

Operations Performance Metrics Monthly Report



February 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 March 8, 2021.

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February 2021 Operations Performance Highlights

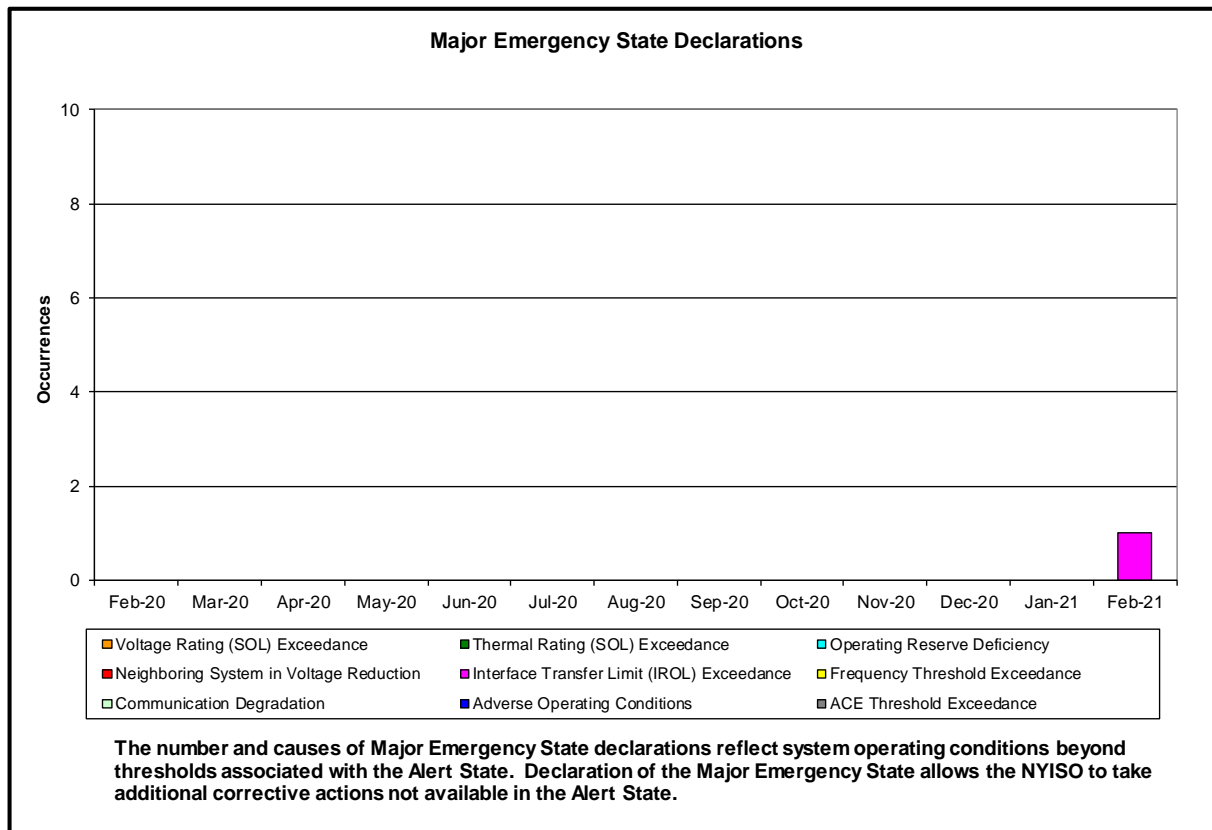
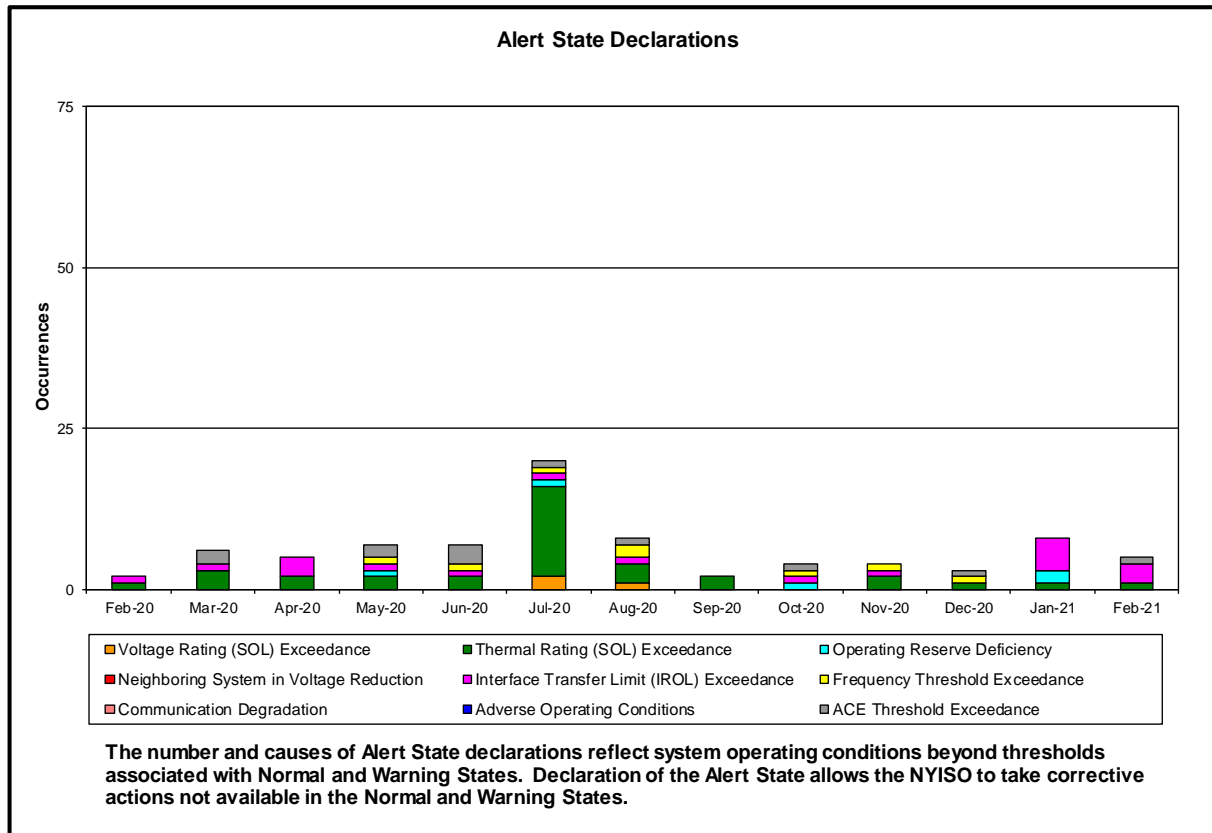
- Peak load of 21,746 MW occurred on 02/08/2021 HB 18
- All-time winter capability period peak load of 25,738 MW occurred on 1/7/2014 HB 18
- 0 hours of Thunder Storm Alerts were declared
- 0 hours of NERC TLR level 3 curtailment
- A Major Emergency was declared on 02/10/2021 in HB01 for the trip of the New Scotland 345kV #77k bus, disconnecting the New Scotland-Alps 345kV (#2), New Scotland-Leeds 345kV (#93), Edic-New Scotland 345kV (#14) from service, causing the power flow on Central East VC to exceed 105% of its voltage transfer limit.
- NYISO began securing the Regeneron-Greenbush 115kV (#9) facility in the Real-Time Market on 02/11/2021 and in the Day-Ahead Market execution occurring on 02/12/2021 for the 02/13/2021 market day.
- 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.

