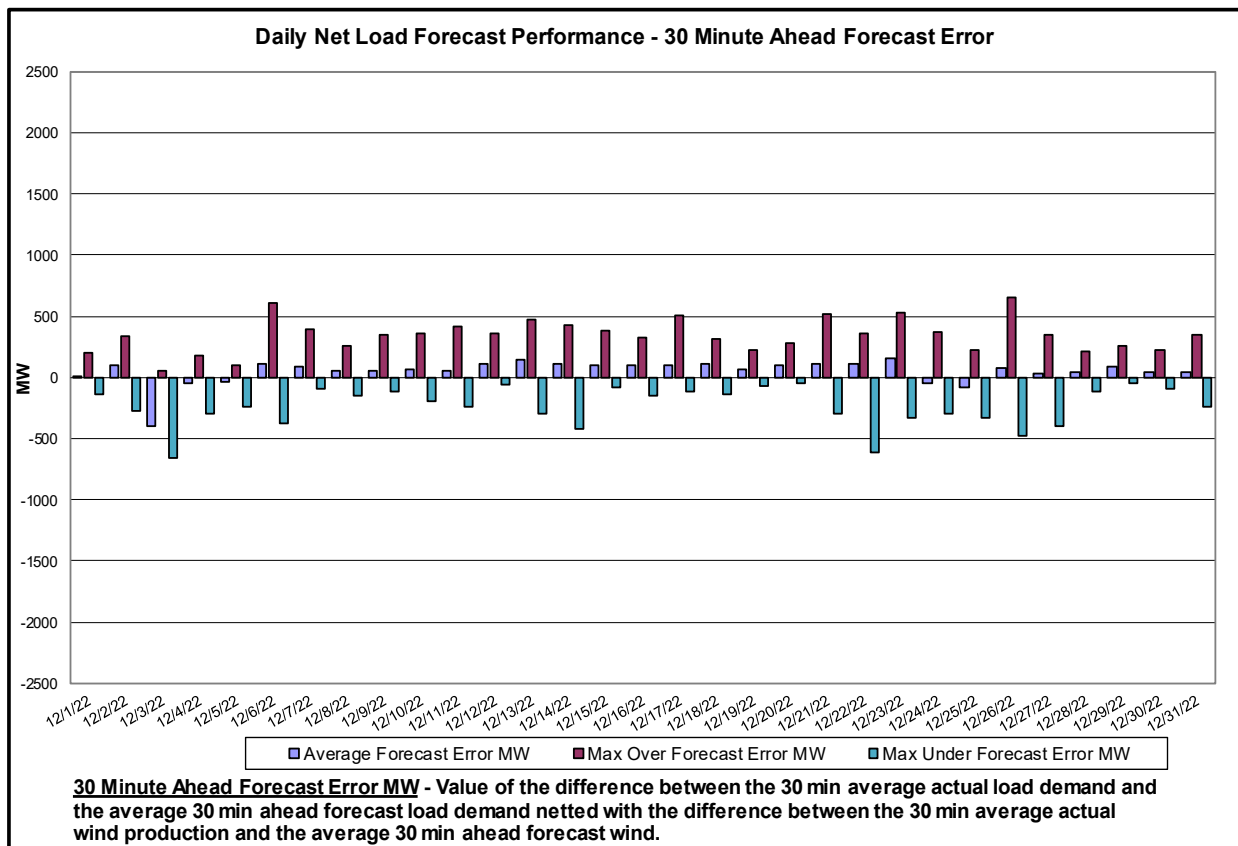
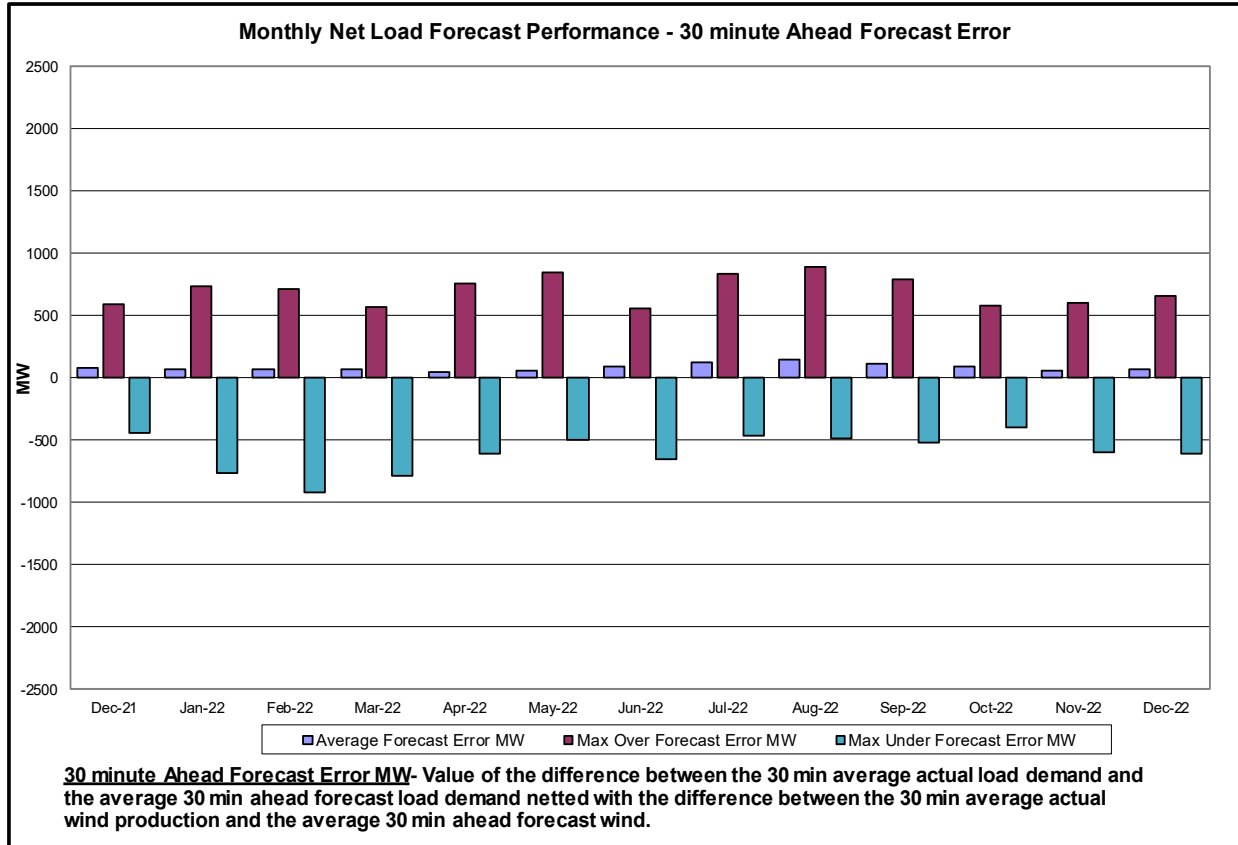
MAE Forecast - Avg |est. actual solar generation - Day Ahead forecast solar generation| / Solar Capacity
Bias - Avg (est. actual solar generation - Day Ahead forecast solar generation) / Solar Capacity

