

Operations Performance Metrics Monthly Report



July 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 August 8, 2023.

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July 2023 Operations Performance Highlights

| Monthly Peak Load | Monthly Minimum Load | Summer 2023 Peak | All-time Summer Peak |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 07/28/2023 HB 17 28,735 MW | 07/31/2023 HB 03 14,677 MW | 07/28/2023 HB 17 28,735 MW | 07/19/2013 HB 16 33,956 MW |

- 62.7 hours of Thunderstorm Alerts were declared
- 0.0 hours of NERC TLR level 3 curtailment

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) |
|-----------------|---------------------------|-----------------------------|----------------------------------|
| 2,521 MW | 4,760 MW | 174 MW | 40 MW |

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

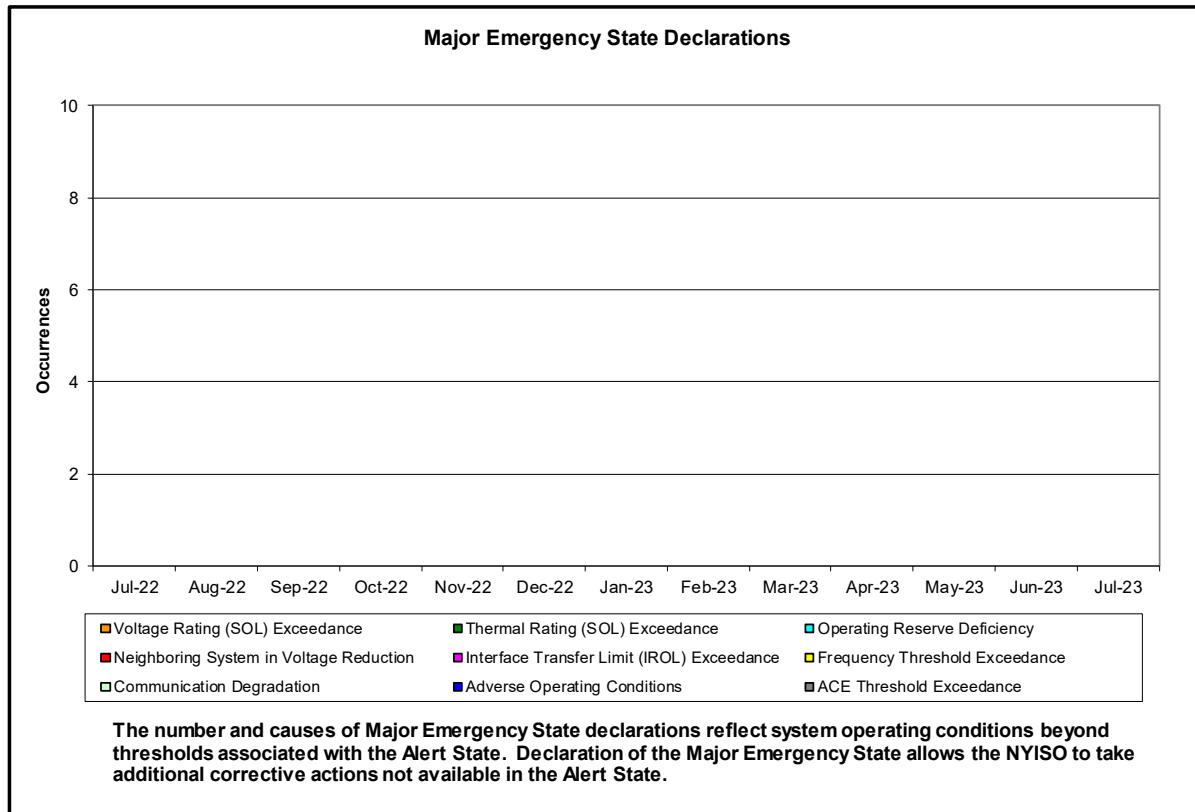
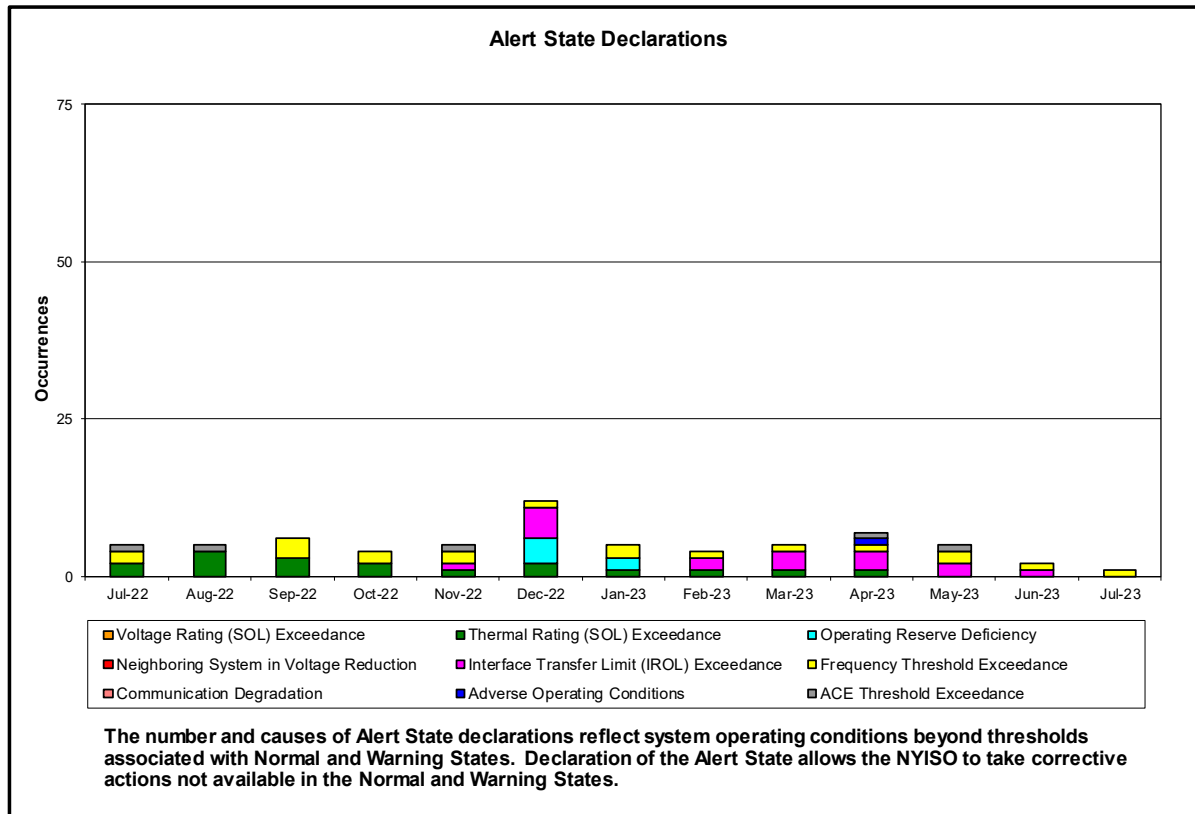
| | Current Month Value (\$M) | Year-to-Date Value (\$M) |
|--|------------------------------|-----------------------------|
| NY Savings from PJM-NY Congestion Coordination | (\$0.96) | \$12.03 |
| NY Savings from PJM-NY Coordinated Transaction Scheduling | (\$0.28) | (\$0.70) |
| NY Savings from NE-NY Coordinated Transaction Scheduling | (\$0.20) | (\$1.49) |
| Total NY Savings | (\$1.44) | \$9.84 |
| | | |
| Regional Savings from PJM-NY Coordinated Transaction Scheduling | \$1.01 | \$4.07 |
| Regional Savings from NE-NY Coordinated Transaction Scheduling | \$0.12 | \$0.58 |
| Total Regional Savings | \$1.13 | \$4.65 |

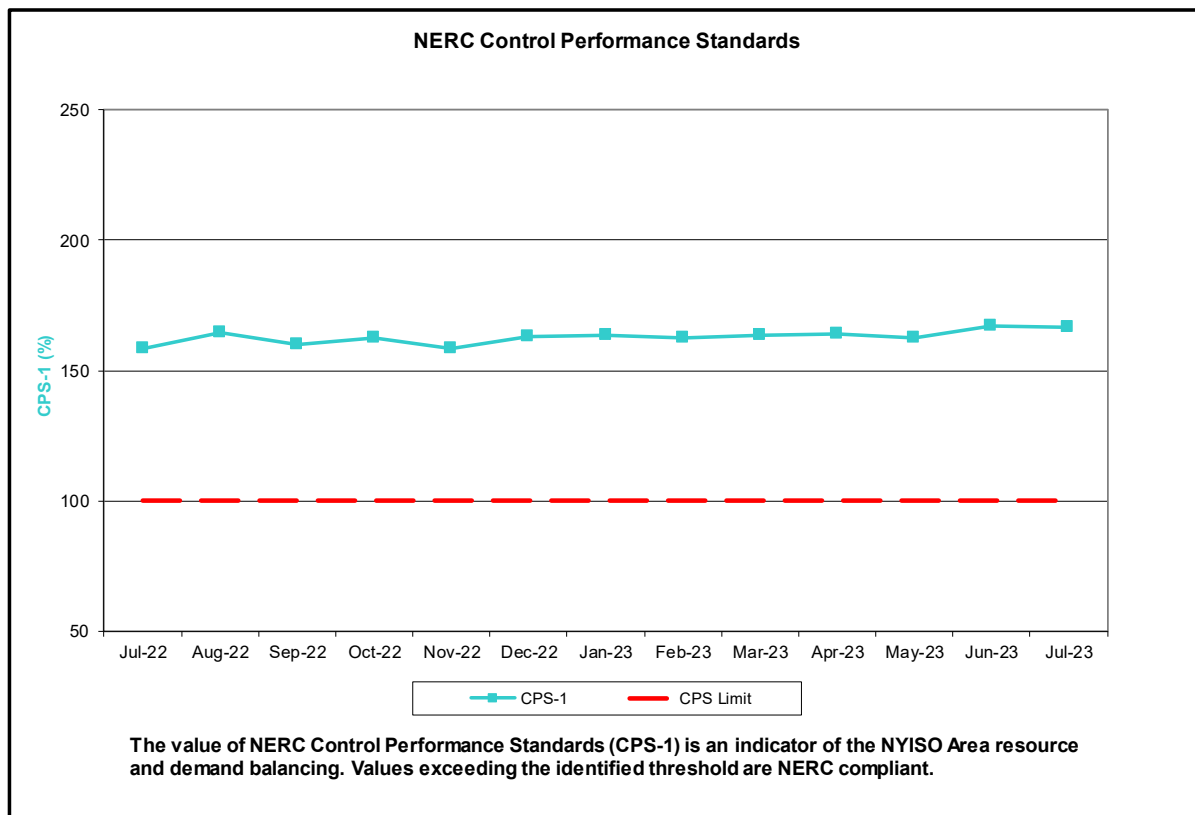
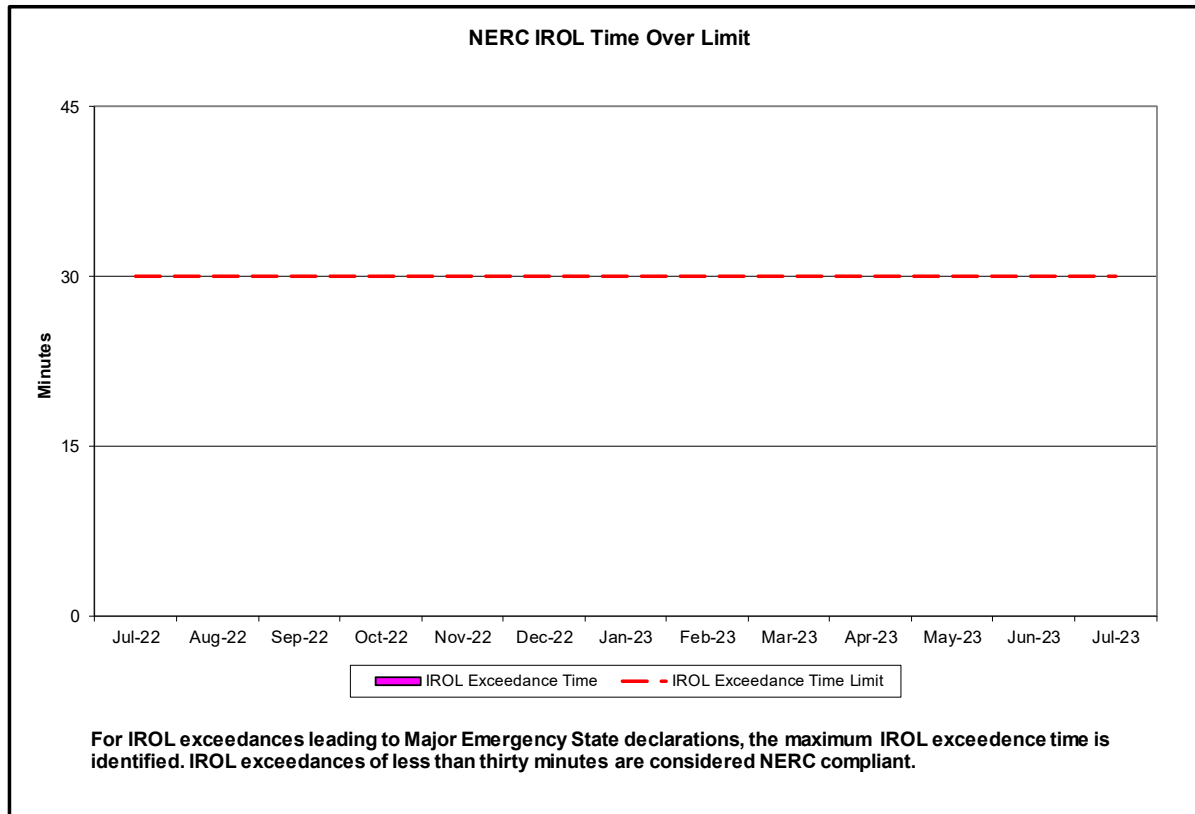
- Statewide uplift cost monthly average was (\$0.62)/MWh.
- The following table identifies the Monthly ICAP spot market prices and the price delta.

| Spot Auction Price Results | NYCA | Lower Hudson Valley Zones | New York City Zone | Long Island Zone |
|----------------------------|----------|---------------------------|--------------------|------------------|
| August 2023 Spot Price | \$6.01 | \$6.01 | \$19.46 | \$6.01 |
| July 2023 Spot Price | \$6.16 | \$6.16 | \$19.47 | \$6.16 |
| Delta | (\$0.15) | (\$0.15) | (\$0.01) | (\$0.15) |

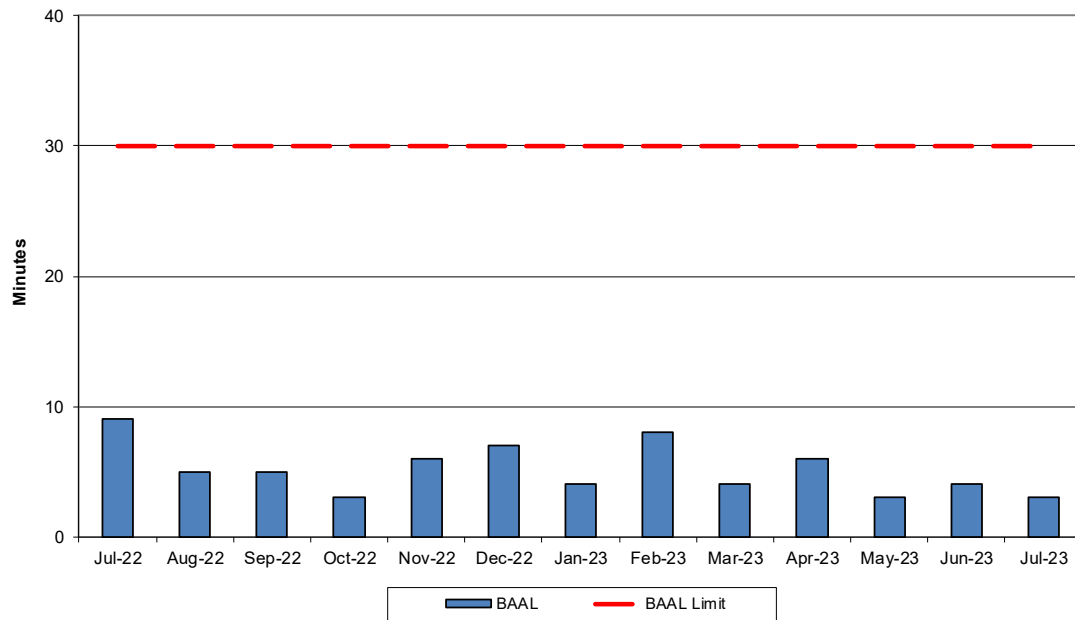
- The market clearing price decreased in NYCA, GHI & Long Island due to increased available UCAP.

Reliability Performance Metrics



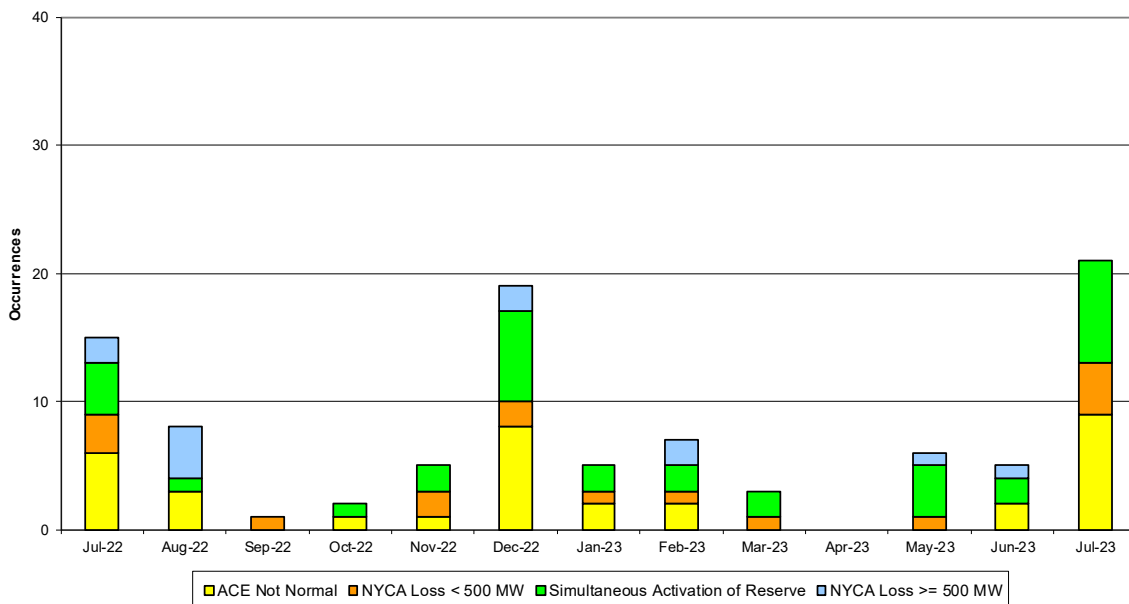


NERC Balancing Authority ACE Limit Standard



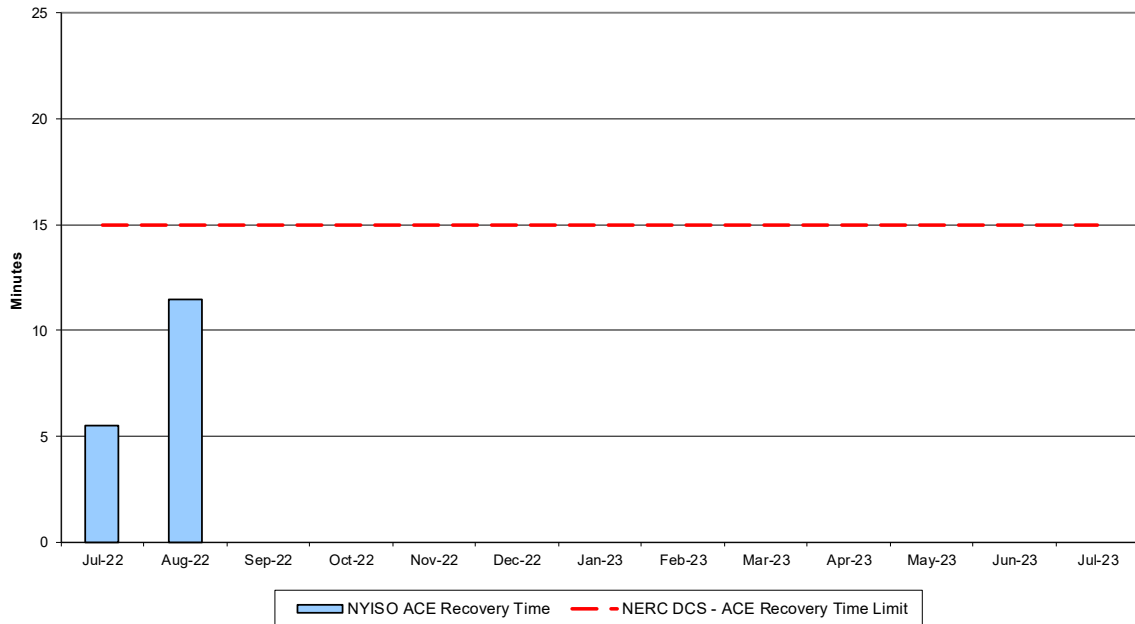
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



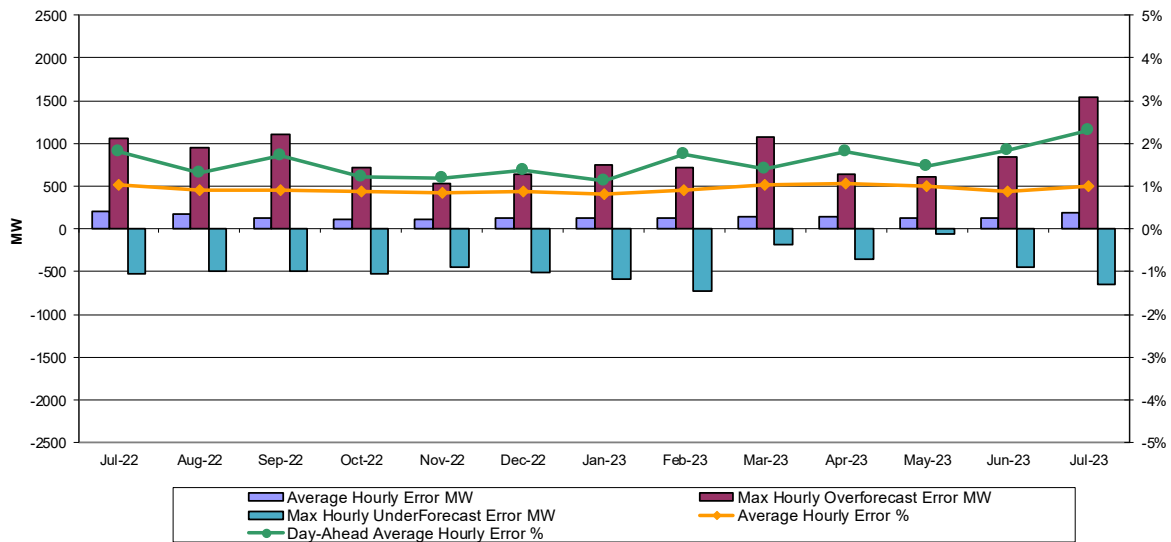
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

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.

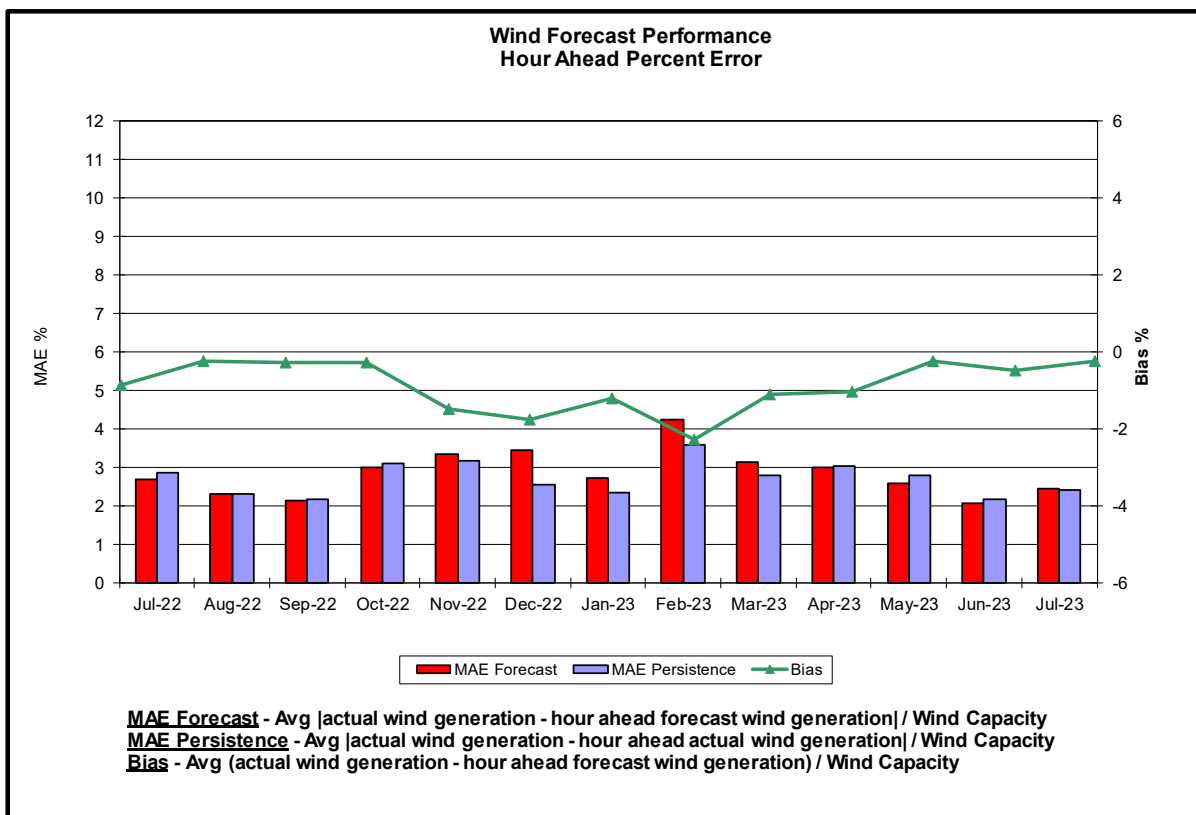
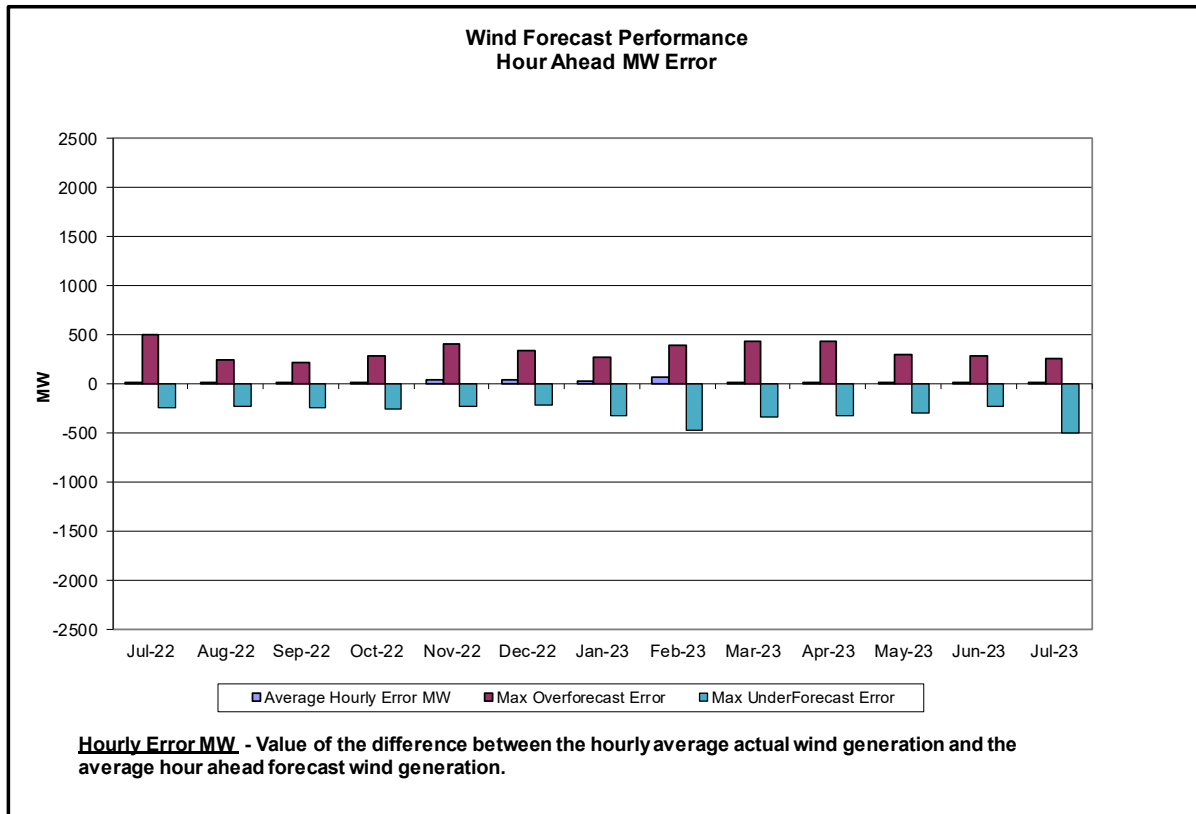
Load Forecast Performance

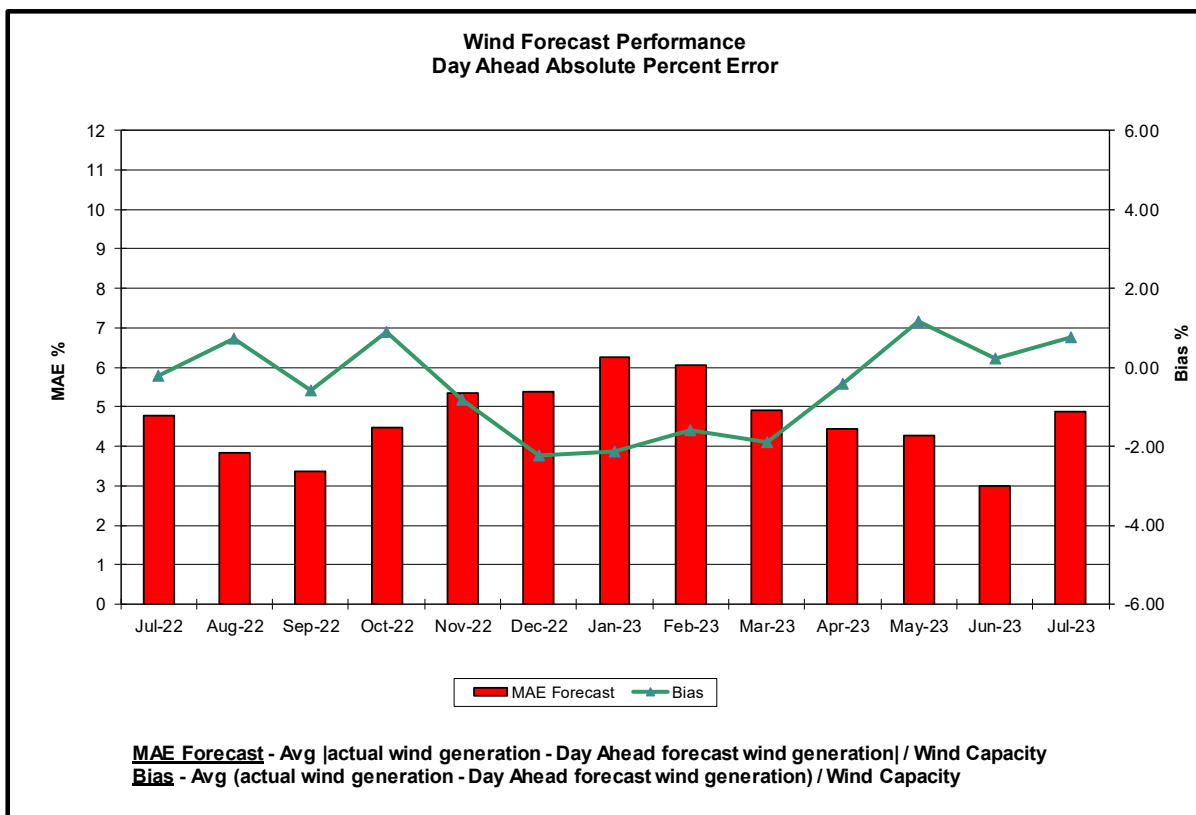
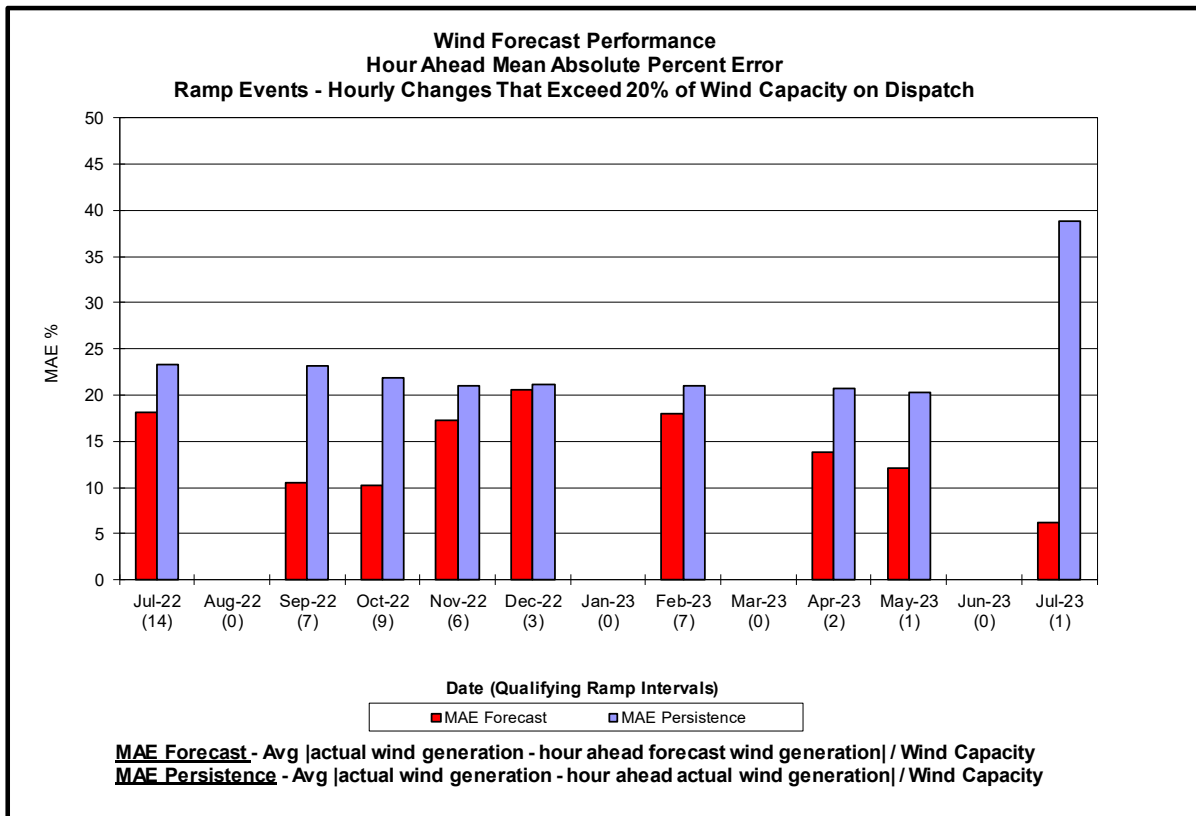


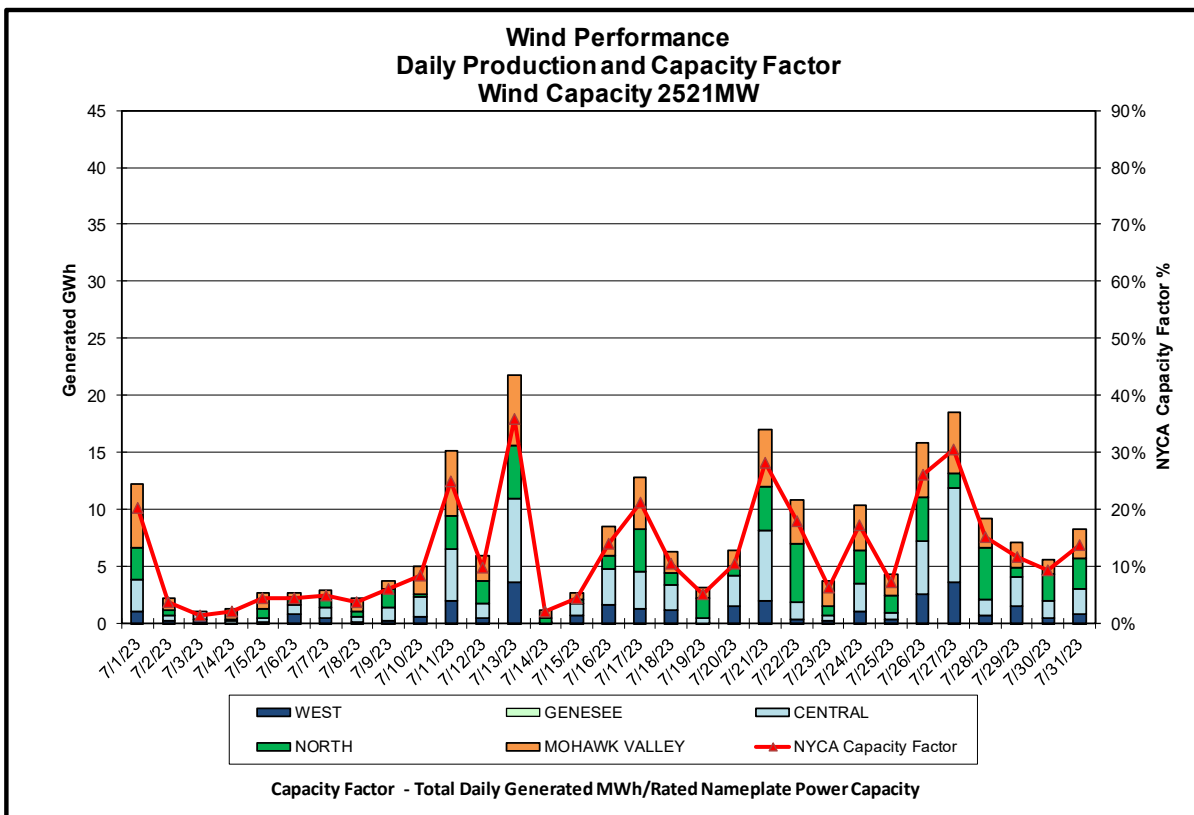
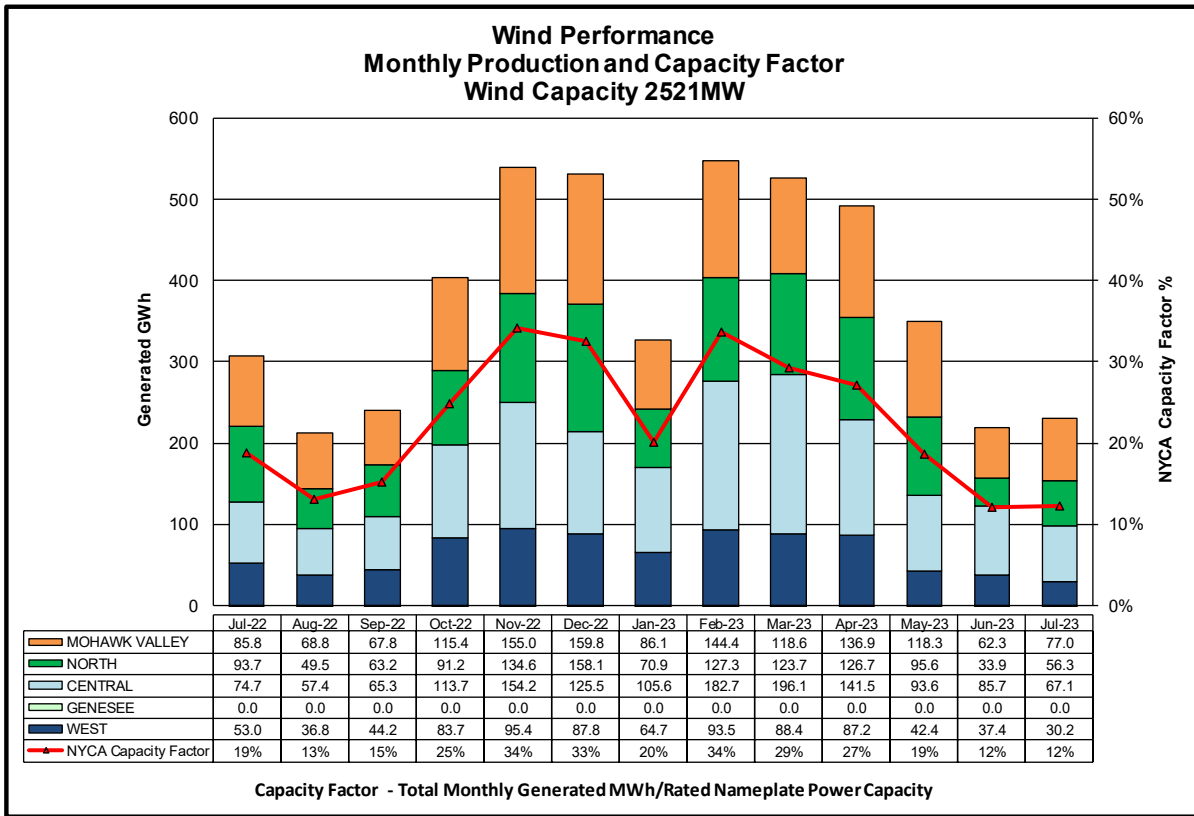
Hourly Error MW - Value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.