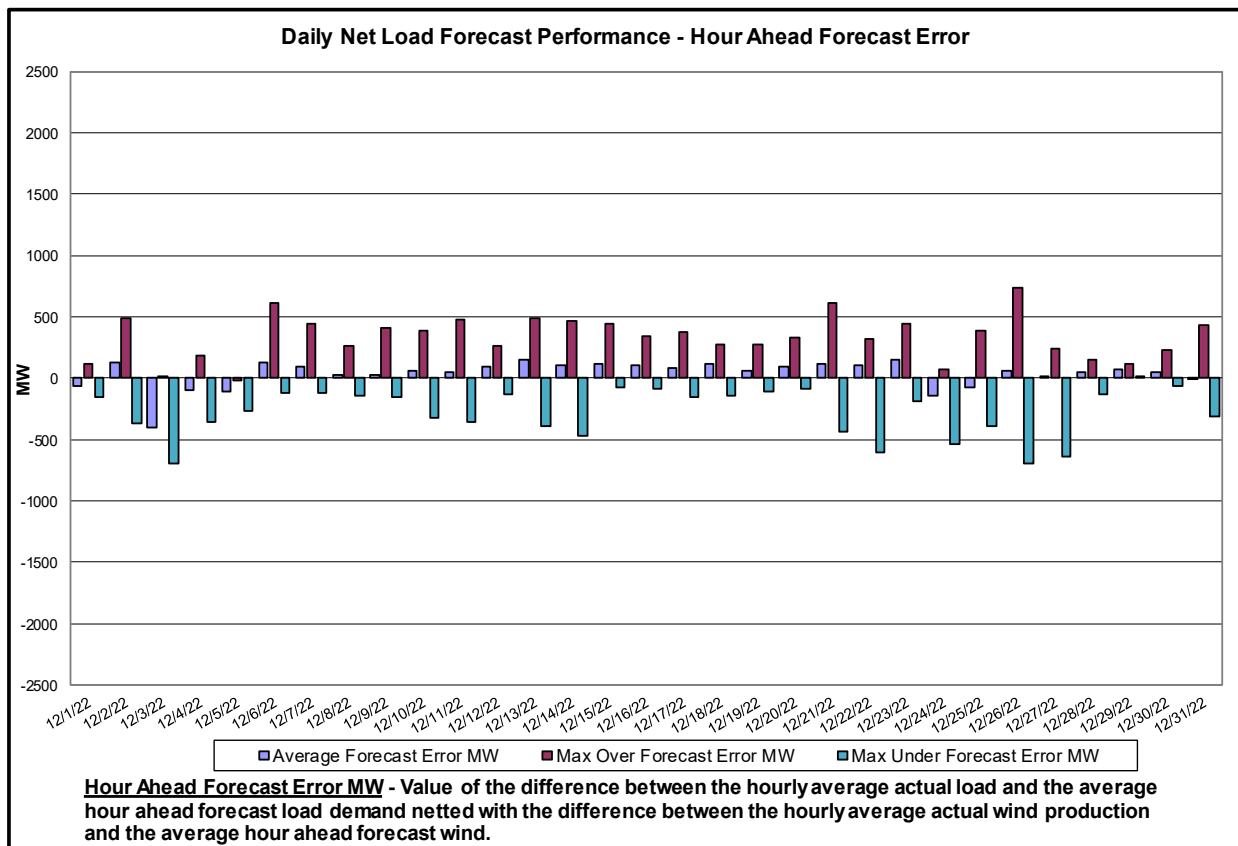
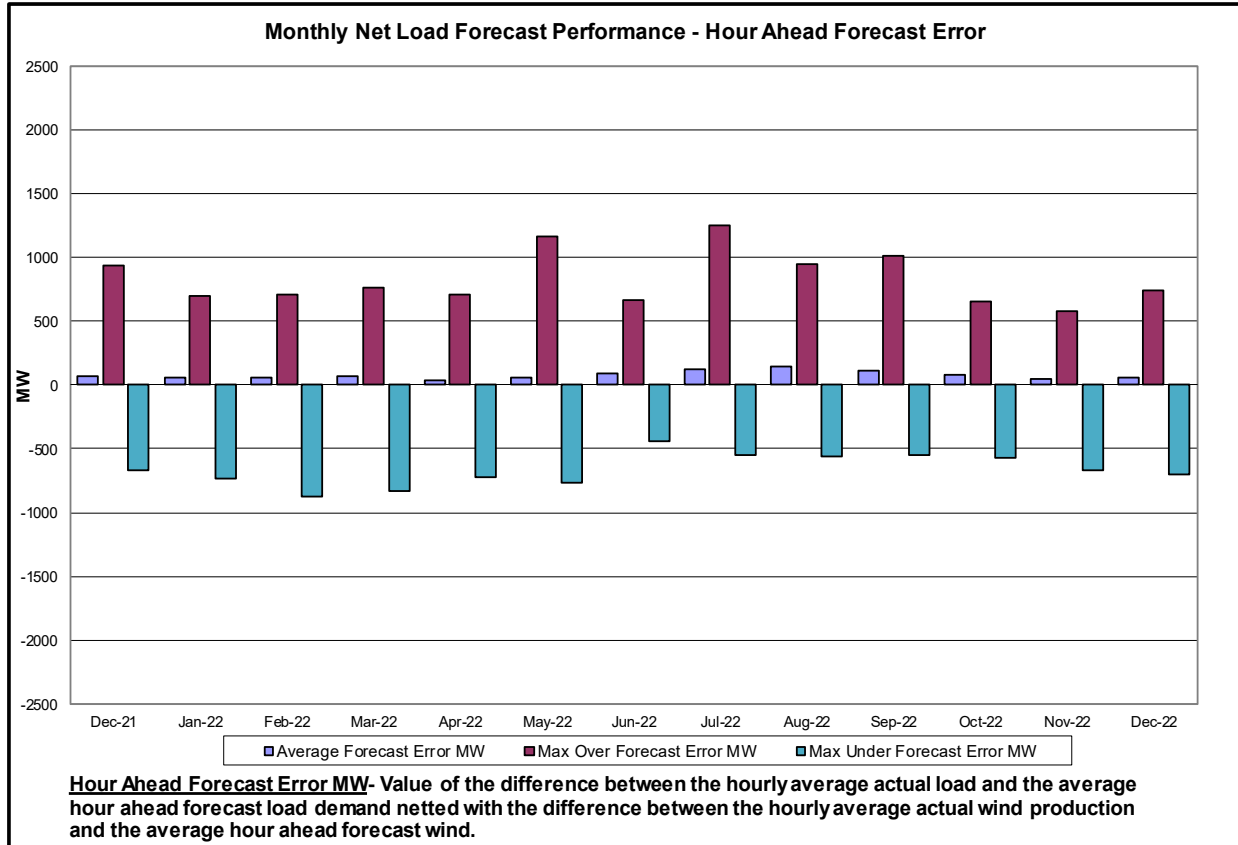
Behind the Meter Solar Forecast Performance Hour Ahead Percent Error