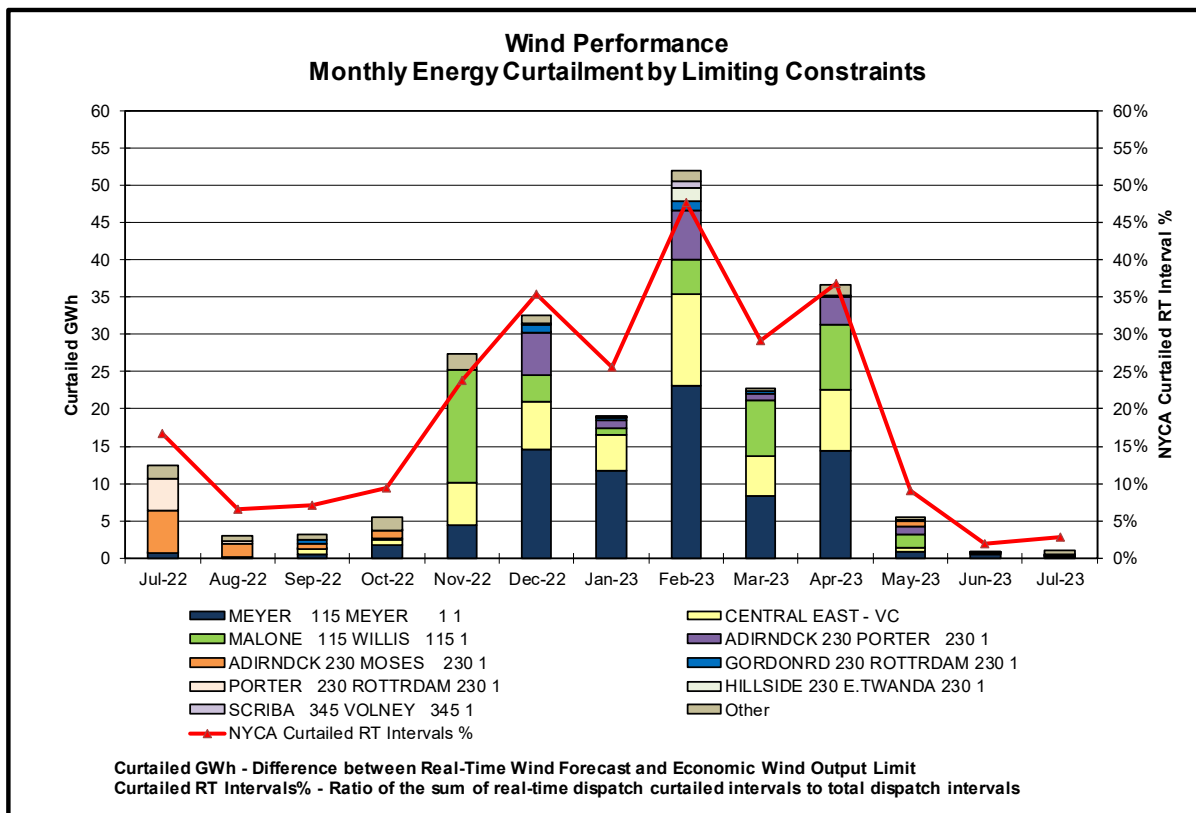
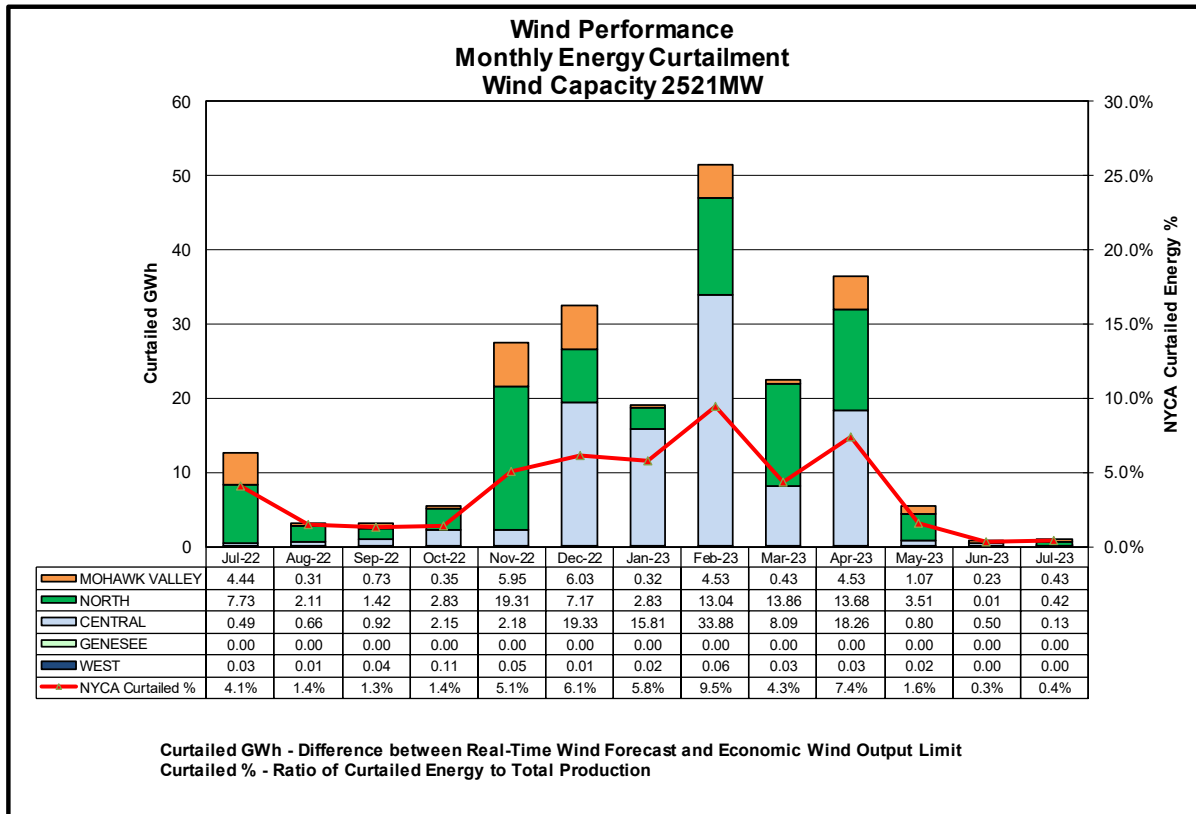
Average Hourly Error % - Average value of the ratio of hourly average error magnitude to hourly average actual load demand.

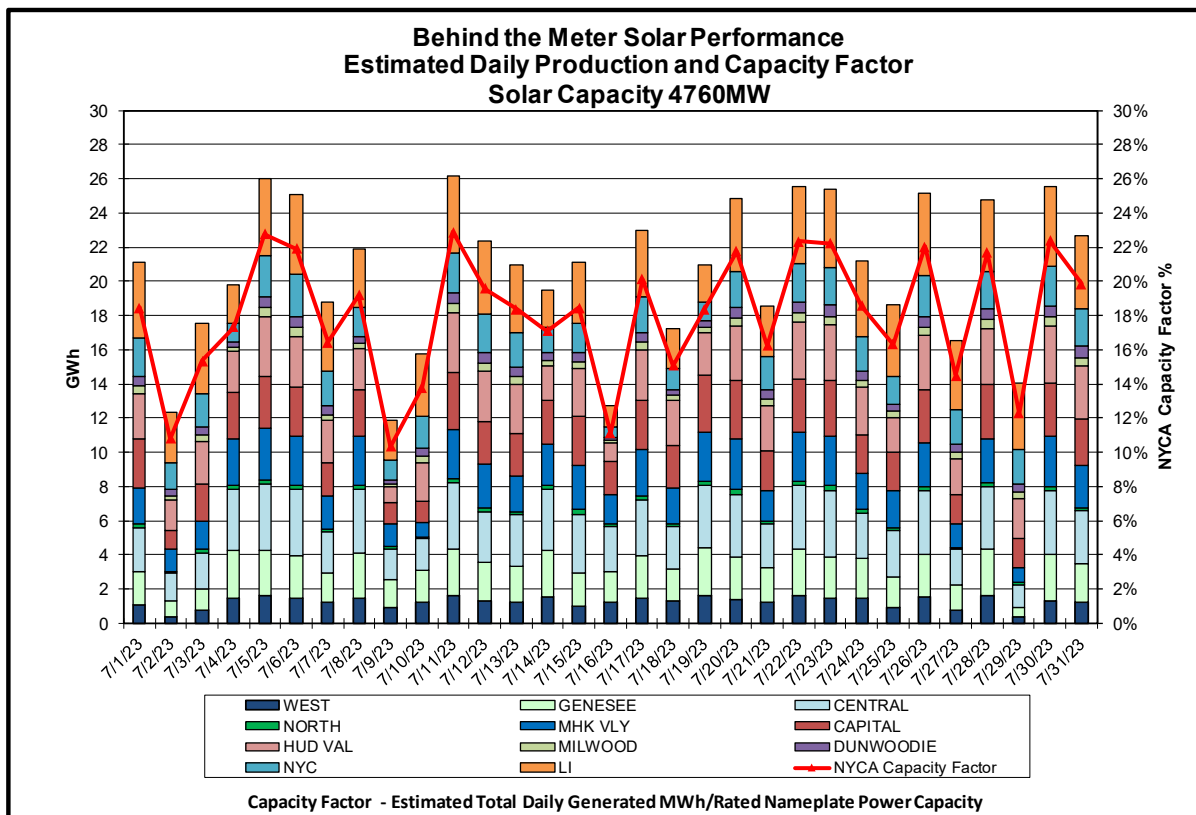
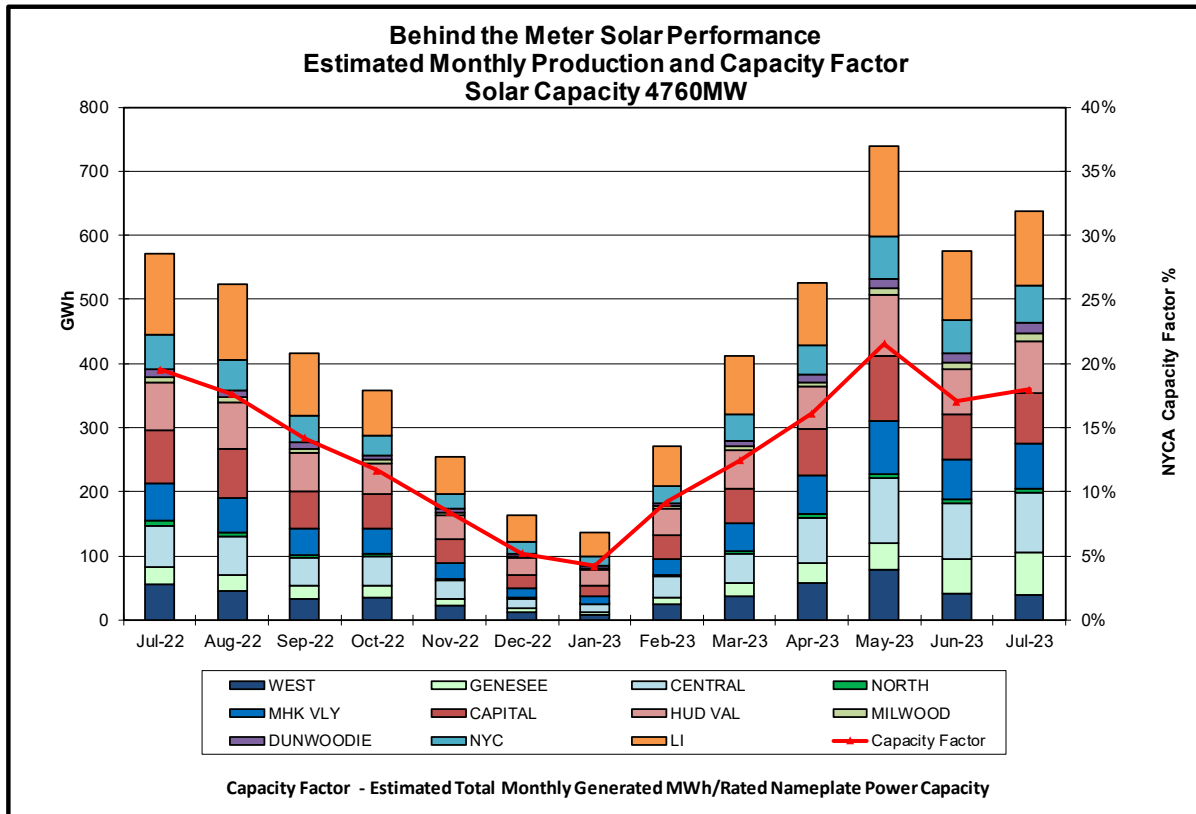
Day-Ahead Average Hourly Error % - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.

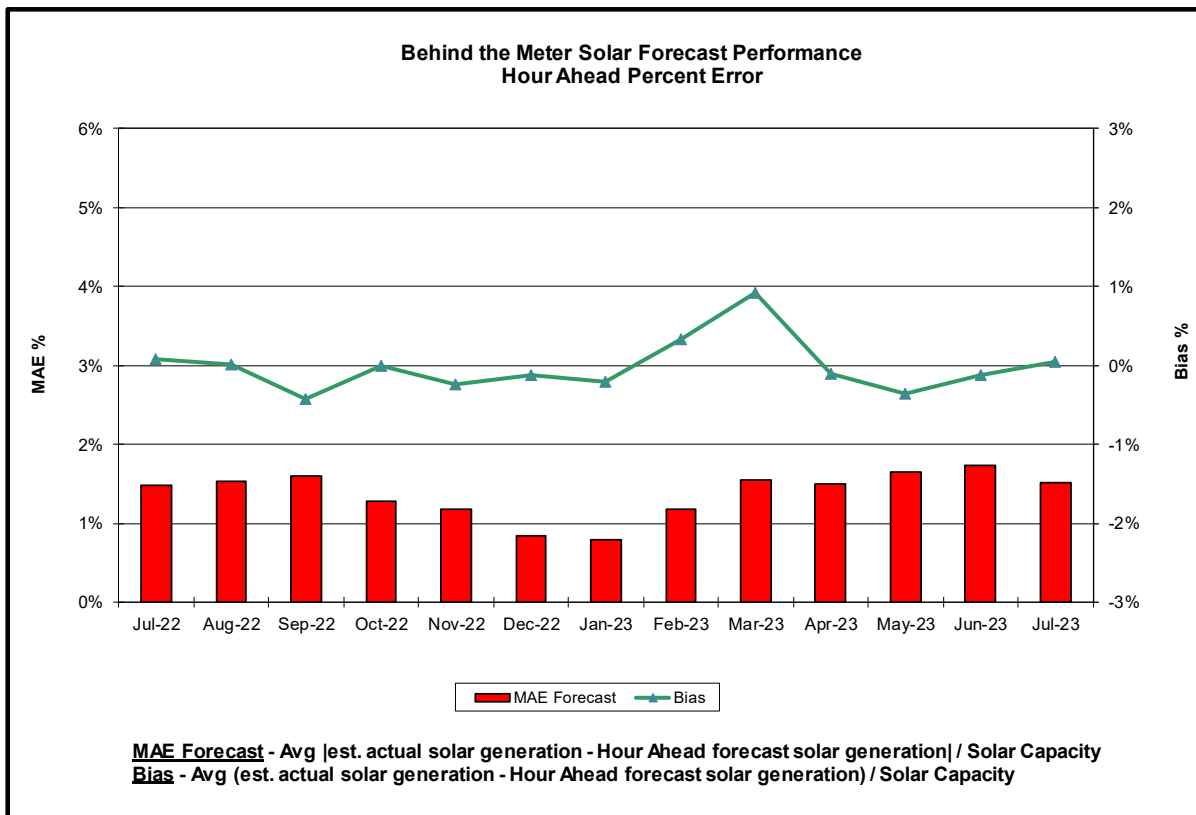
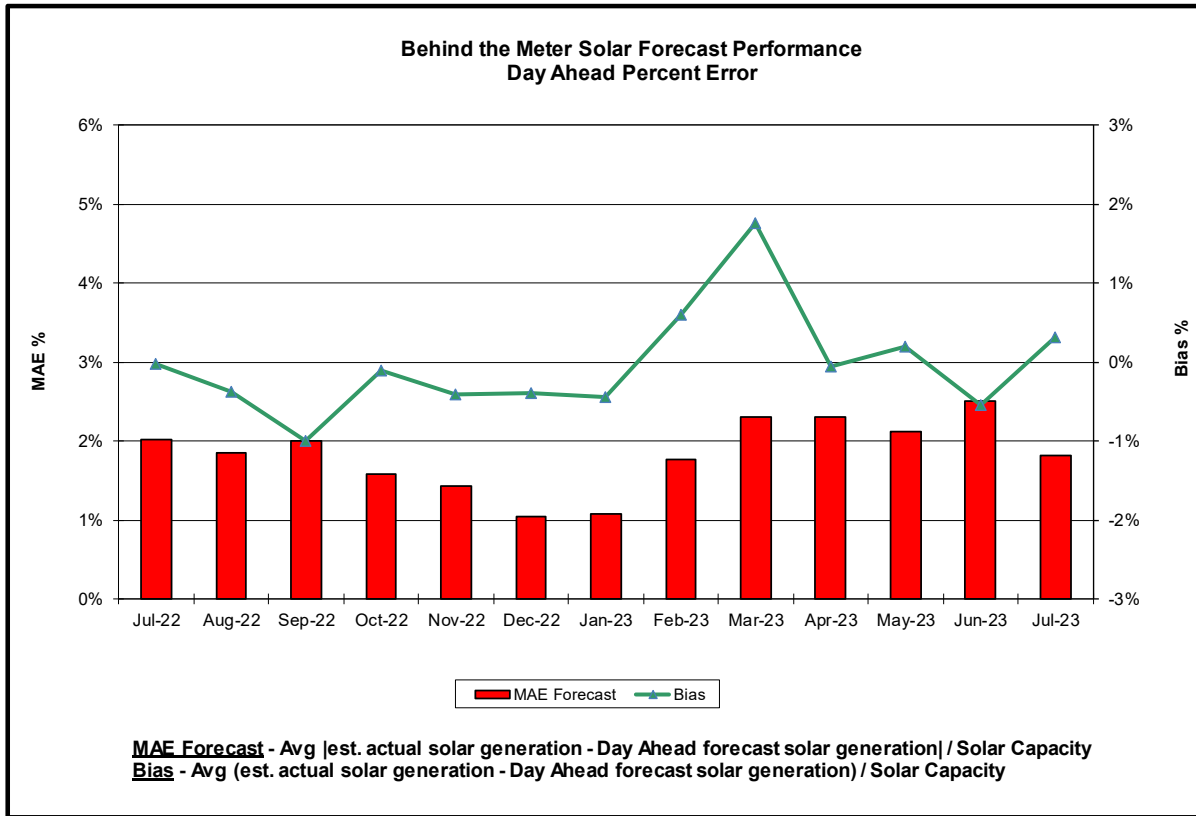


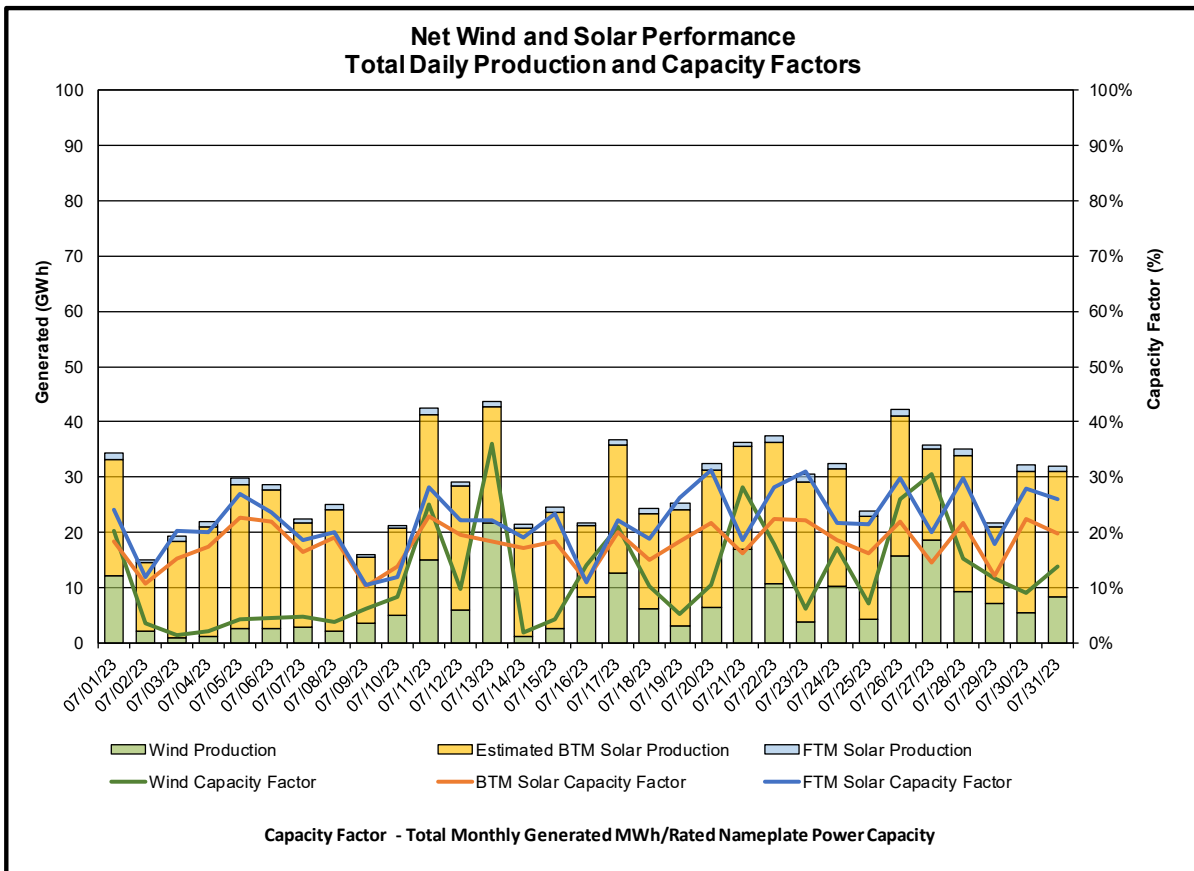
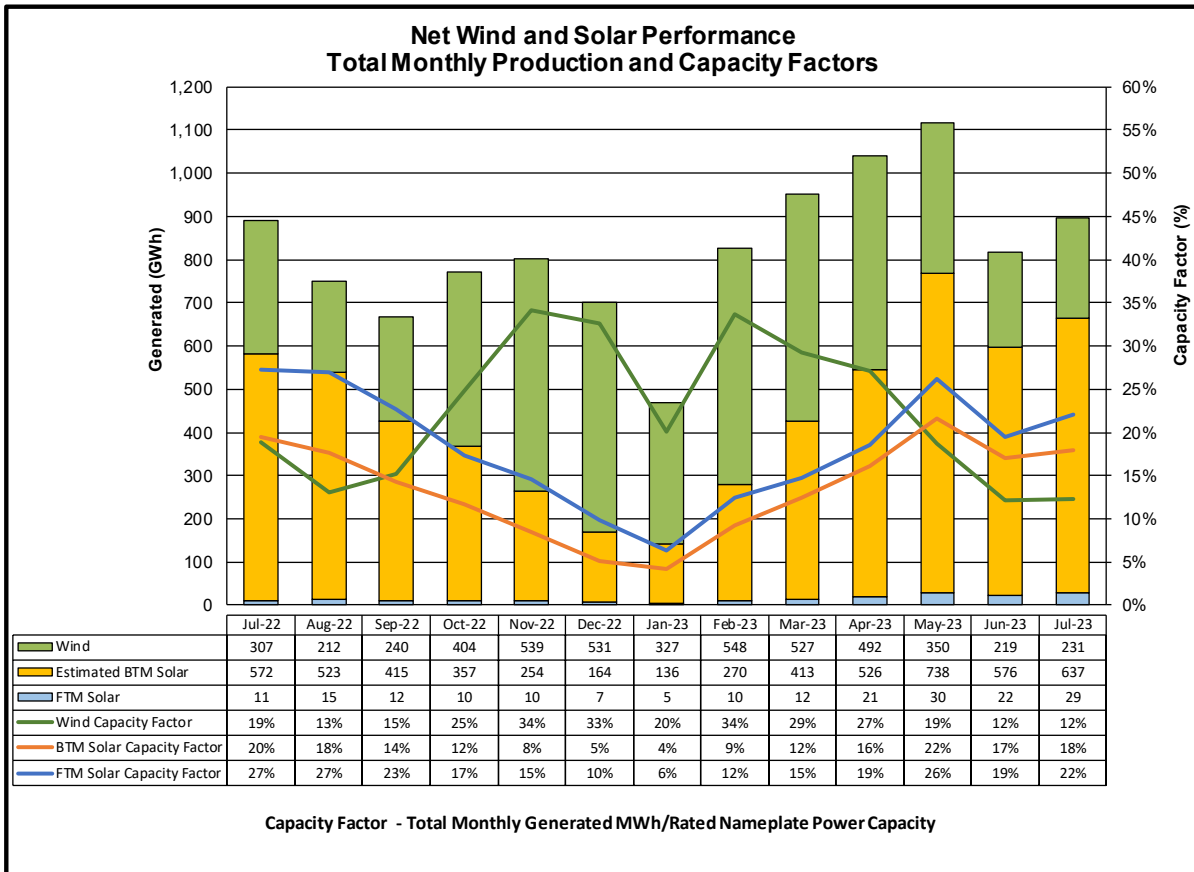


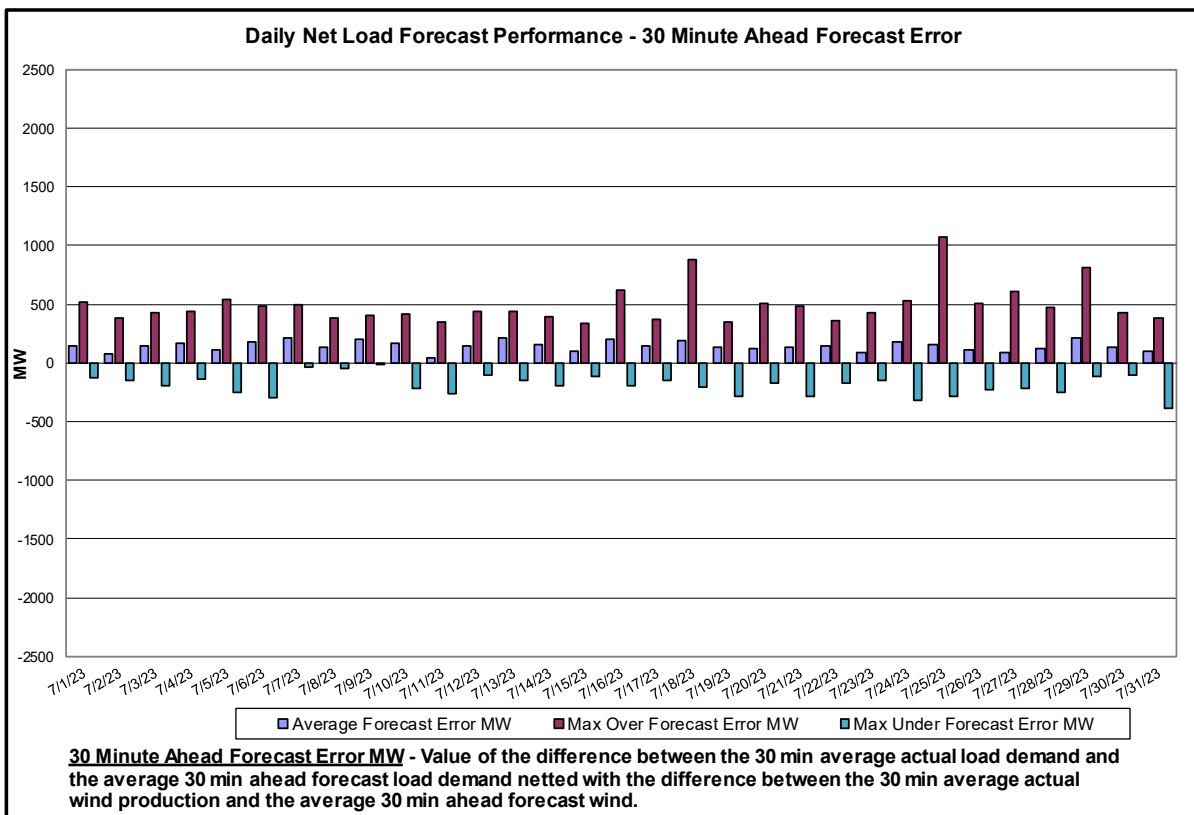
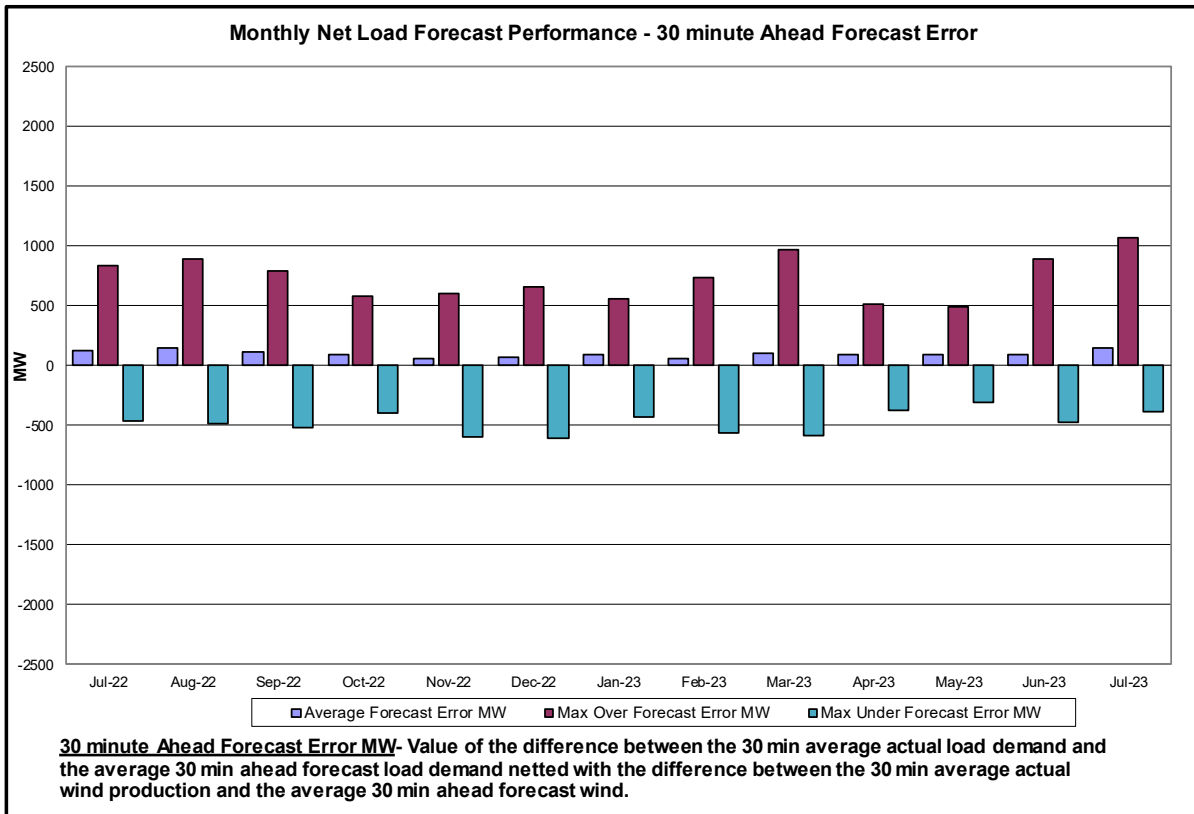


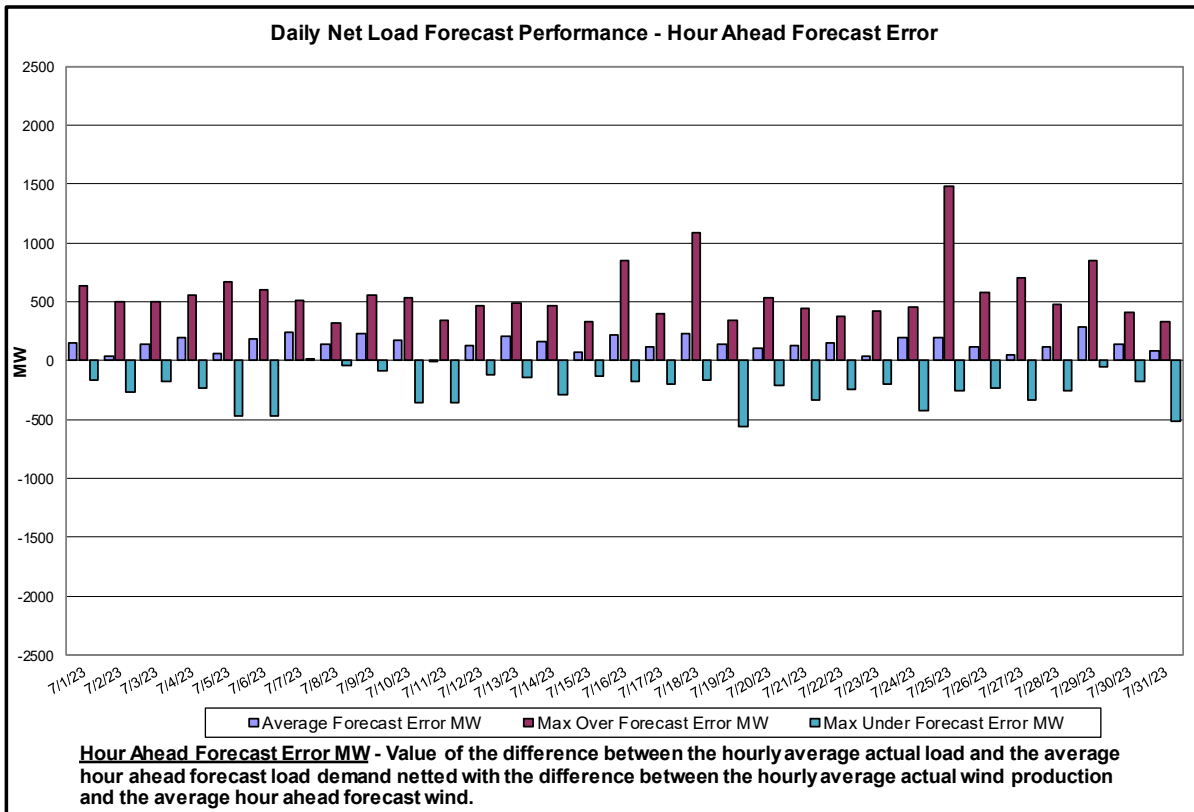
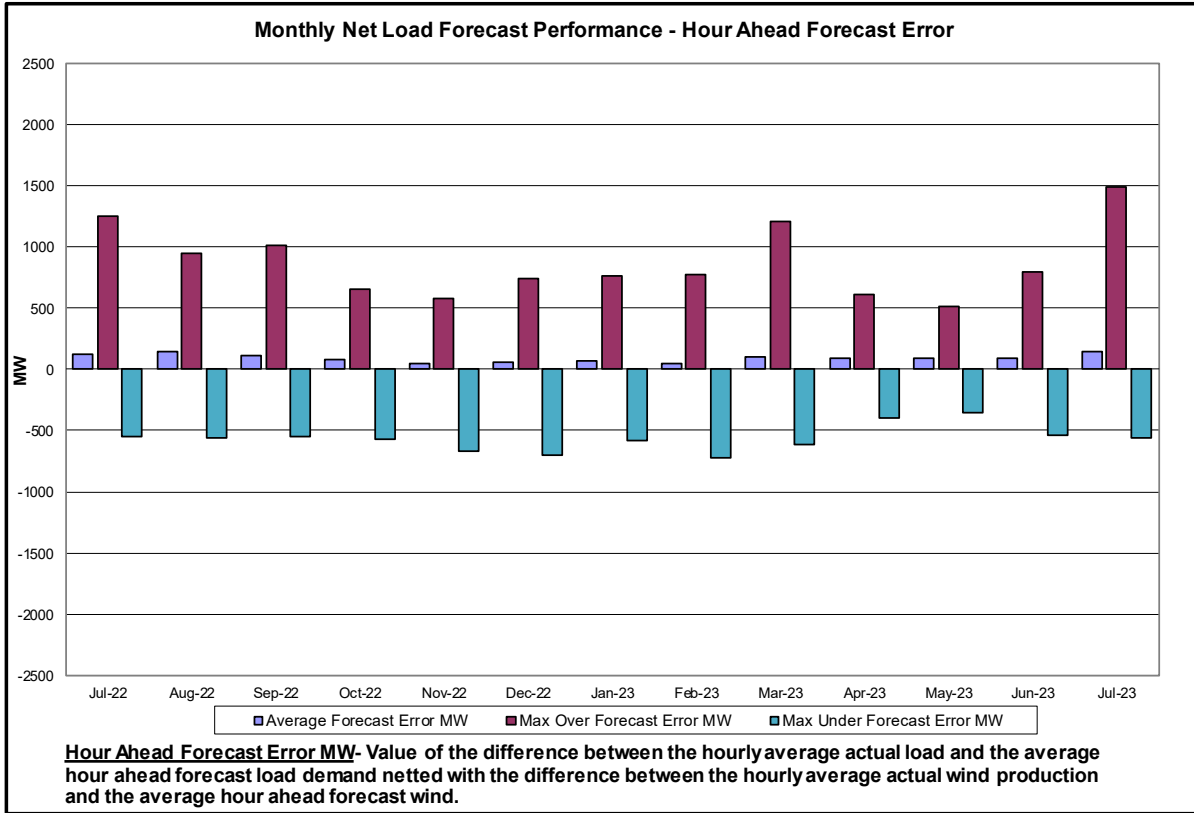


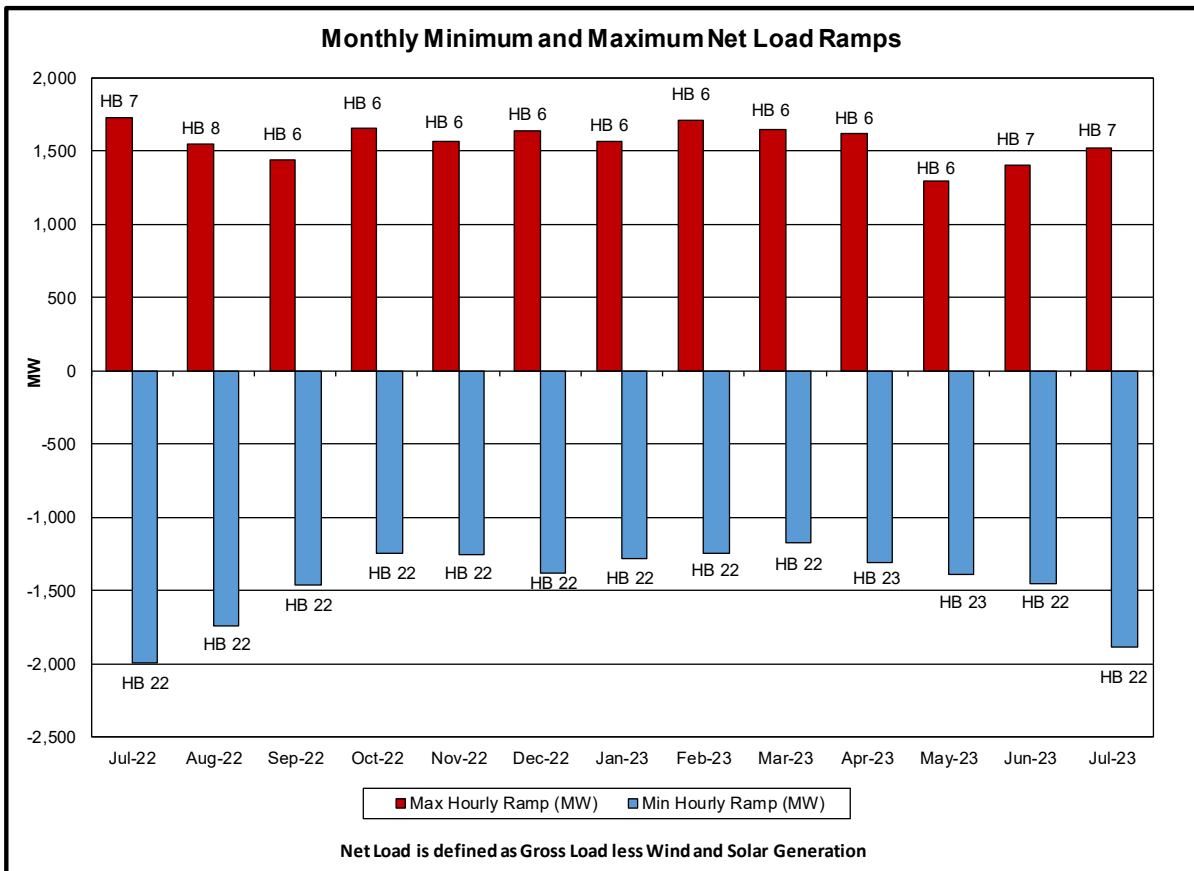
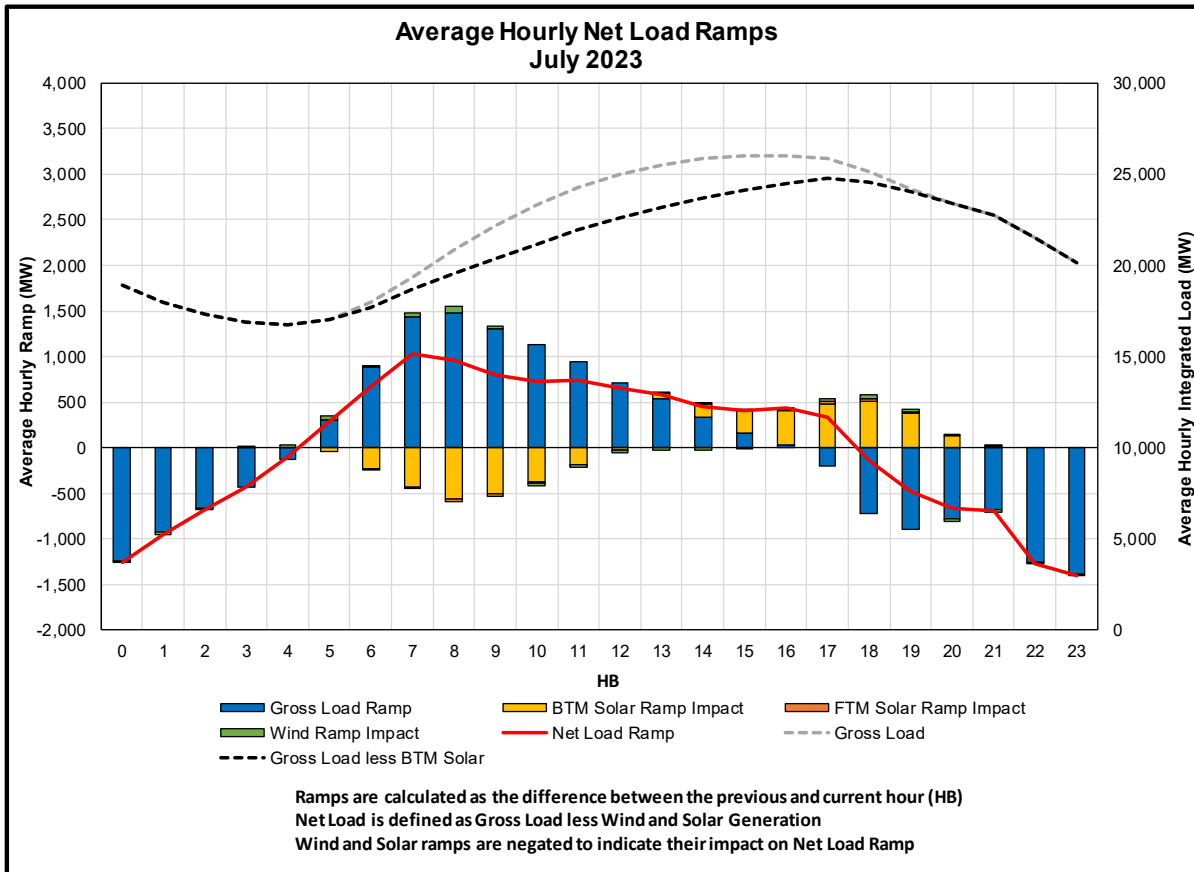