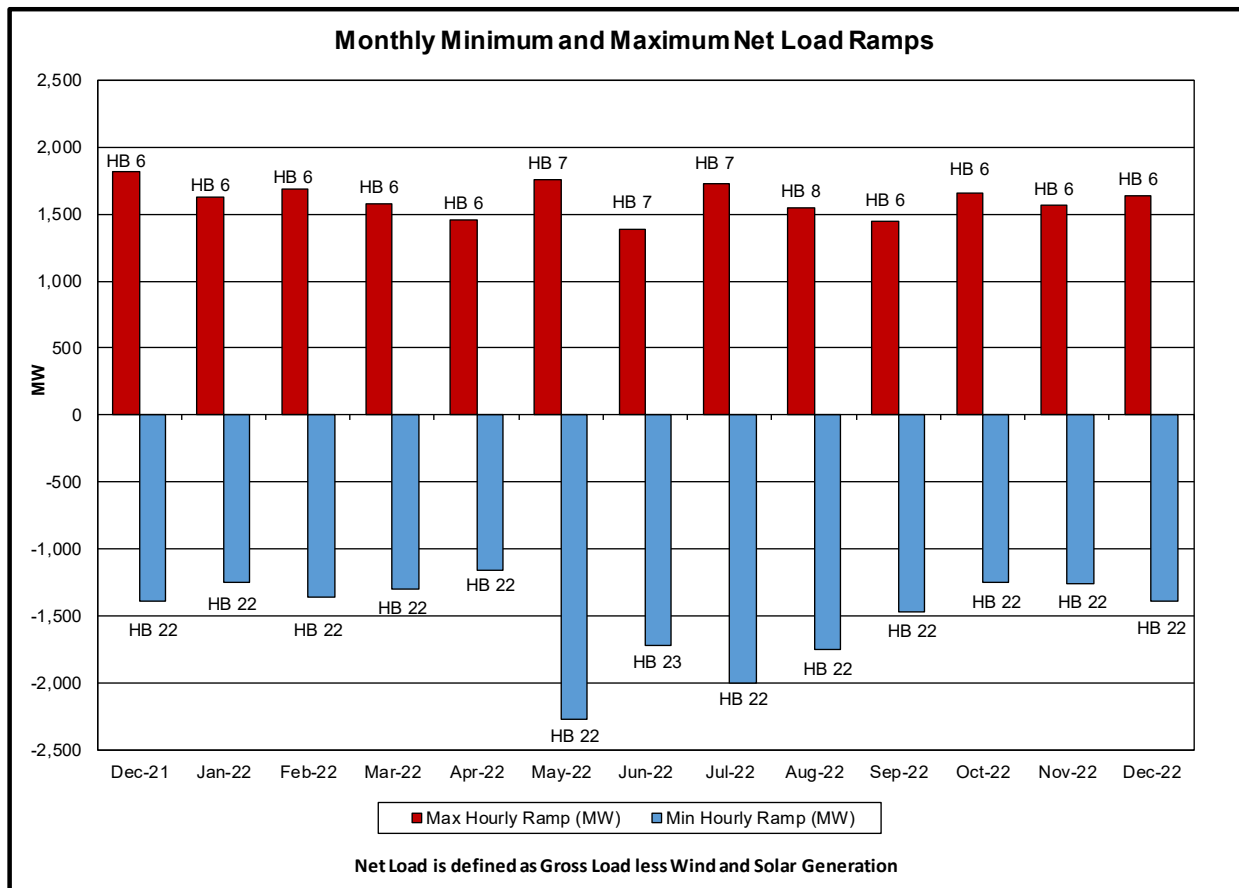
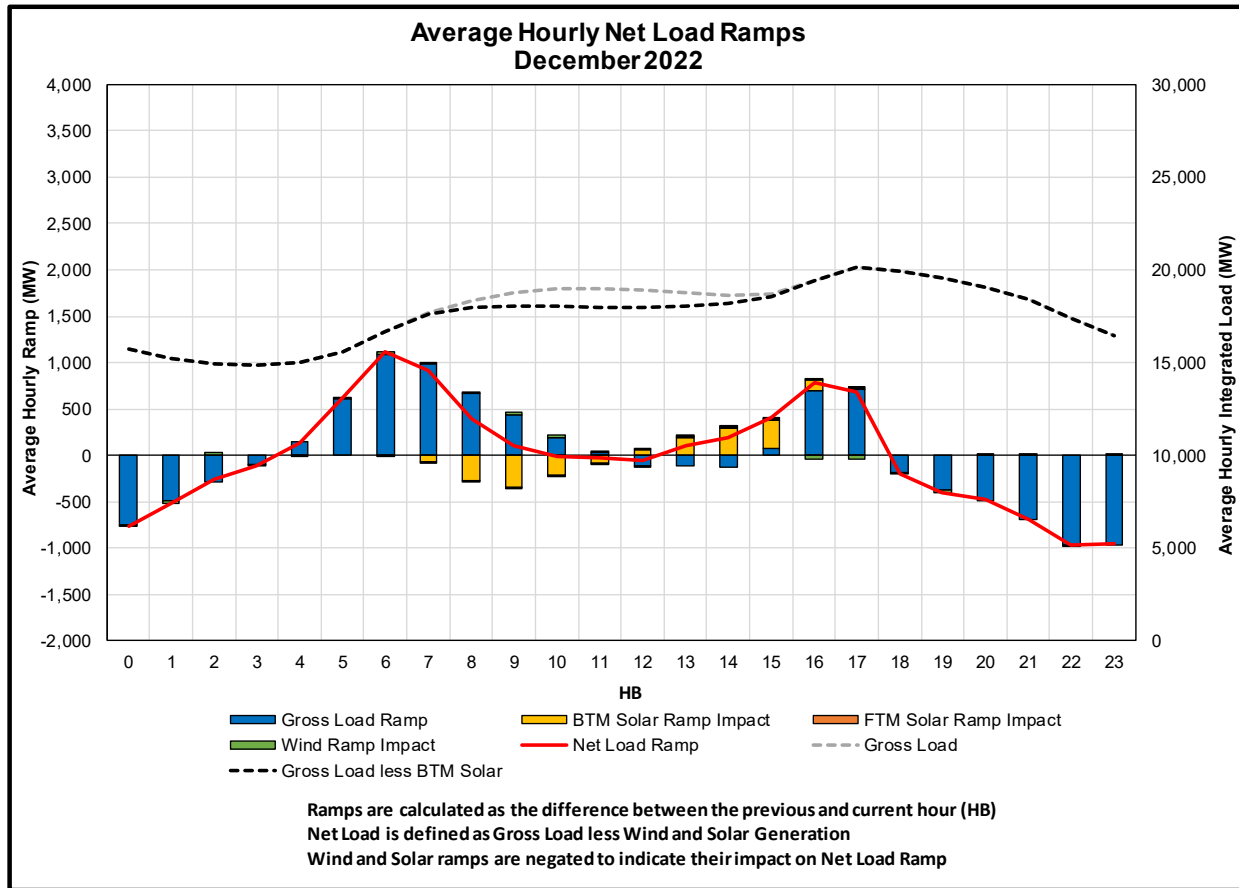


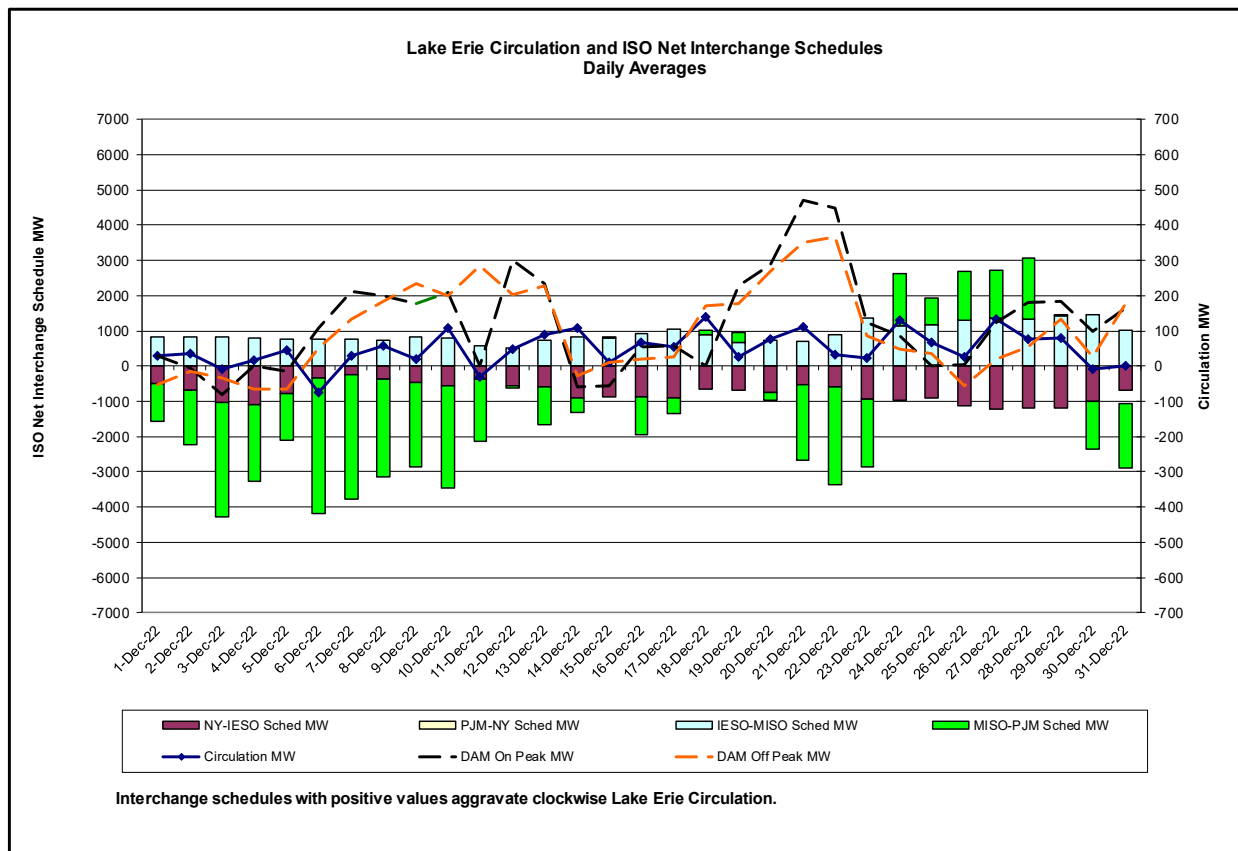
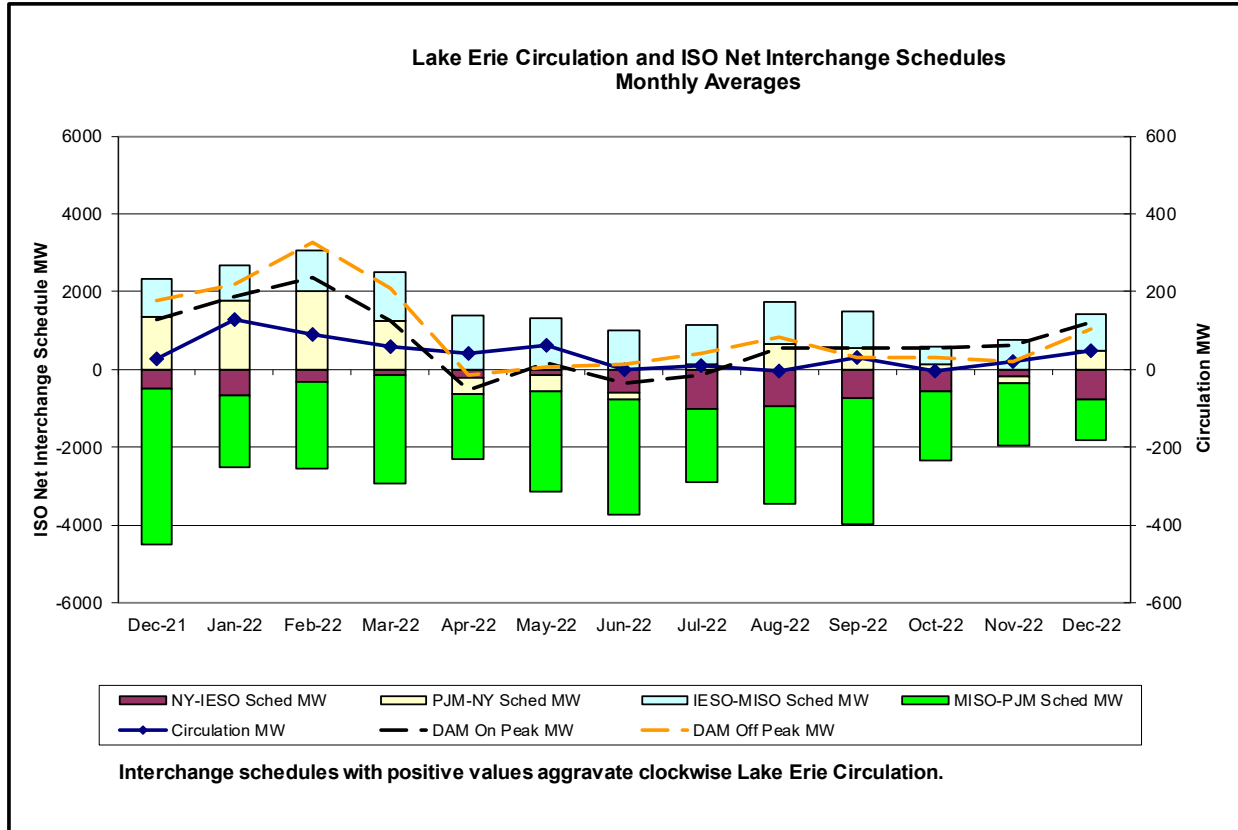
MAE Forecast - Avg |est. actual solar generation - Hour Ahead forecast solar generation| / Solar Capacity
Bias - Avg (est. actual solar generation - Hour Ahead forecast solar generation) / Solar Capacity