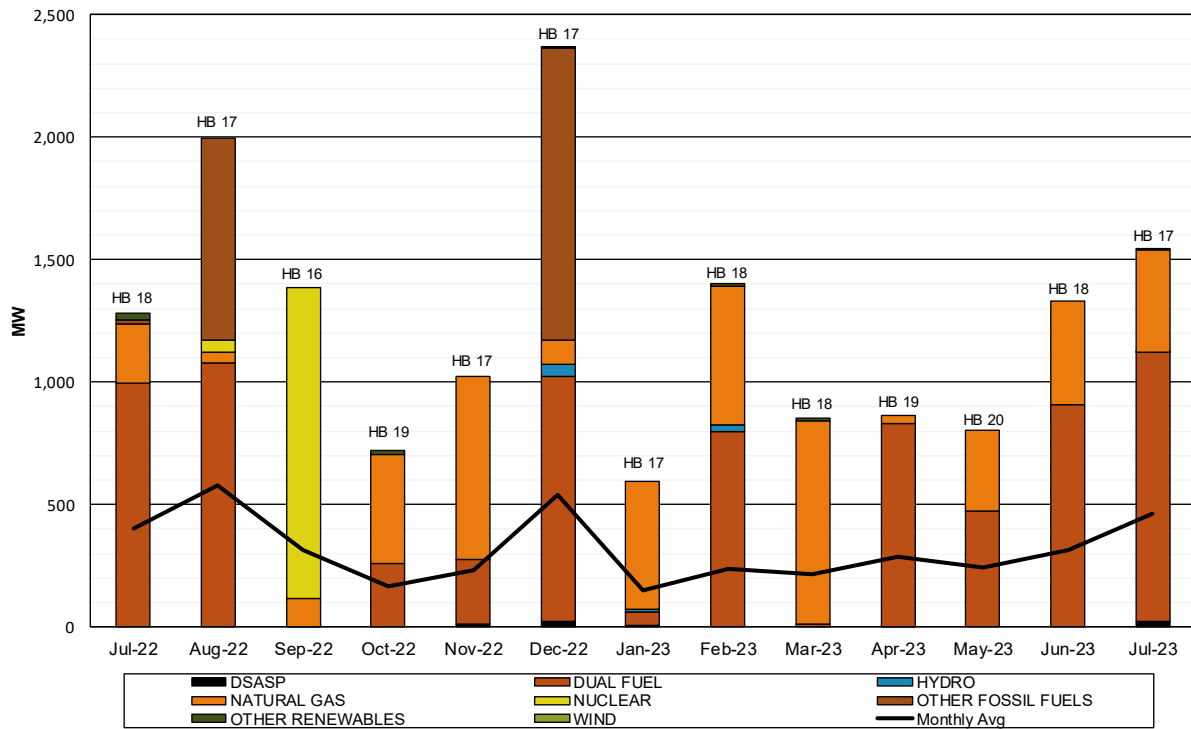








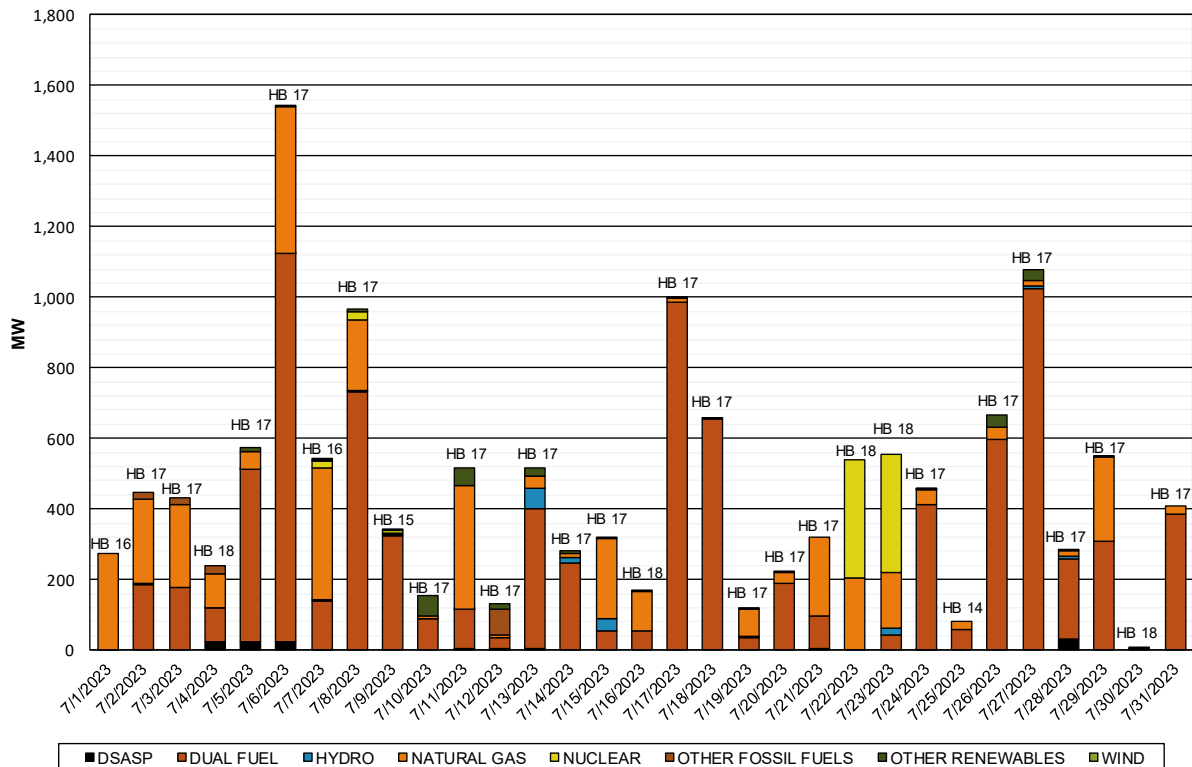
Monthly Maximum Day-Ahead Market Capacity Unavailable In Real Time



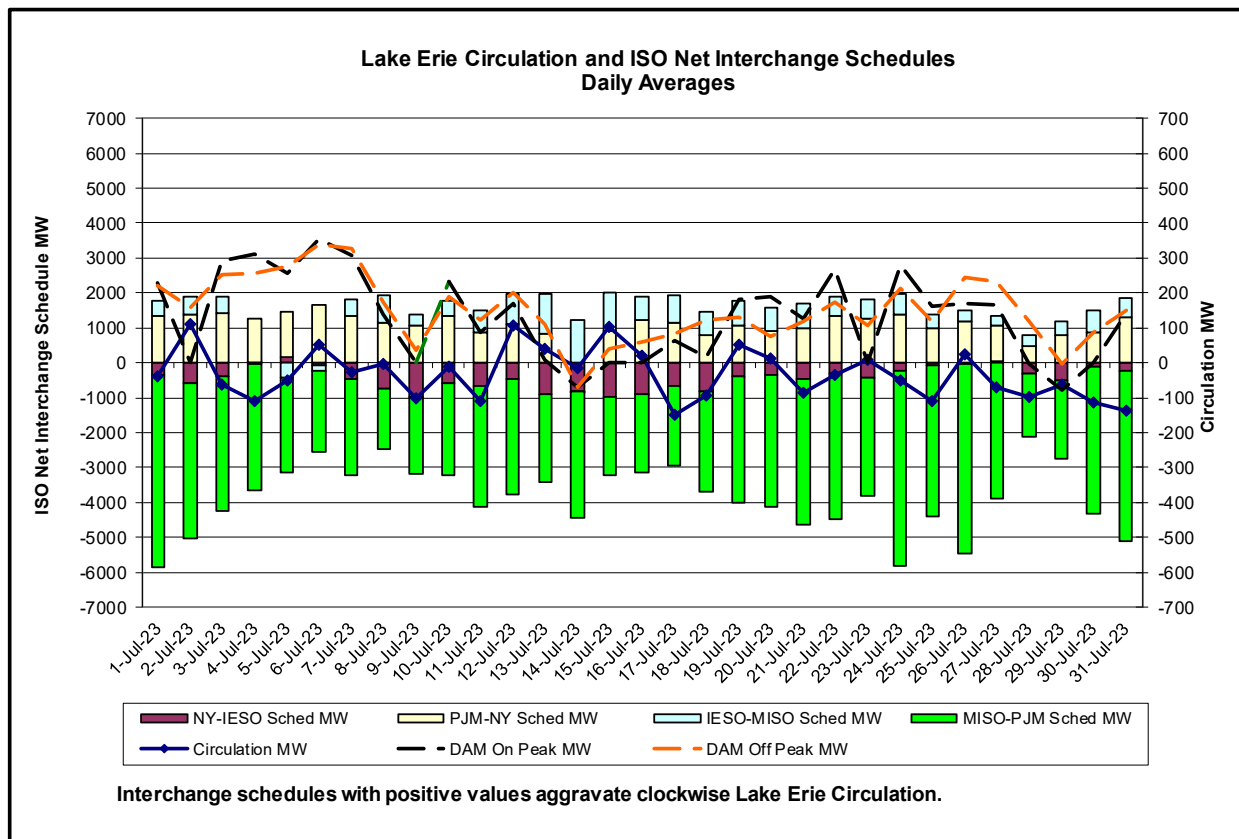
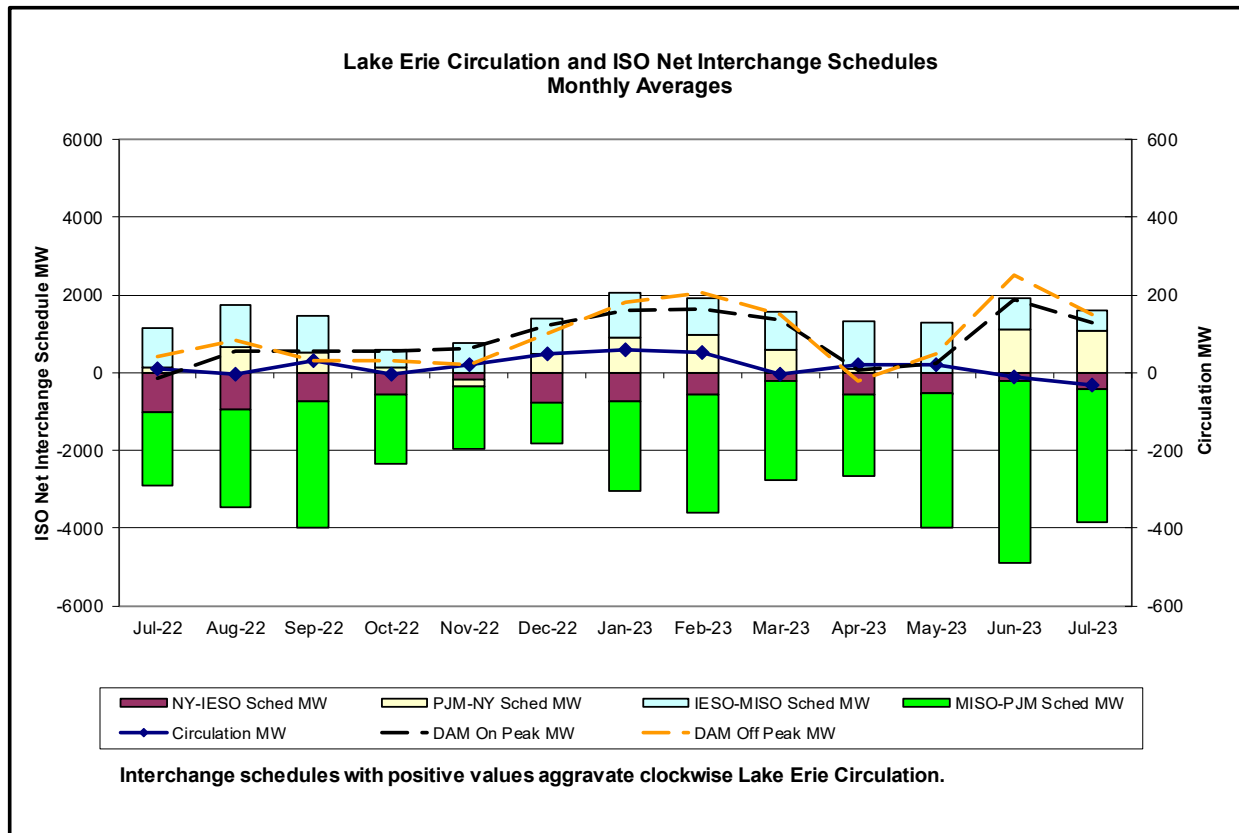
Unavailable Capacity is calculated as the difference of Day-Ahead Market (DAM) capacity relative to Real-Time (RT) capacity during RT peak load hour.

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

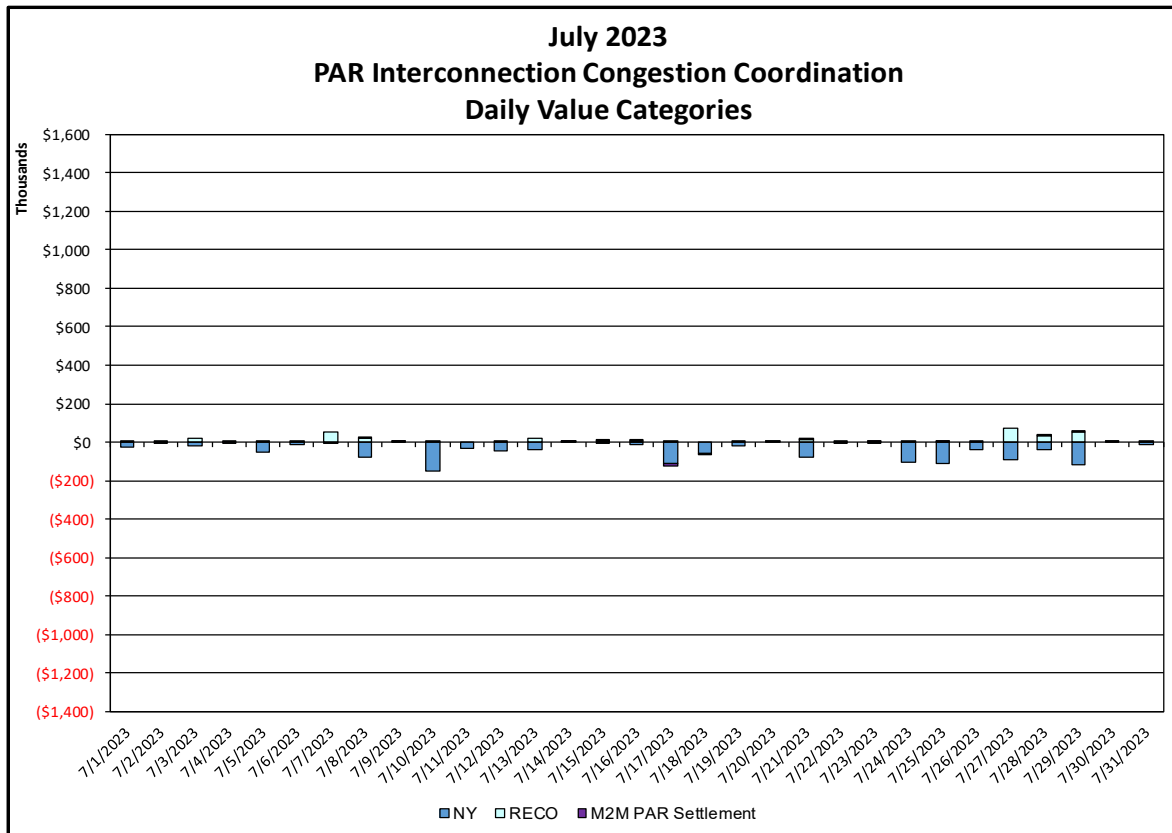
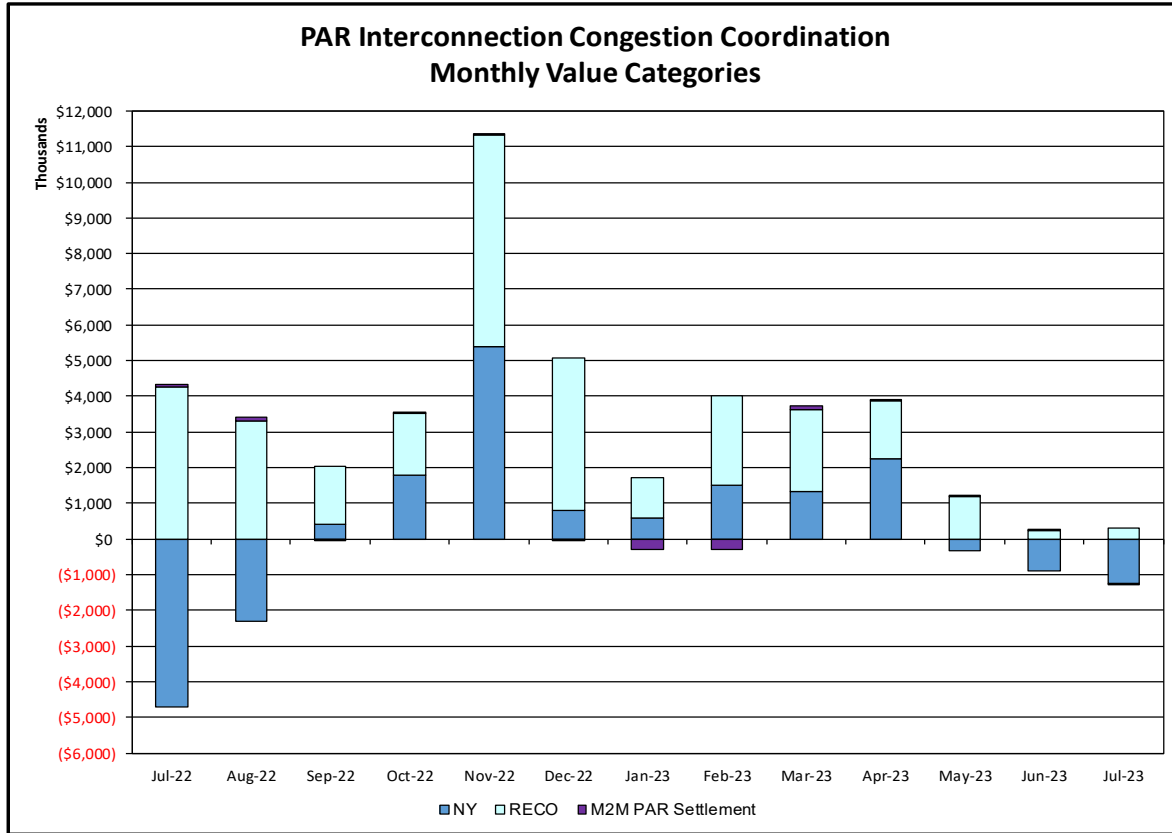
Daily Day-Ahead Market Capacity Unavailable In Real Time



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

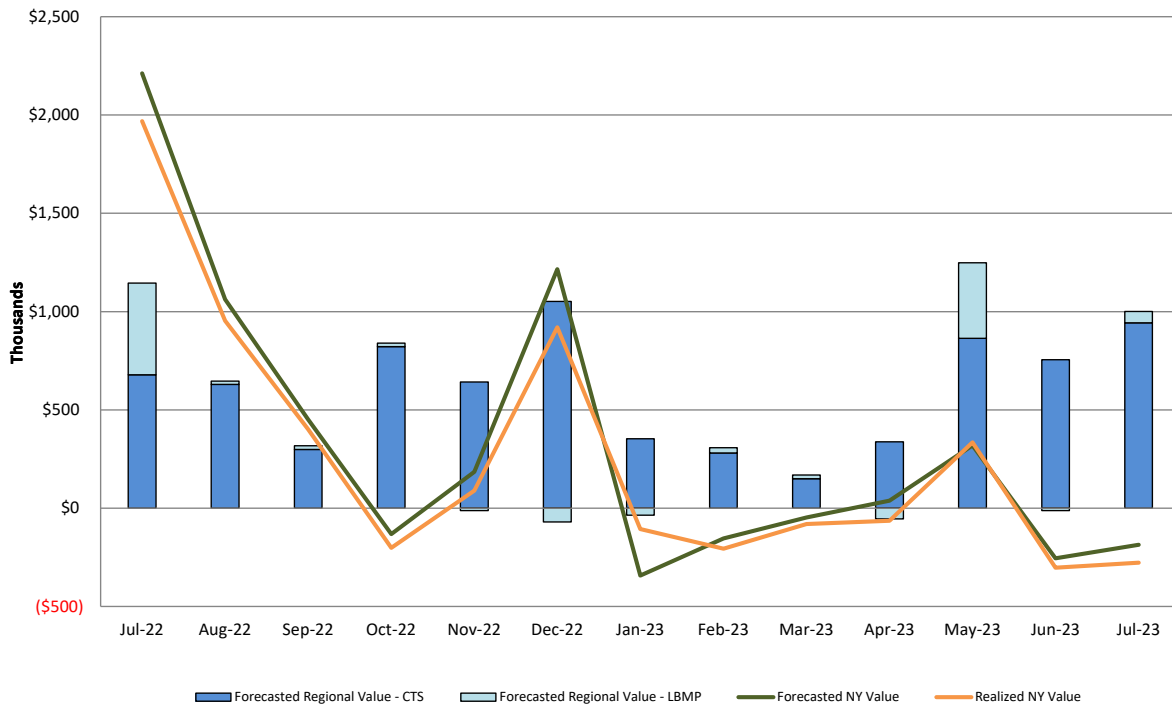


Broader Regional Market Performance Metrics



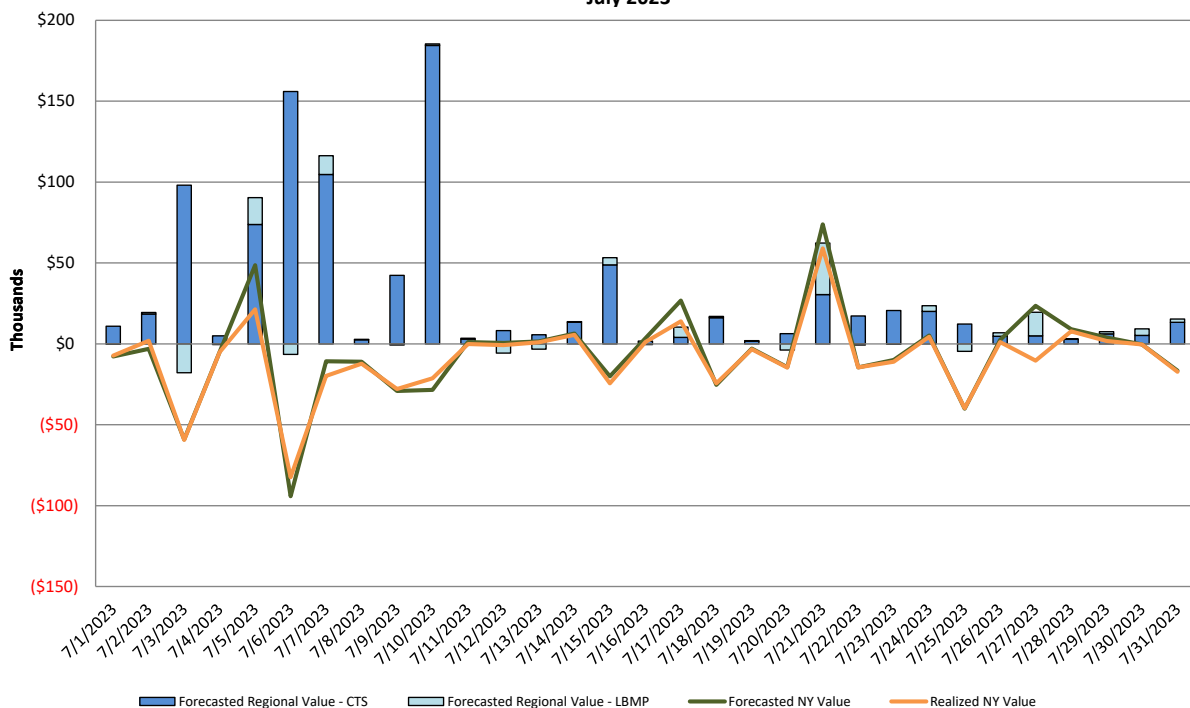
| <u>PAR Interconnection Congestion Coordination</u> | |
|---|--|
| <u>Category</u> | <u>Description</u> |
| NY | Represents the value NY realizes from Market-to-Market PAR Coordination when experiencing congestion. This is the estimated savings to NY for additional deliveries into NY |
| RECO | Represents 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/PJM RT Scheduling for All PJM Proxies Monthly Value Categories

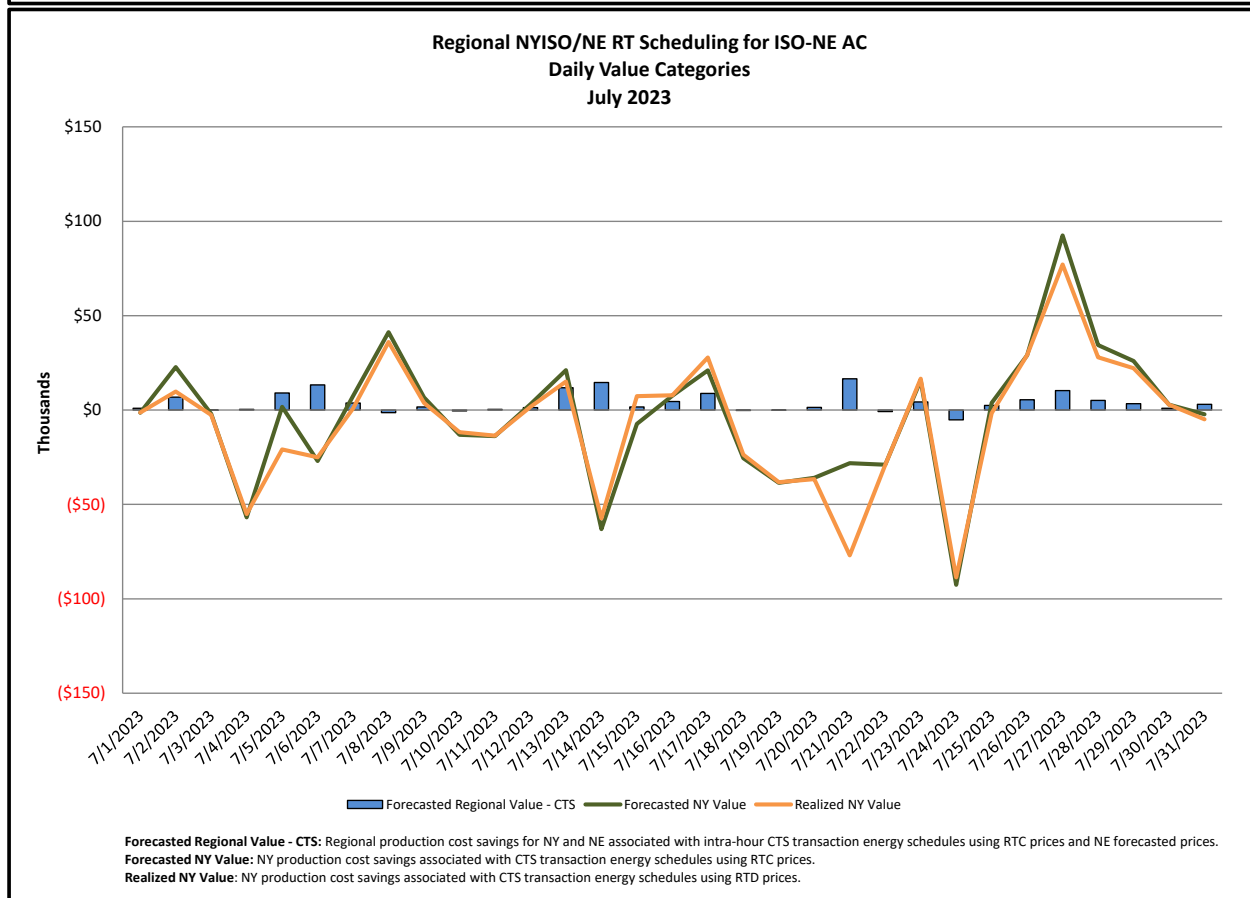
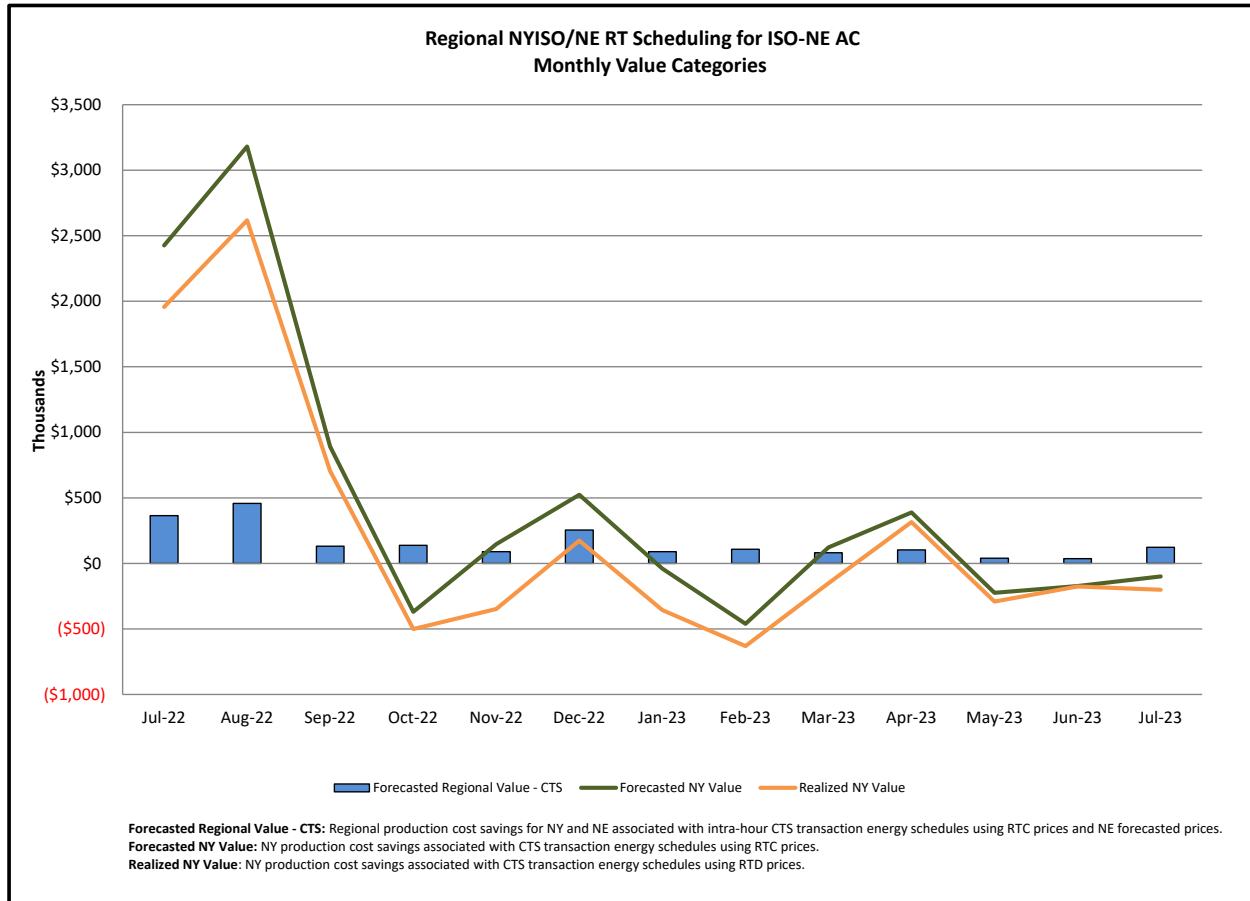


Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCEd prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules using RTC/ITSCEd prices.
Forecasted NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTD prices.

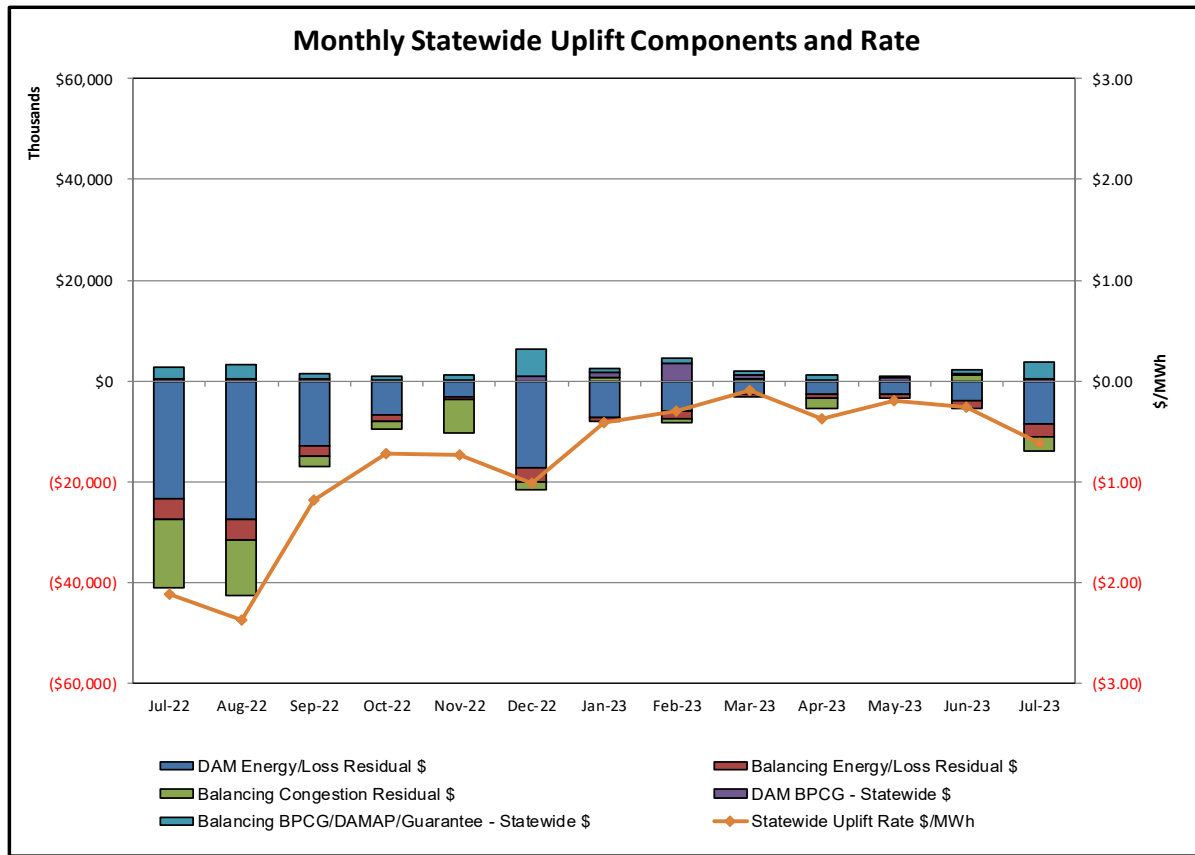
Regional NYISO/PJM RT Scheduling for All PJM Proxies Daily Value Categories July 2023

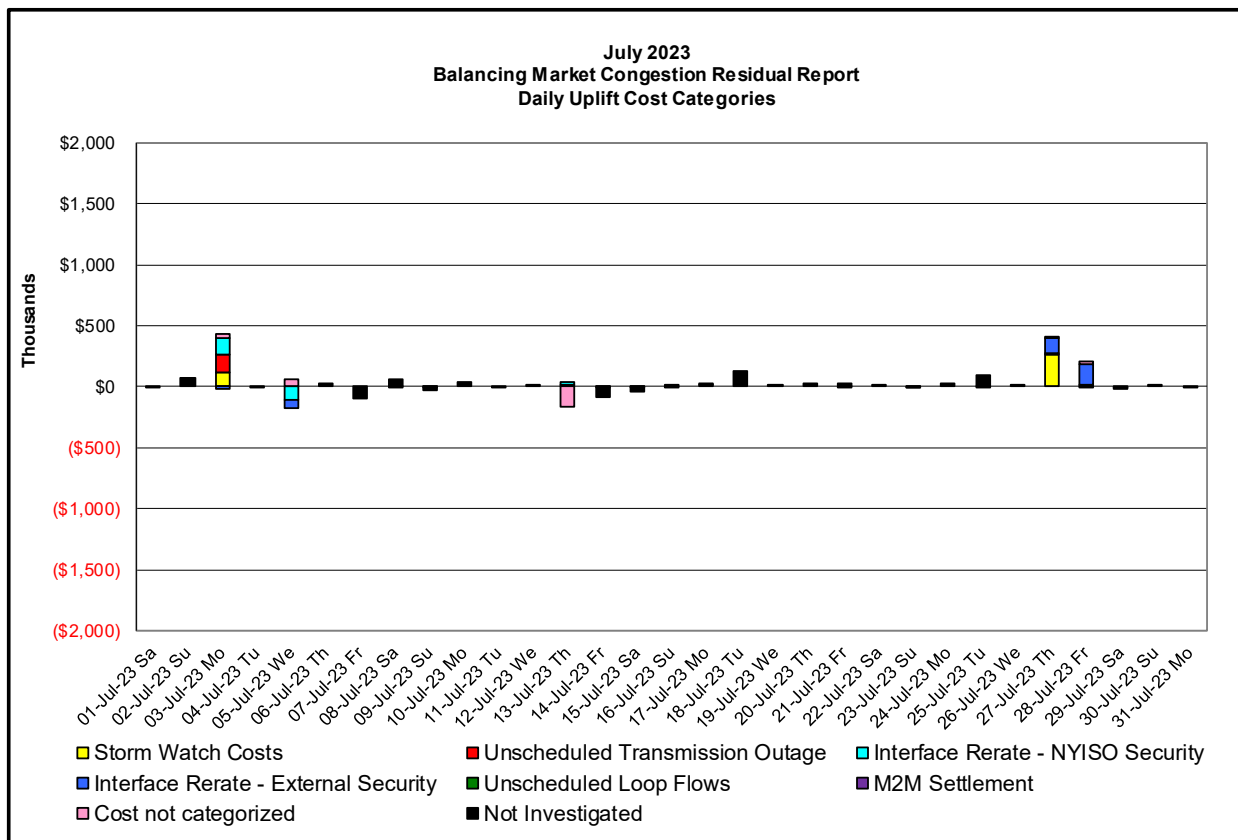
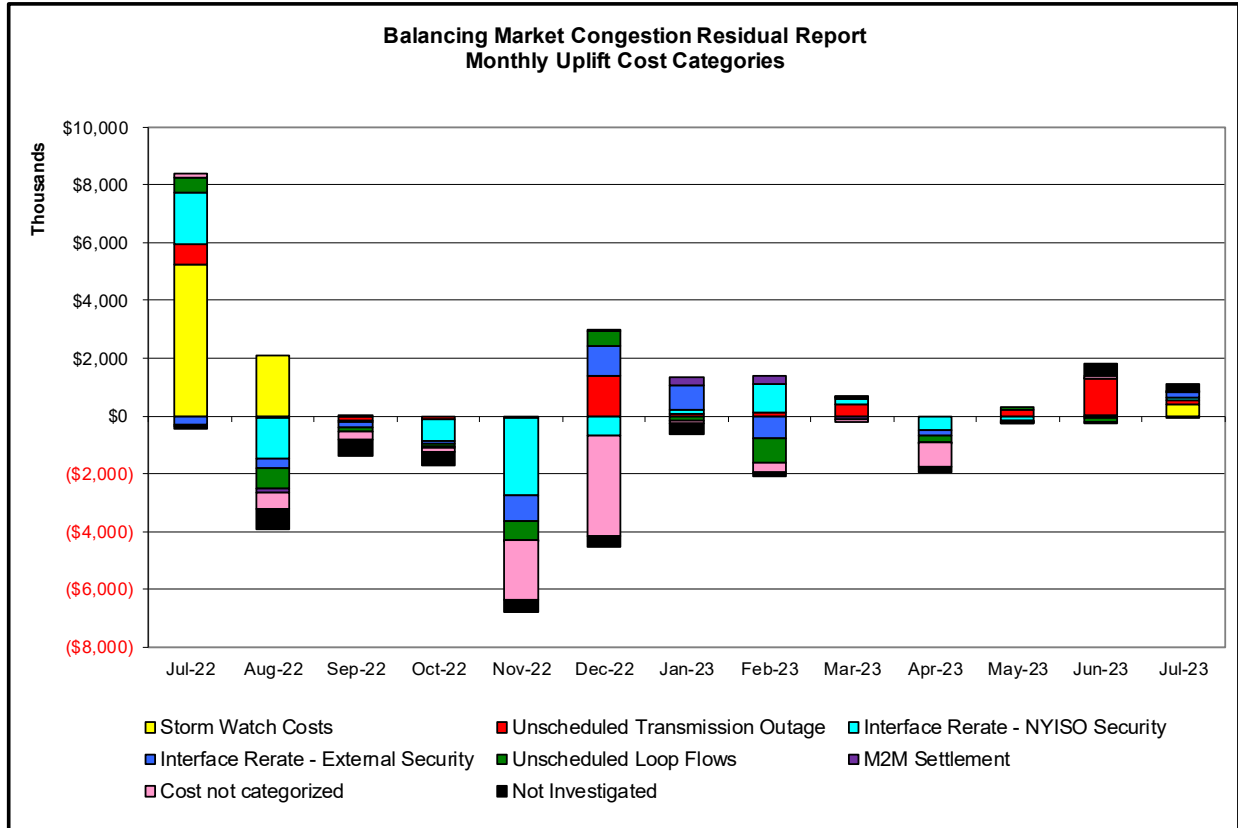


Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCEd prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules using RTC/ITSCEd prices.
Forecasted NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTD prices.