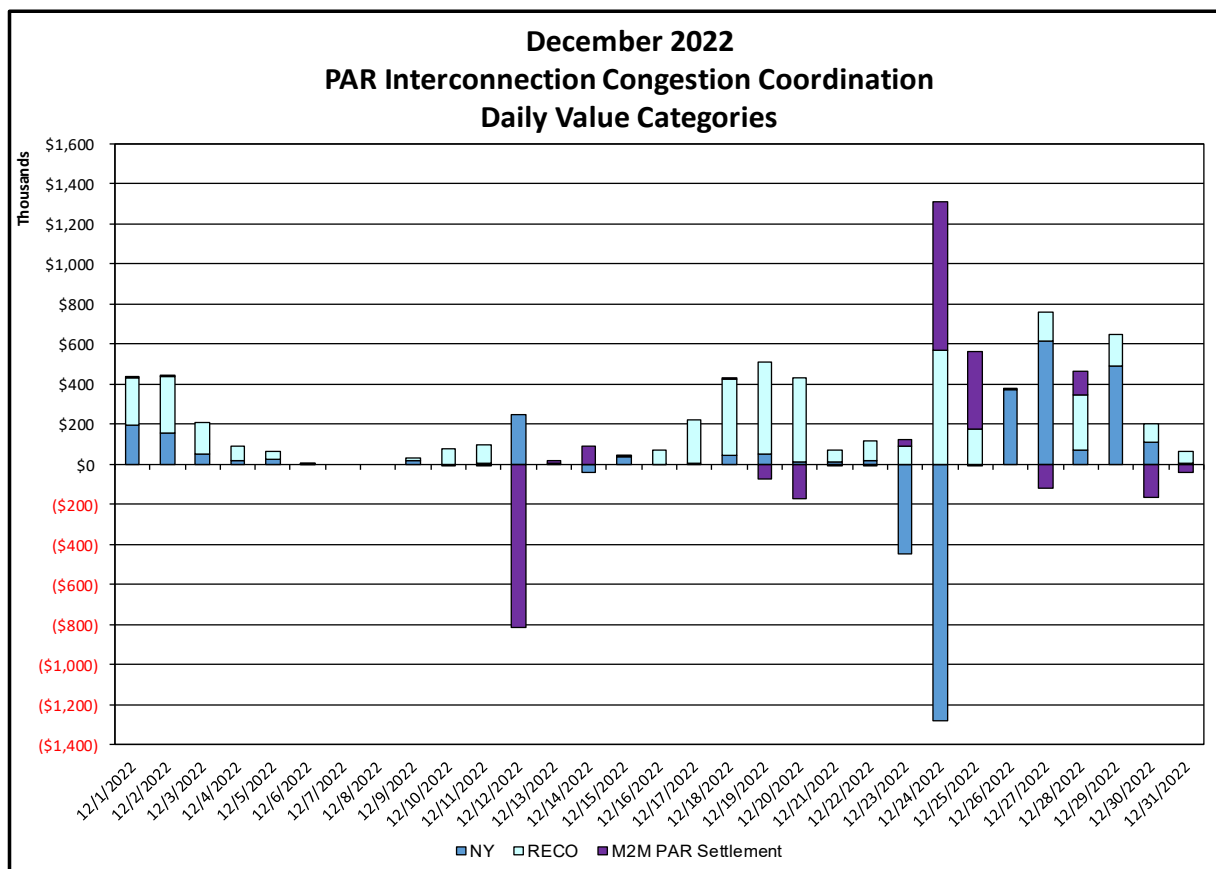
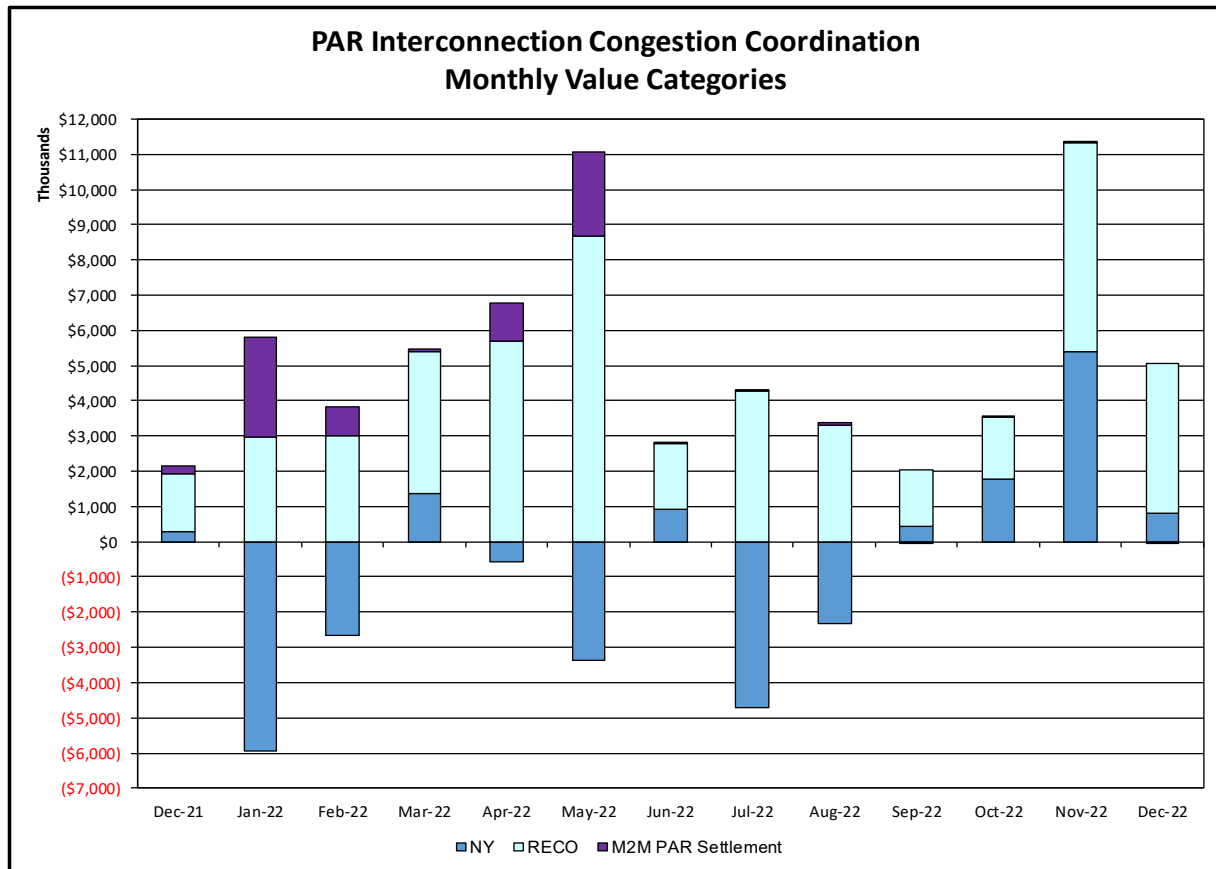