Market Performance Metrics





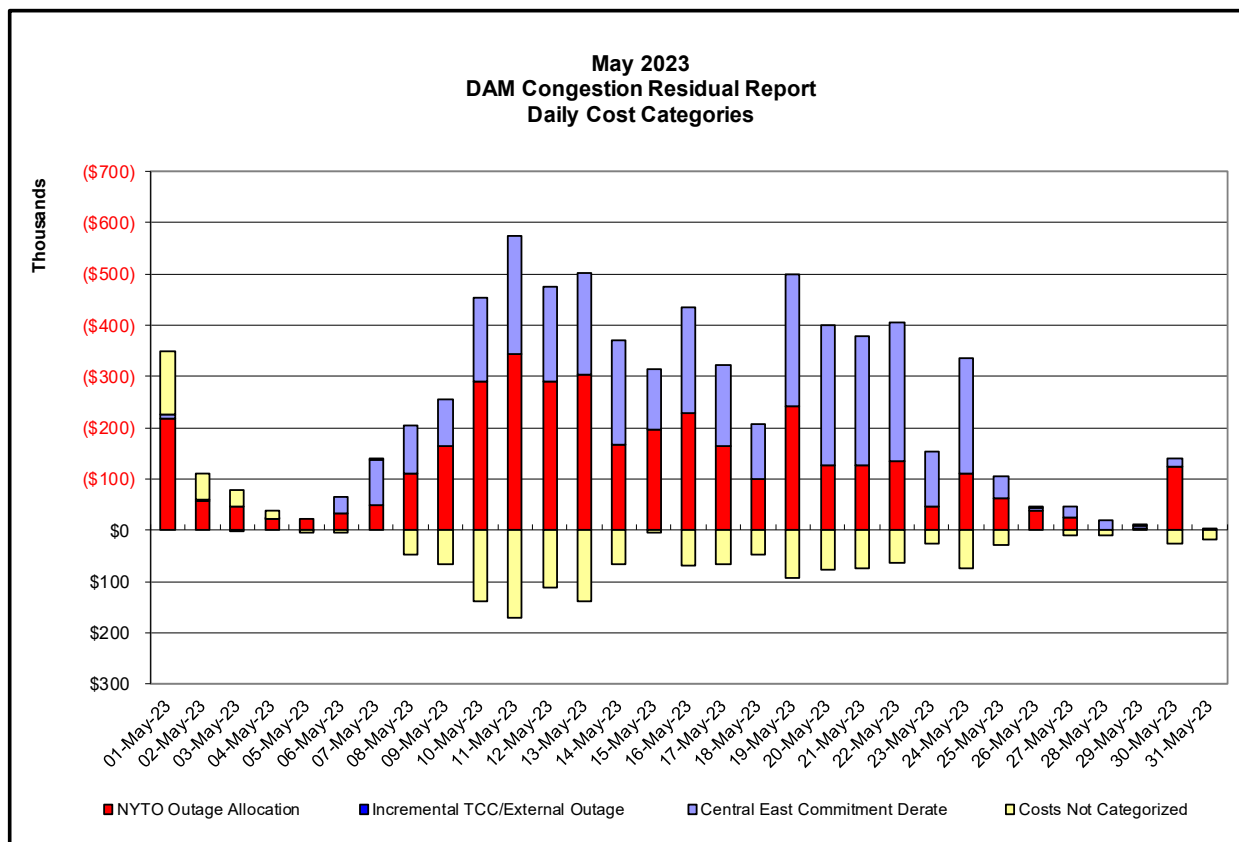
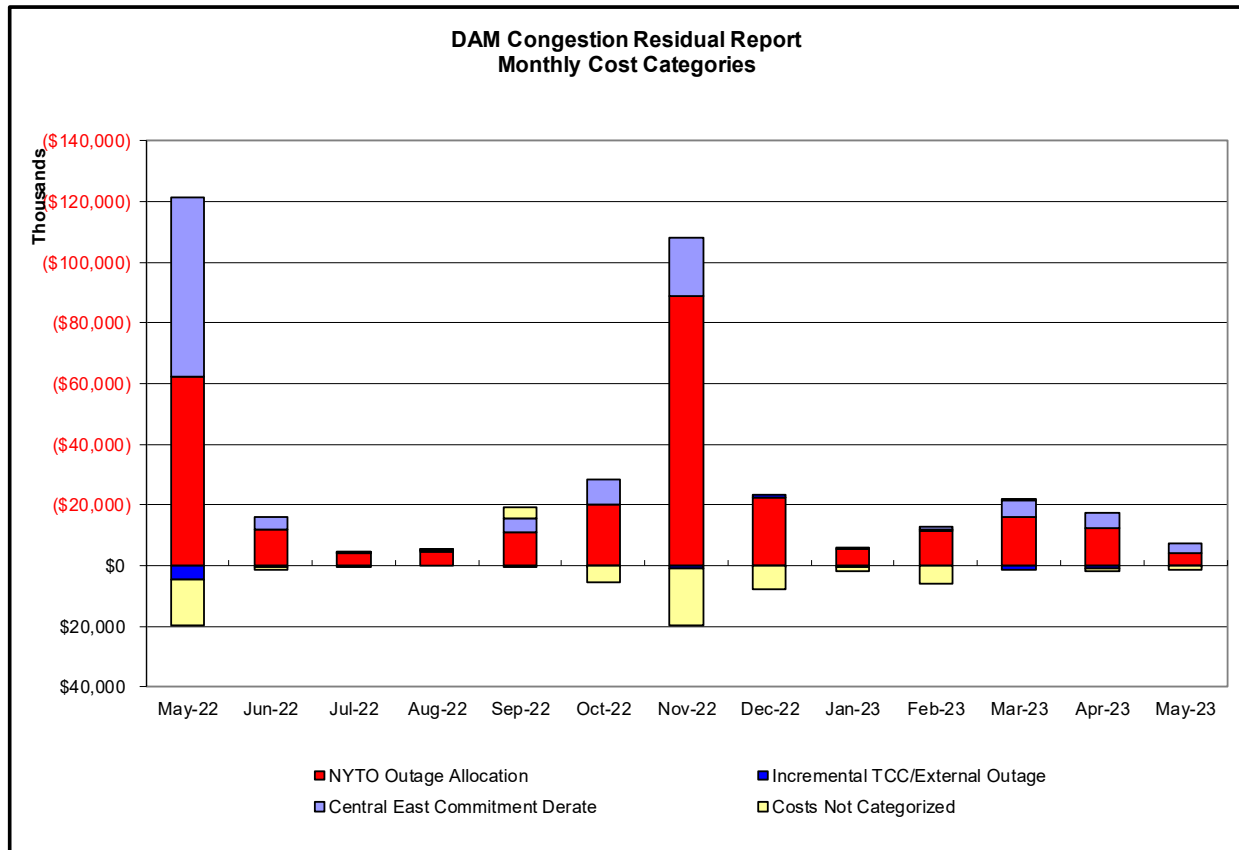
| Day's investigated in July: 3,5,13,27,28 | | | |
|--|-----------------|----------------|--|
| Event | Date (yyyymmdd) | Hours | Description |
| | 7/3/2023 | 17 | Thunder Storm Alert, Linden-Goethals 230kV (#A2253) |
| | 7/3/2023 | 16-18 | Forced outage Dunwoodie-Motthaven 345kV (#71) |
| | 7/3/2023 | 17,18 | Derate East 13th Sta-West 49th St 345kV (#M55) I/o SCB:E13TH(1):M54&45&BK14&15 |
| | 7/3/2023 | 16-18 | Derate East 13th Sta-West 49th St 345kV (#M55) I/o SCB:E13TH(2):M55&46&BK12+13 |
| | 7/3/2023 | 16 | NE AC ACTIVE DNI Ramp Limit |
| | 7/3/2023 | 13 | PJM AC ACTIVE DNI Ramp Limit |
| | 7/5/2023 | 13,22 | NYCA DNI Ramp Limit |
| | 7/5/2023 | 13,22 | Uprate Goethals-Gowanus 345kV (#25) |
| | 7/5/2023 | 22 | Uprate Goethals-Gowanus 345kV (#26) |
| | 7/5/2023 | 13,19-22 | Uprate Scriba-Volney 345kV (#20) I/o Scriba-Volney 345kV (#21) |
| | 7/5/2023 | 22 | NE AC ACTIVE DNI Ramp Limit |
| | 7/5/2023 | 19-21 | NE AC-NY Scheduling Limit |
| | 7/5/2023 | 19 | PJM AC-NY Scheduling Limit |
| | 7/5/2023 | 4,7 | IESO AC ACTIVE DNI Ramp Limit |
| | 7/5/2023 | 21,22 | NE NNC1385-NY Scheduling Limit |
| | 7/5/2023 | 19 | PJM AC ACTIVE DNI Ramp Limit |
| | 7/13/2023 | 21-23 | Thunder Storm Alert, Buchanan North 345/138kV (BKTA5) |
| | 7/13/2023 | 8,22 | Derate Goethals-Gowanus (#26) I/o SCB:GOETH(3):25&22&R25 |
| | 7/13/2023 | 21,22 | Derate Goethals-Gowanus (#26) I/o SCB:GOETH(5):25&R25&A2253&BK1 |
| | 7/27/2023 | 19 | Thunder Storm Alert, Buchanan North 345/138kV (BKTA5) |
| | 7/27/2023 | 14-18 | Thunder Storm Alert, Chestor-Shoemaker 138kV (#27) |
| | 7/27/2023 | 14-16,18,19,21 | Thunder Storm Alert, Linden-Goethals 230kV (#A2253) |
| | 7/27/2023 | 15 | NYCA DNI Ramp Limit |
| | 7/27/2023 | 9 | Uprate Scriba-Volney 345kV (#20) I/o Scriba-Volney 345kV (#21) |
| | 7/27/2023 | 14-16,21 | NE AC ACTIVE DNI Ramp Limit |
| | 7/28/2023 | 16,17 | Derate Brownfalls-Taylorville 115kV (#3) I/o Brownfalls-Taylorville 115kV (#4) |
| | 7/28/2023 | 20 | NE AC ACTIVE DNI Ramp Limit |
| | 7/28/2023 | 14,17,19 | HQ CEDARS - NY Scheduling Limit |
| | 7/28/2023 | 14-19 | IESO AC Active DNI Ramp Limit |

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 | |

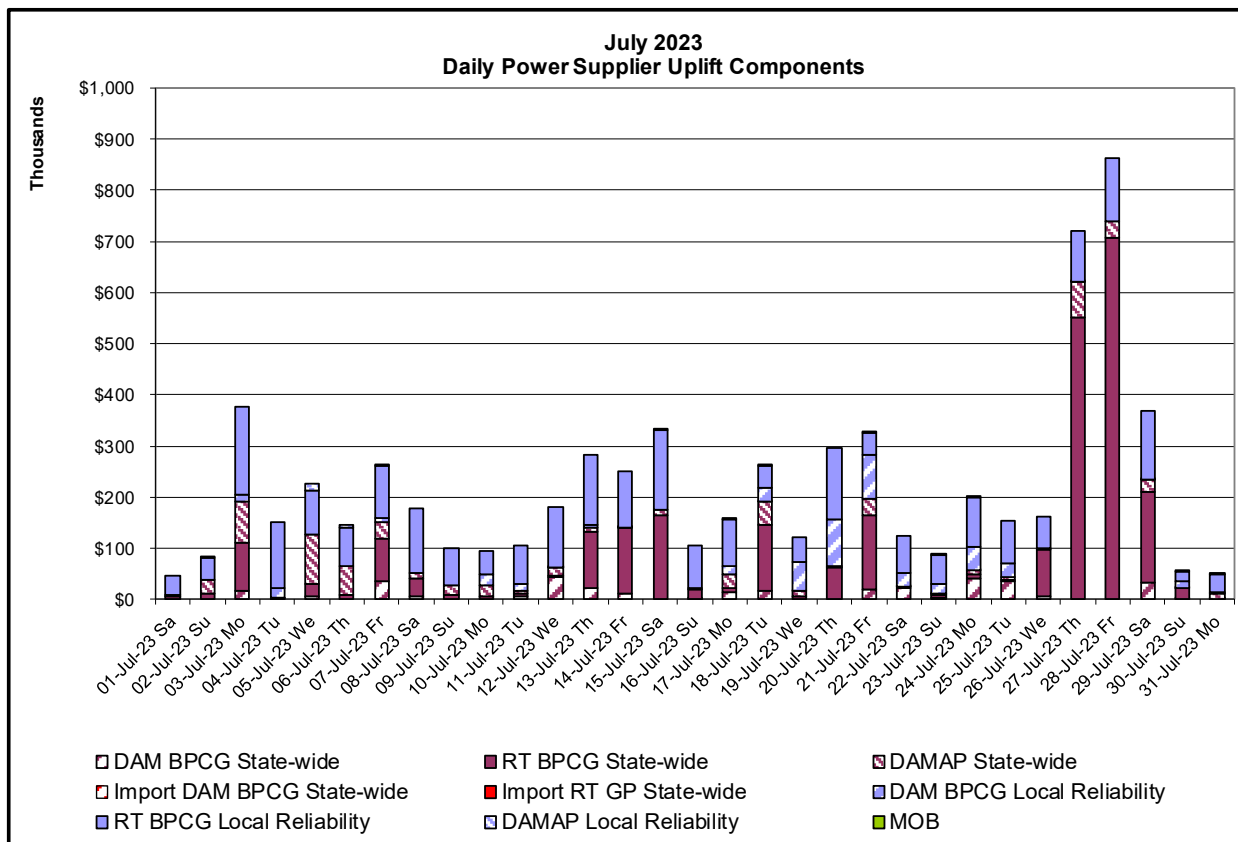
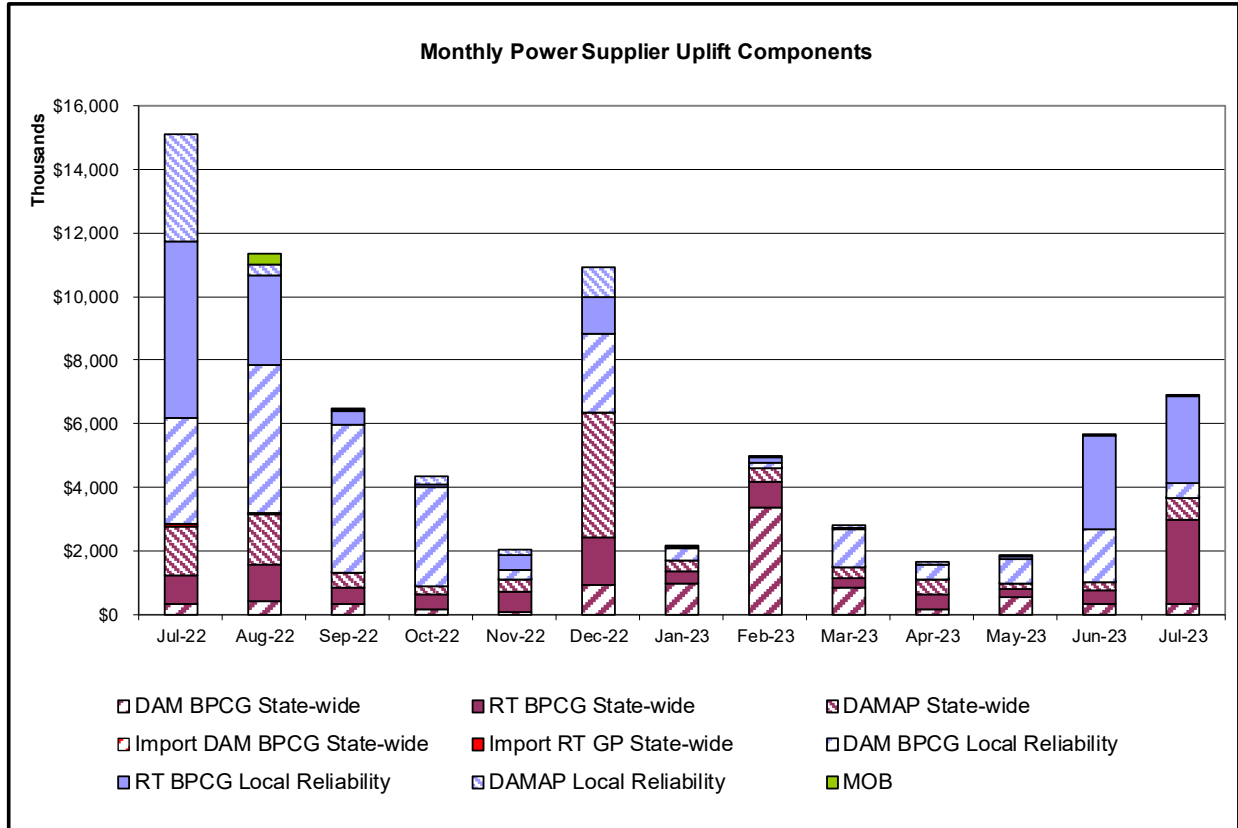
Monthly Balancing Market Congestion Report Assumptions/Notes

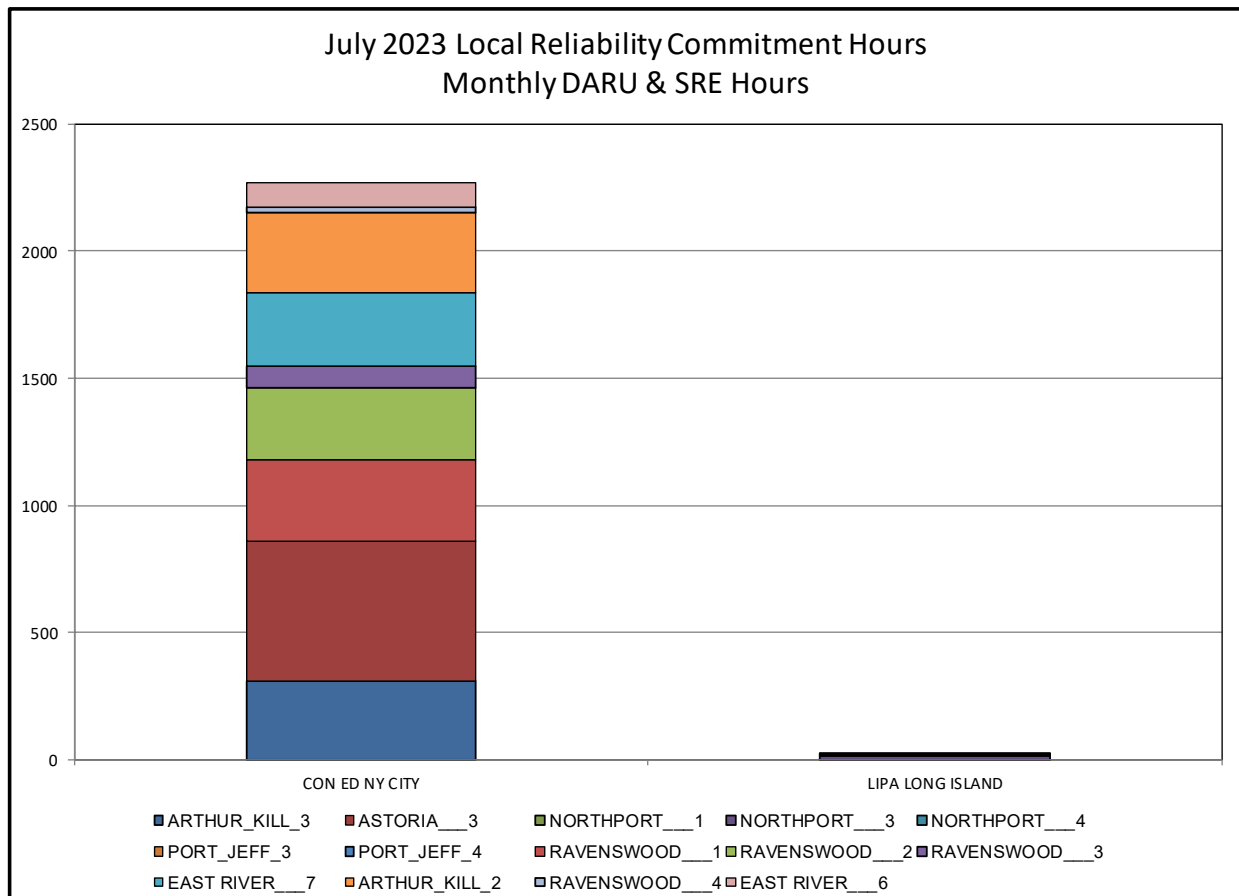
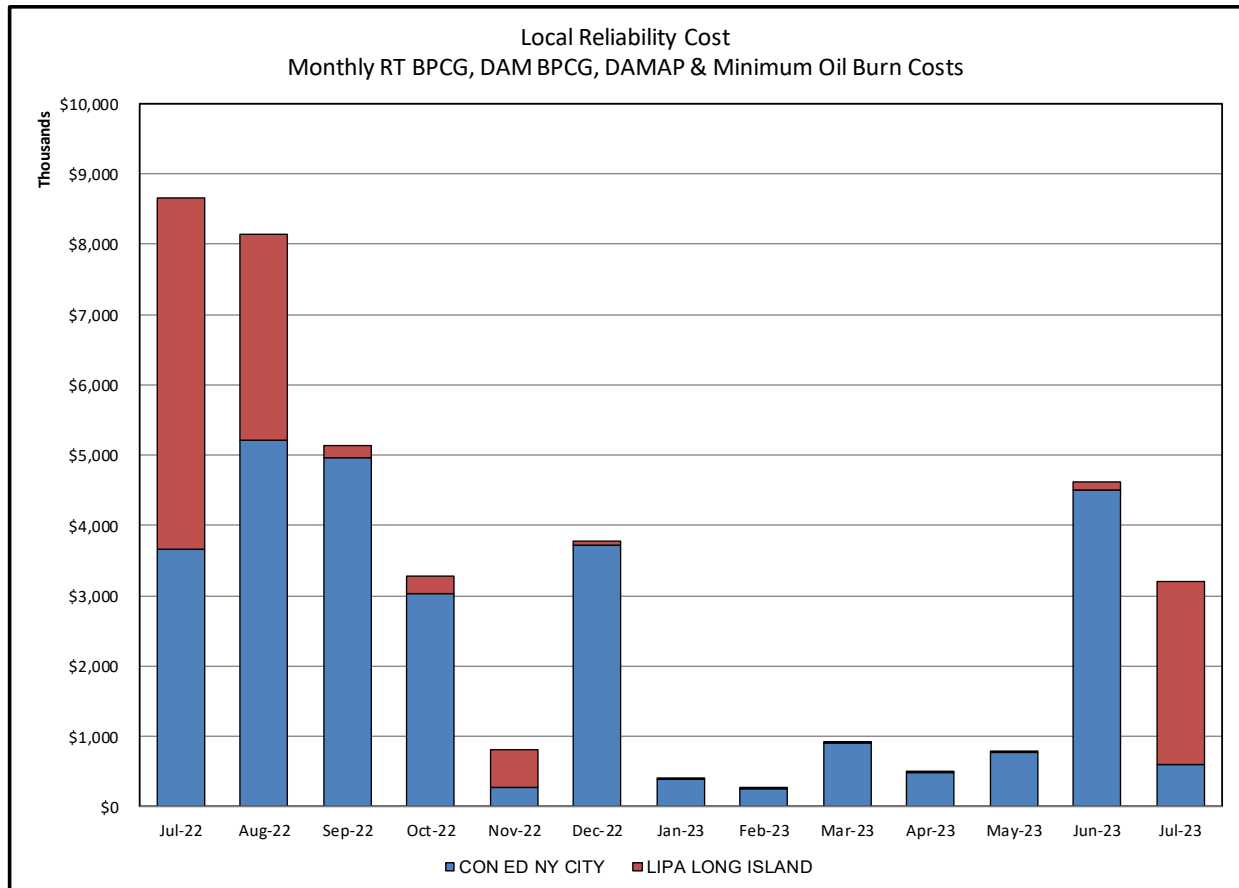
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

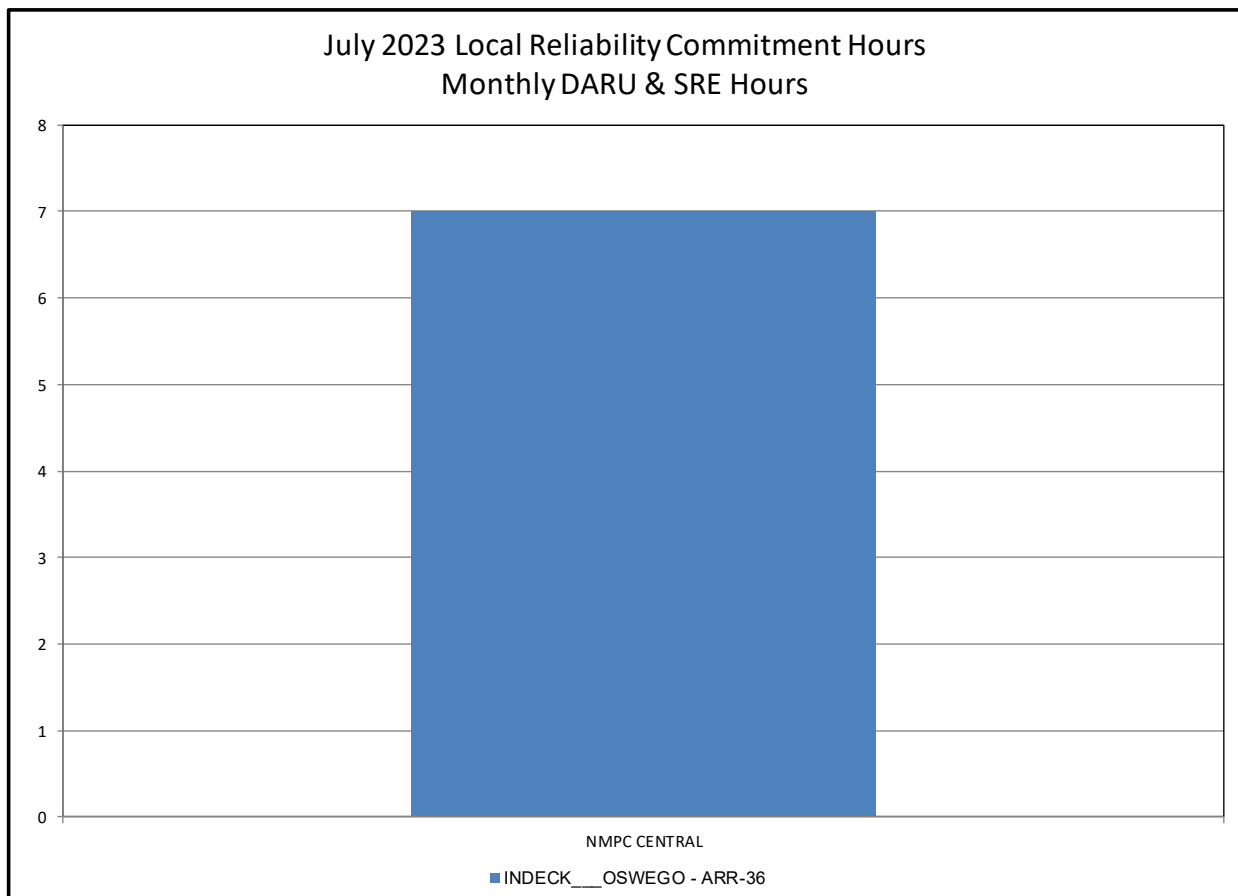
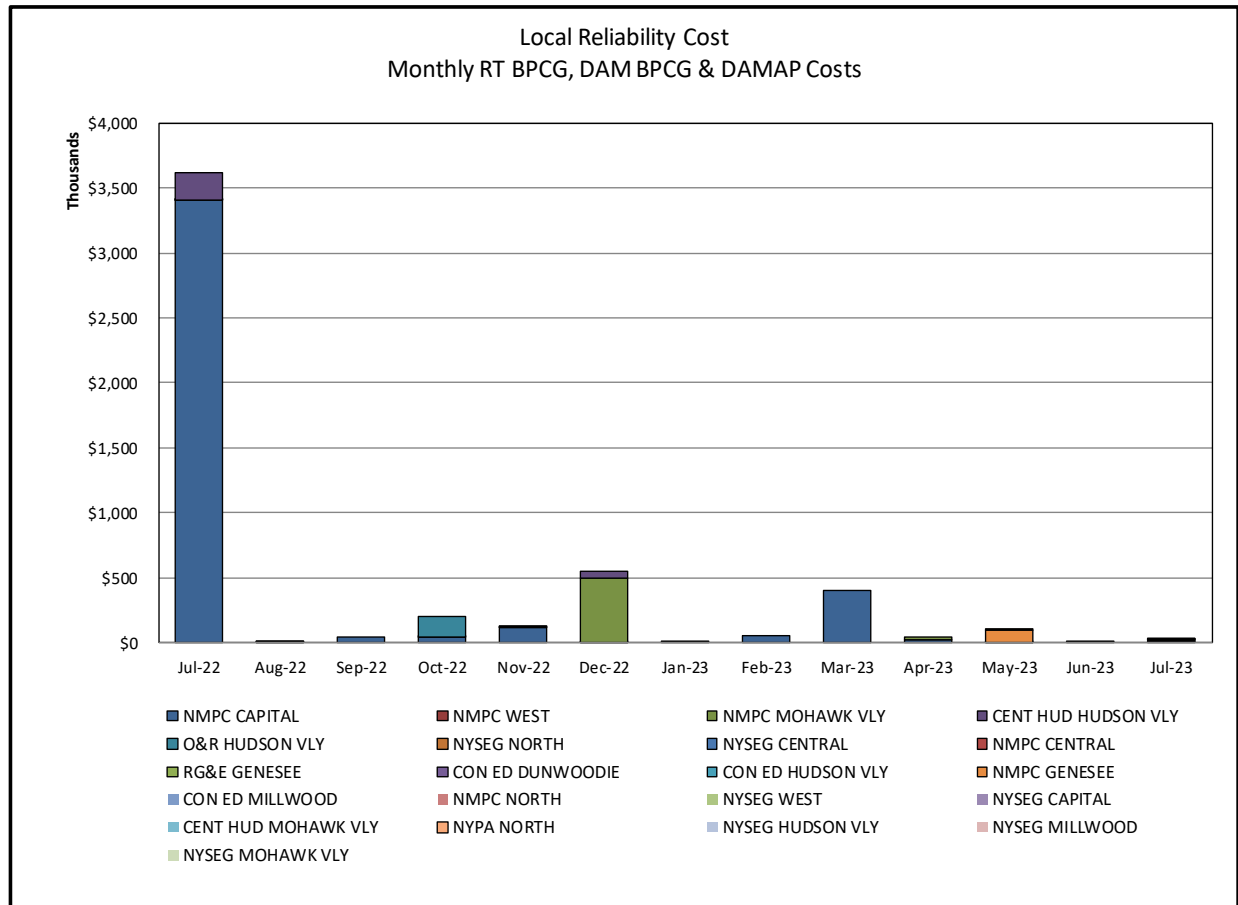


Day-Ahead Market Congestion Residual Categories

| <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. | |

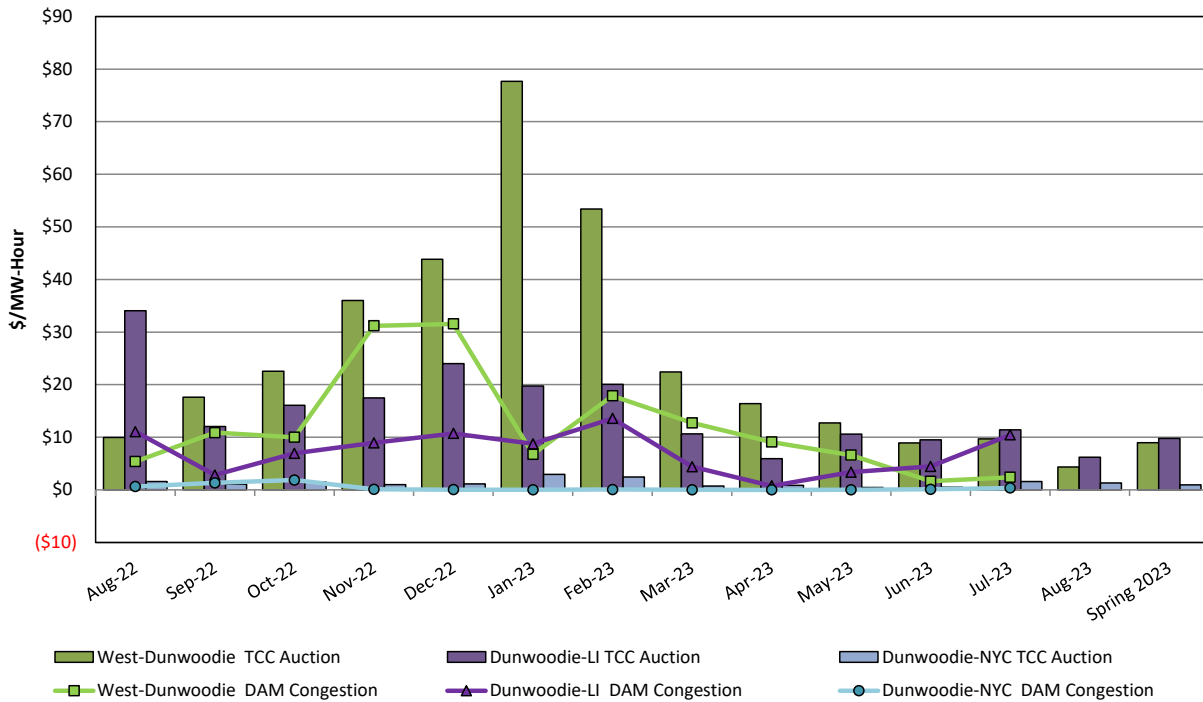






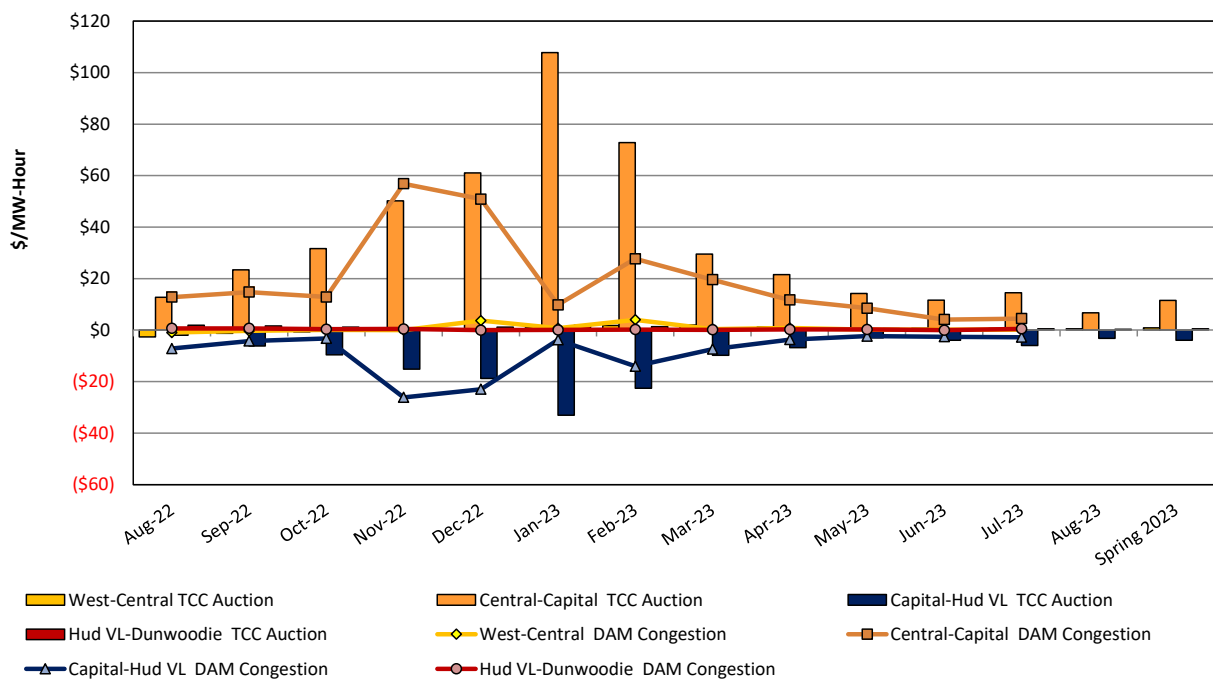
TCC & Day Ahead Market Selected Internal Path Congestion

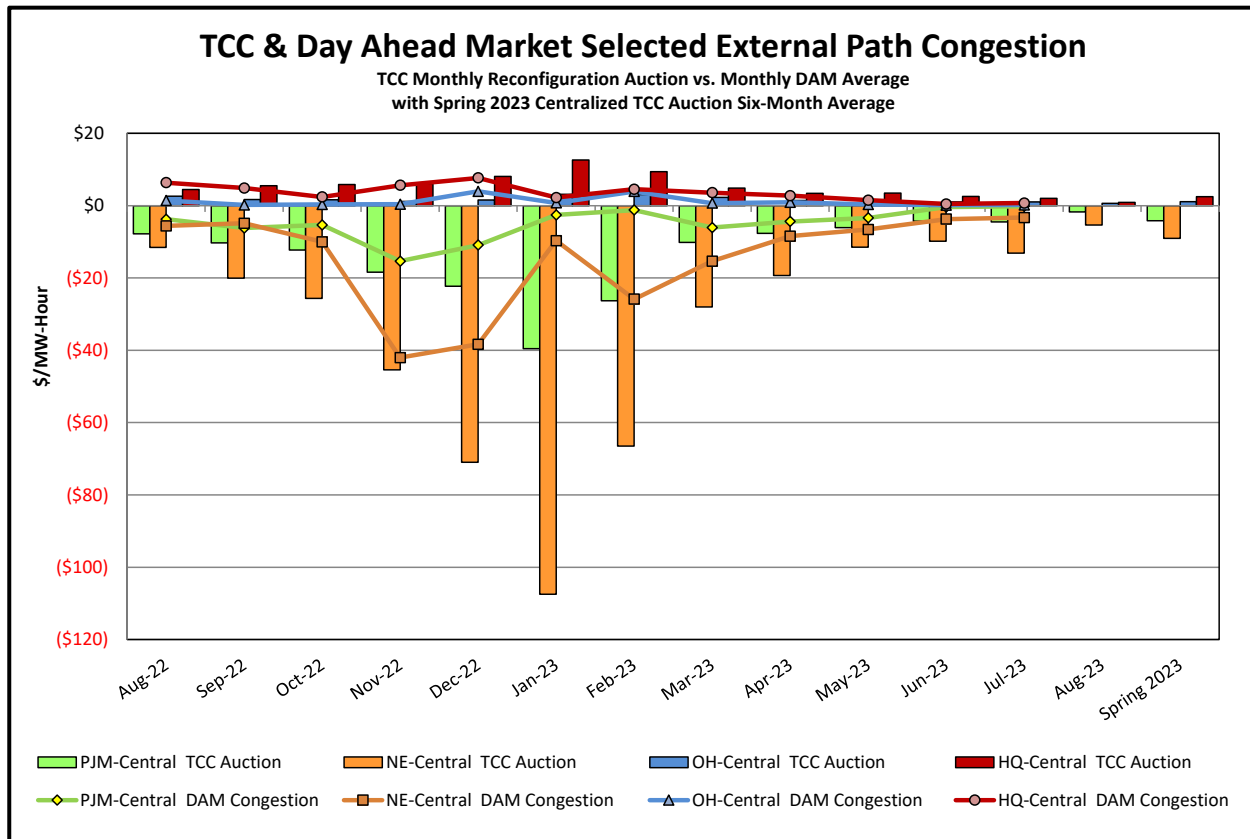
TCC Monthly Reconfiguration Auction vs. Monthly DAM Average
with Spring 2023 Centralized TCC Auction Six-Month Average



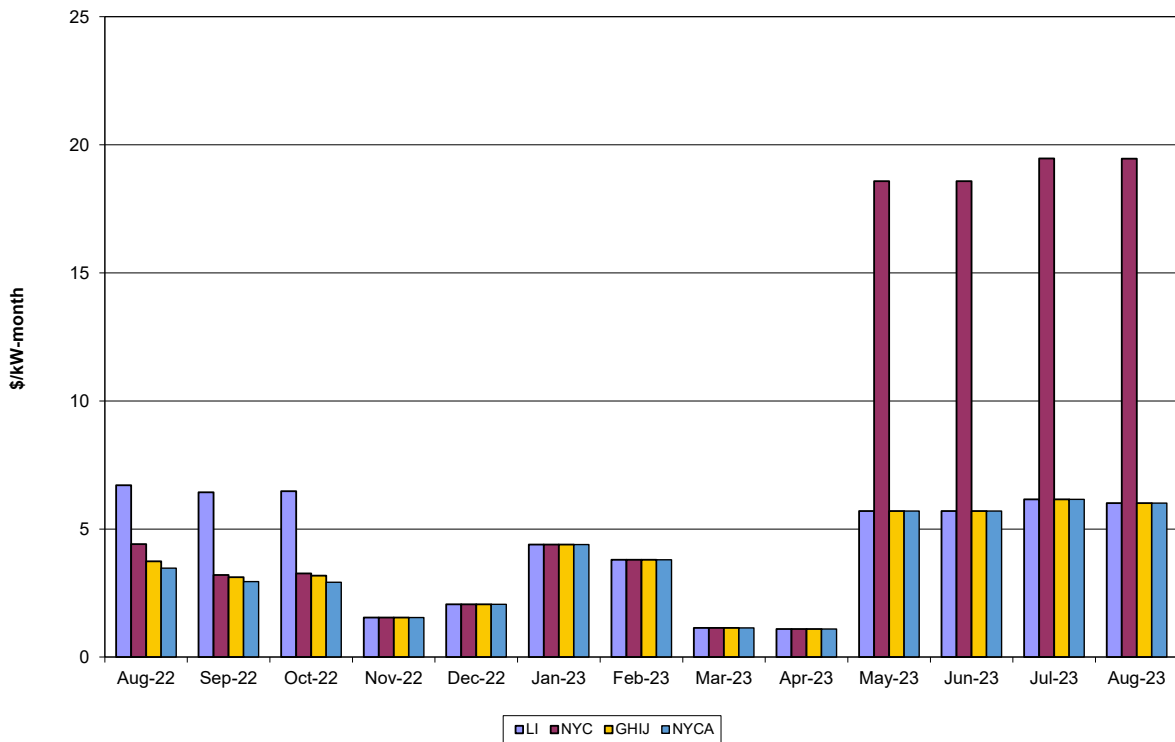
TCC & Day Ahead Market West to Dunwoodie Path Congestion

TCC Monthly Reconfiguration Auction vs. Monthly DAM Average
with Spring 2023 Centralized TCC Auction Six-Month Average





ICAP Spot Market Clearing Price



UCAP Sales