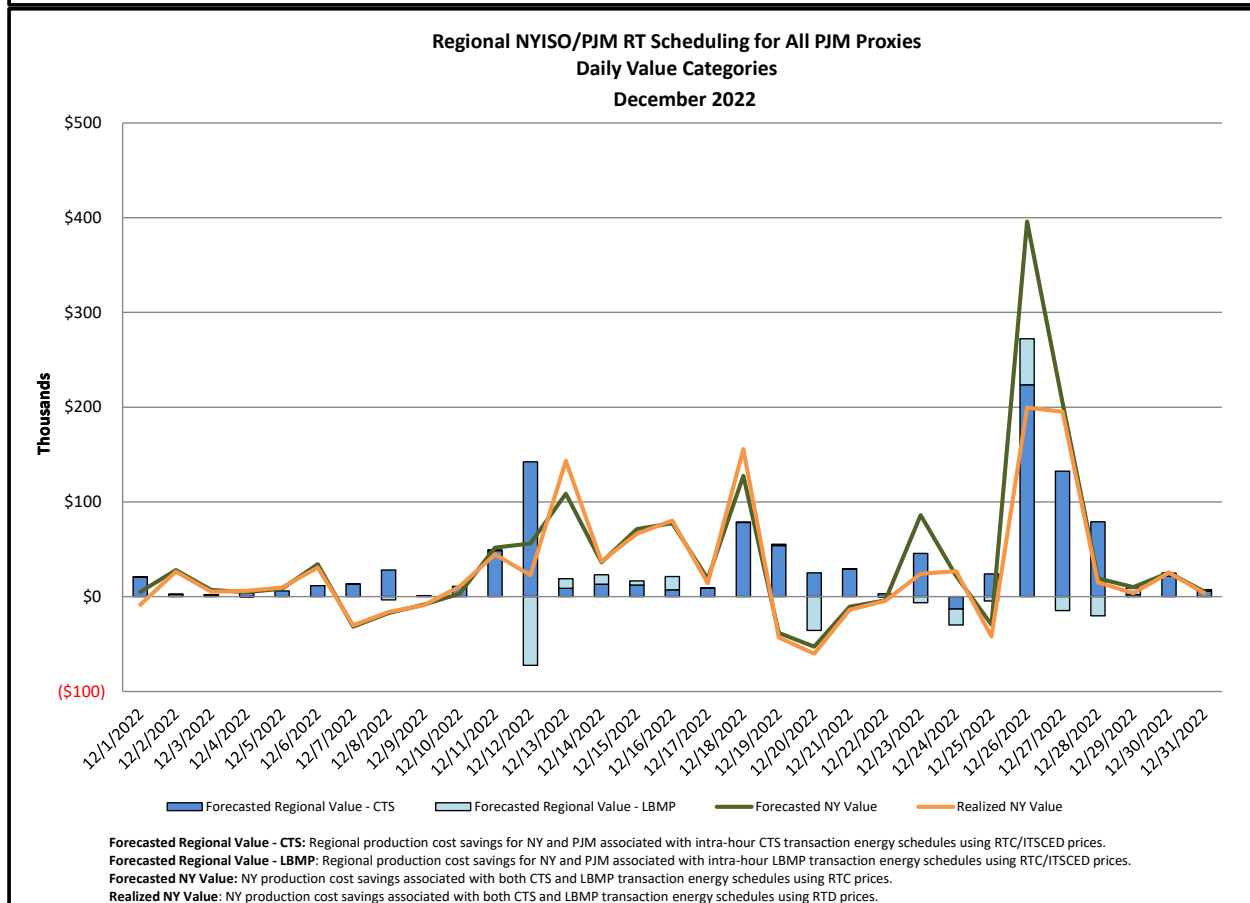
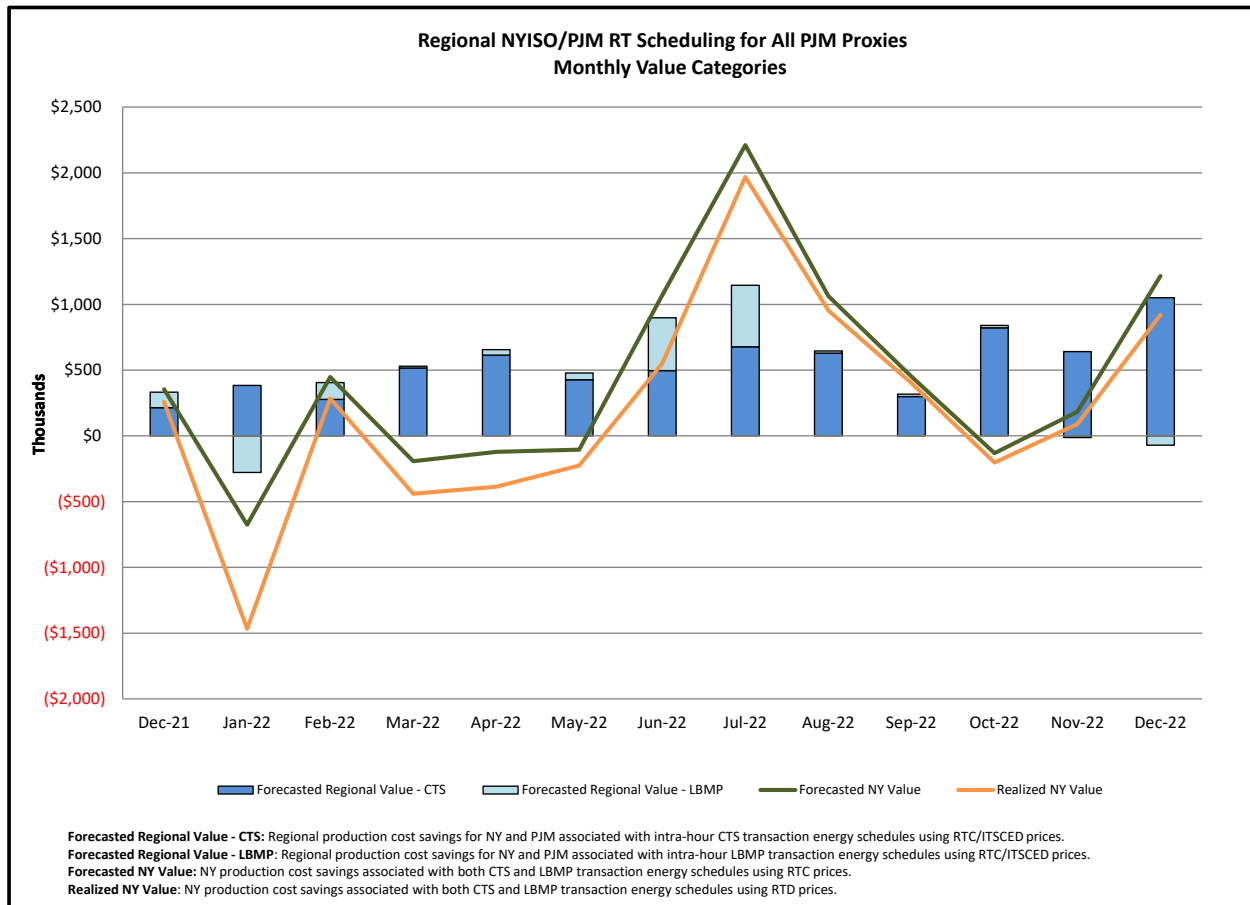




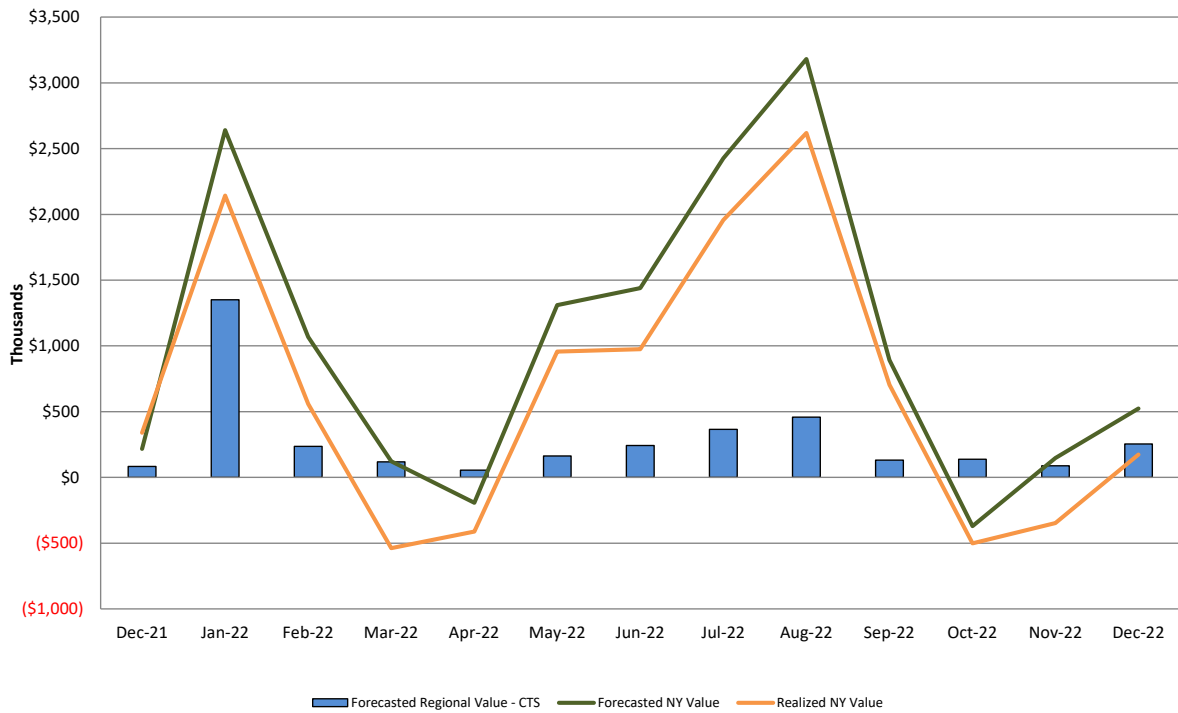
Broader Regional Market Performance Metrics



<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.

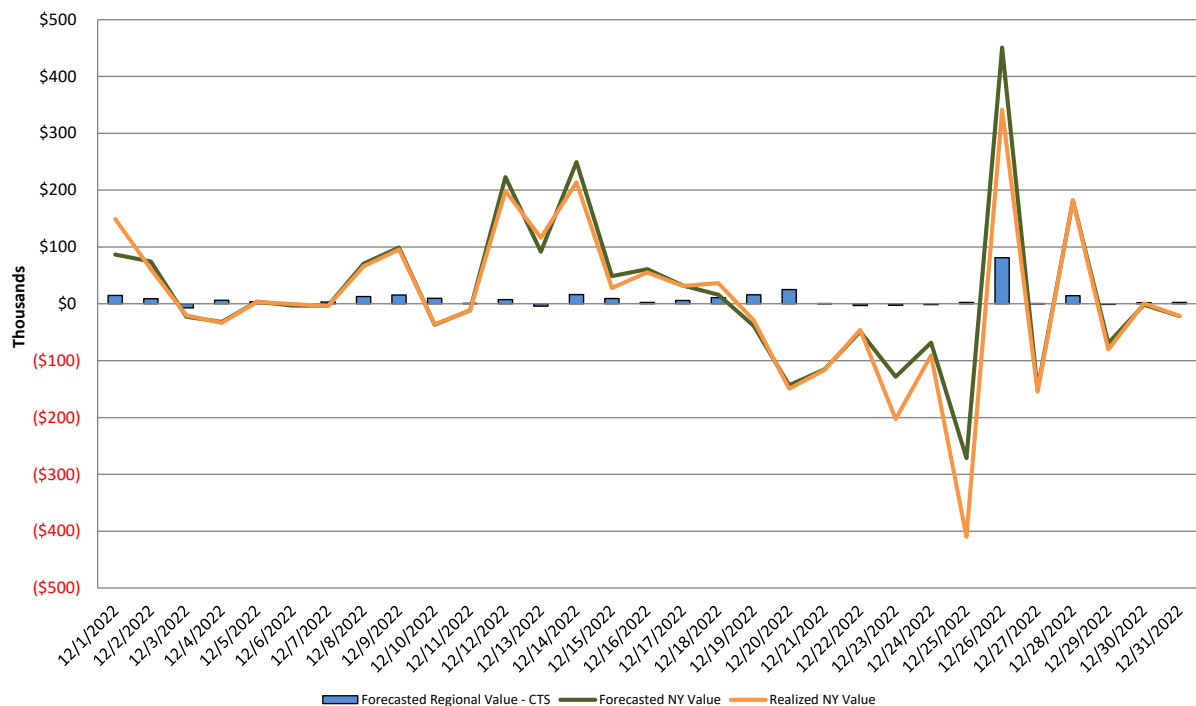


Regional NYISO/NE RT Scheduling for ISO-NE AC Monthly Value Categories



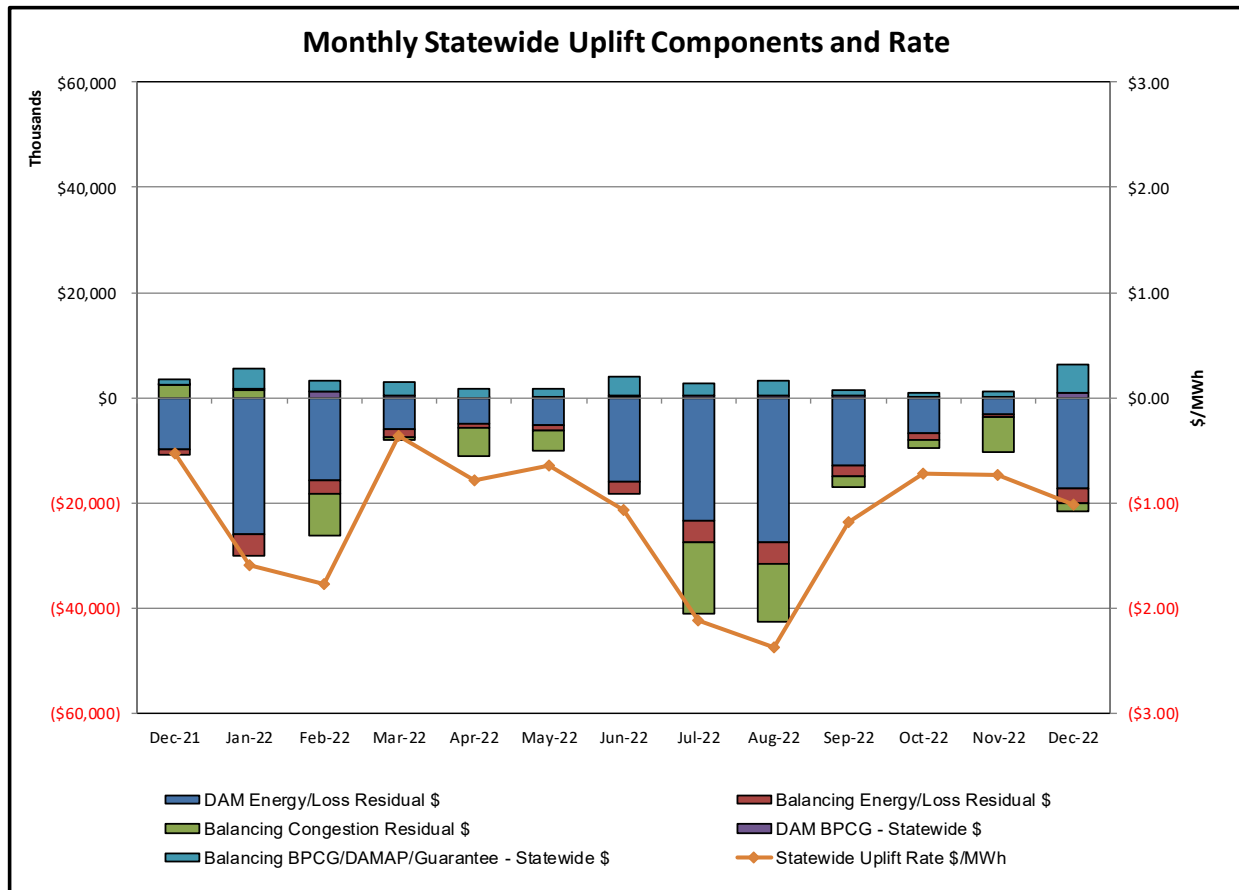
Forecasted Regional Value - CTS: Regional production cost savings for NY and NE associated with intra-hour CTS transaction energy schedules using RTC prices and NE forecasted prices.
Forecasted NY Value: NY production cost savings associated with CTS transaction energy schedules using RTC prices.
Realized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

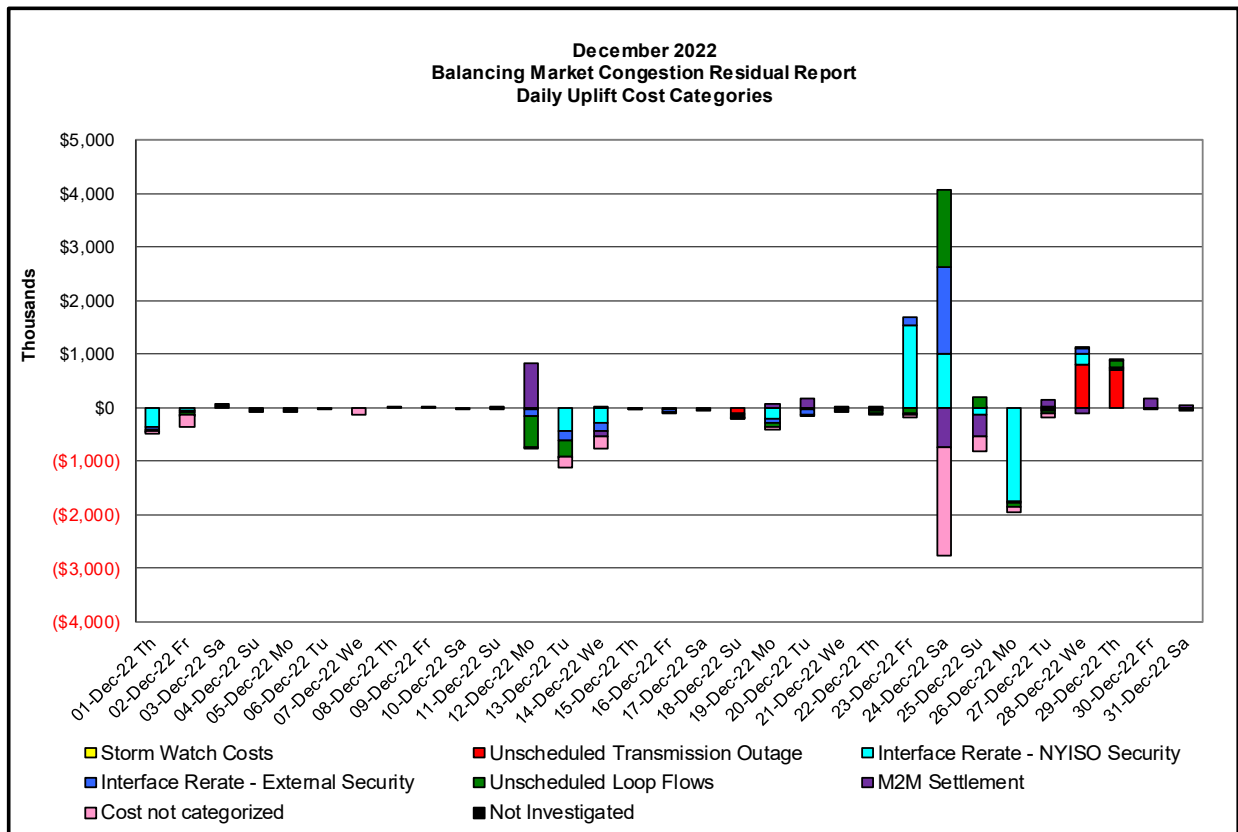
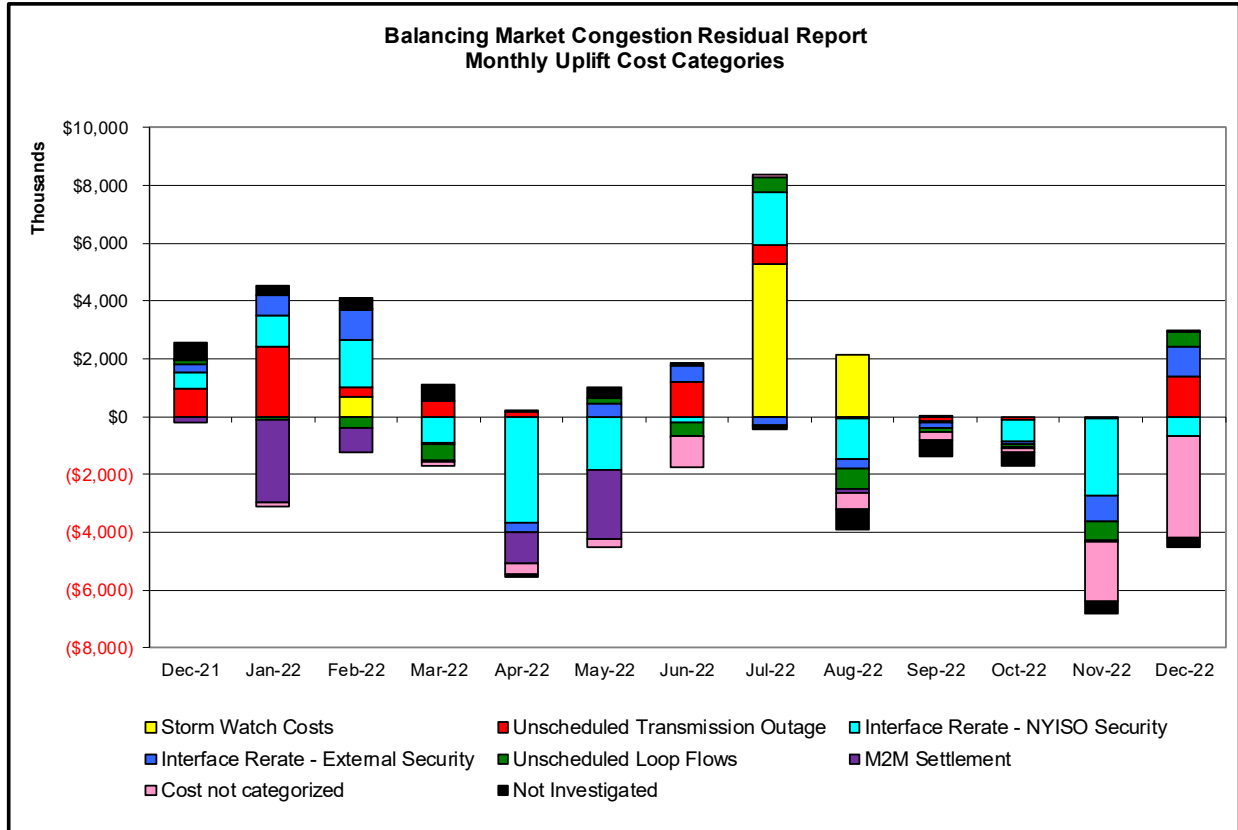
Regional NYISO/NE RT Scheduling for ISO-NE AC Daily Value Categories December 2022



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





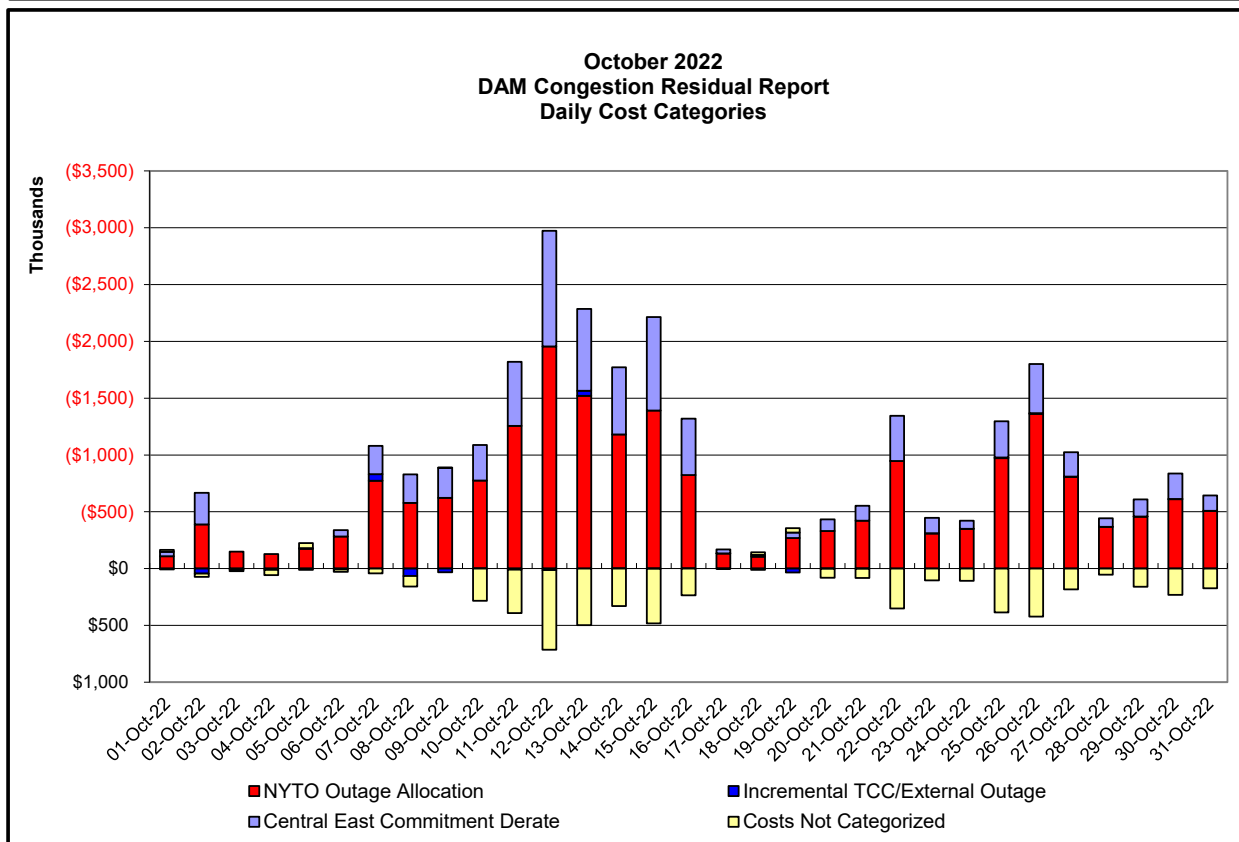
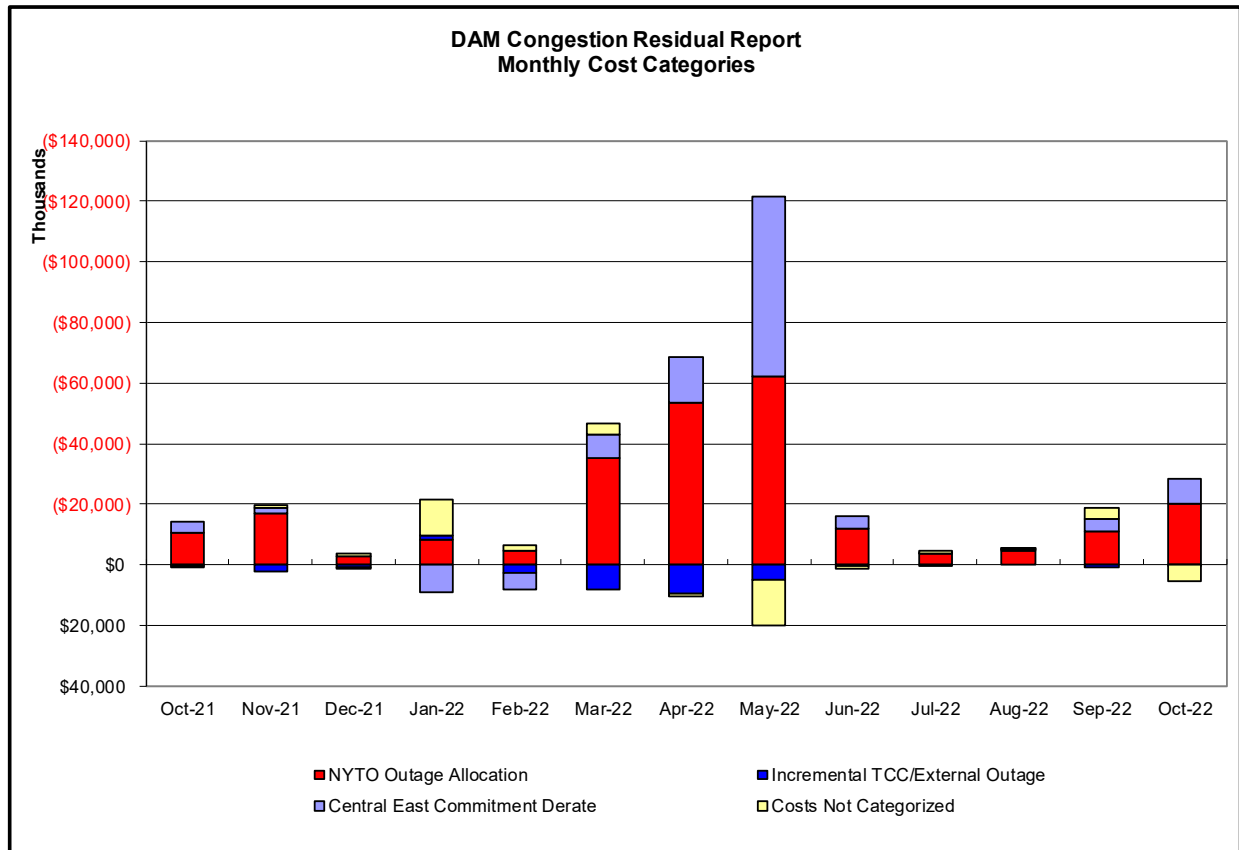
Day's investigated in December: 1,2,7,12,13,14,16,18,19,20,22,23,24,25,26,27,28,29		
Event	Description	December Dates
	Early return to service Coopers Corners-Middletown Tap-Rock Tavern 345kV (#CCRT34)	18
	Forced outage Hopatcon-Ramapo 500kV (#5018)	27-29
	Derate Carl Place-East Garden City 138kV (#361) I/o EGRDNCTY-ROSLYN 138kV (#362)	24,28
	Derate Central East	14,18,24,25,27
	Derate Coopers Corners-Middle Town Tap 345kV (#CCRT34) I/o Dolson Ave-RockTavern 345kV (#DART44)	23
	Derate Farragut-Gowanus 345kV (#42) I/o SCB:GOWANUS(2):41&42231&R4	28
	Derate Goethals-Gowanus 345kV (#26) I/o Goethals-Gowanus 345kV (#25)	29
	Derate Scriba-Volney 345kV (#20) I/o SCB:SCRIBA(R935):21&FS-10	27
	NYCA DNI Ramp Limit	2, 12, 14, 18-20,23-29
	Uprate Central East	1,2, 12-14, 16, 19,23-26
	Uprate Farragut-Gowanus 345kV (#42) I/o SCB:GOWANUS(2):41&42231&R4	28
	Uprate Meyer 230/115kV (BK4S) I/o MEYER -CANANDGA 230 60	25-27
	Uprate Meyer 230/115kV (BK4S) I/o SCB:STONYRDG(72/B102)72&BK1	18,19,22,25-27
	Uprate Meyer 230/115kV (BK4S) I/o SIN:CANANDGA-STONYRGE 230 68	22,25,26
	HQ CHAT - NY Scheduling Limit	13,16,18,20,23,24
	HQ CHAT ACTIVE DNI Ramp Limit	19,20,27
	IESO AC ACTIVE DNI Ramp Limit	20,25
	IESO AC Scheduling Limit	25
	NE AC - NY Scheduling Limit	1,13,14,16,19,20,22,23
	NE AC ACTIVE DNI Ramp Limit	1,2,12-14,16,18-20,23-29
	NE NNC1385-NY Scheduling Limit	19
	PJM AC ACTIVE DNI Ramp Limit	12,20,23-25,27,29
	PJM AC-NY Scheduling Limit	20,23,24,27
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East	1,2,12-14,18,22-29
	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West	1,2,12,14,18,19,22-29

Real-Time Balancing Market Congestion Residual (Uplift Cost) Categories

Category	Cost Assignment	Events Types	Event Examples
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.	