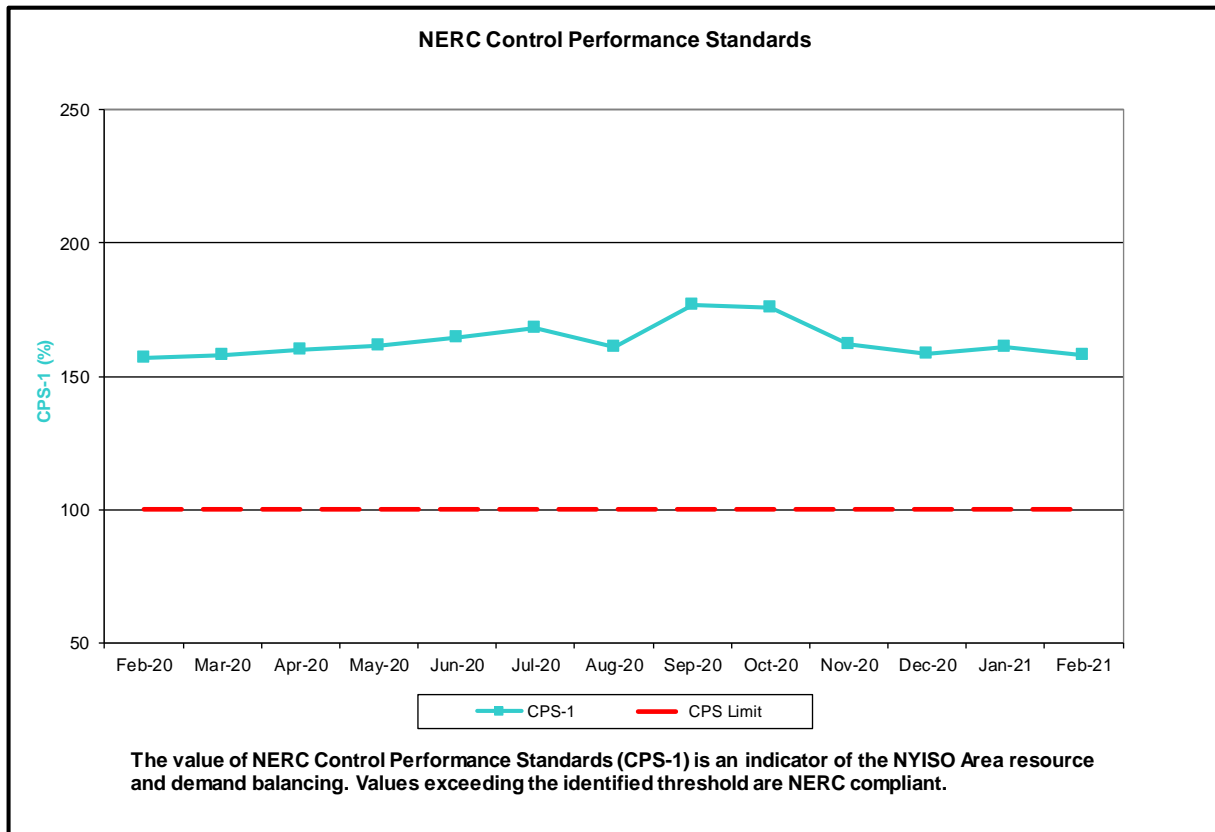
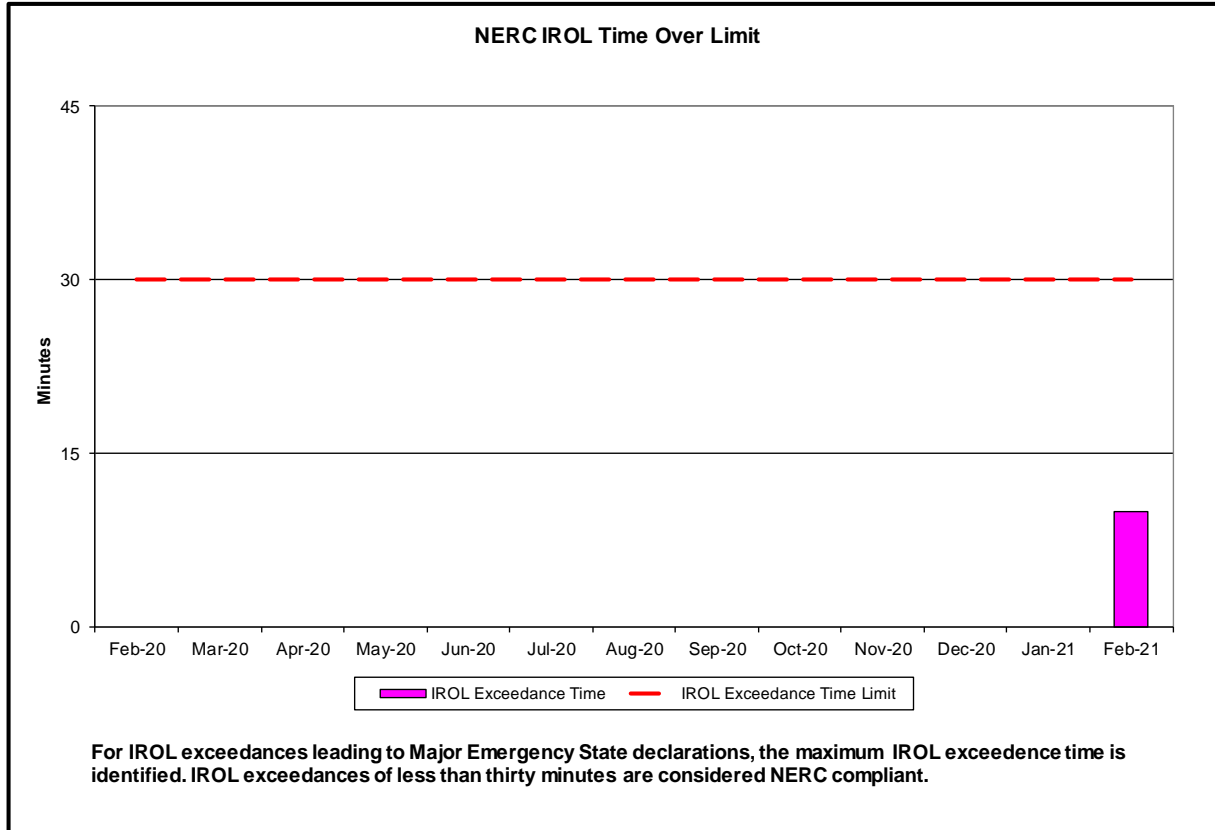
	Current Month Value (\$M)	Year-to-Date Value (\$M)
NY Savings from PJM-NY Congestion Coordination	\$2.48	\$3.66
NY Savings from PJM-NY Coordinated Transaction Scheduling	\$1.17	\$1.45
NY Savings from NE-NY Coordinated Transaction Scheduling	(\$2.71)	(\$1.59)
Total NY Savings	\$0.94	\$3.52
Regional Savings from PJM-NY Coordinated Transaction Scheduling	\$0.51	\$0.97
Regional Savings from NE-NY Coordinated Transaction Scheduling	(\$0.47)	(\$0.34)
Total Regional Savings	\$0.04	\$0.63

- Statewide uplift cost monthly average was (\$0.30)/MWh.
- The following table identifies the Monthly ICAP spot market prices and the price delta.

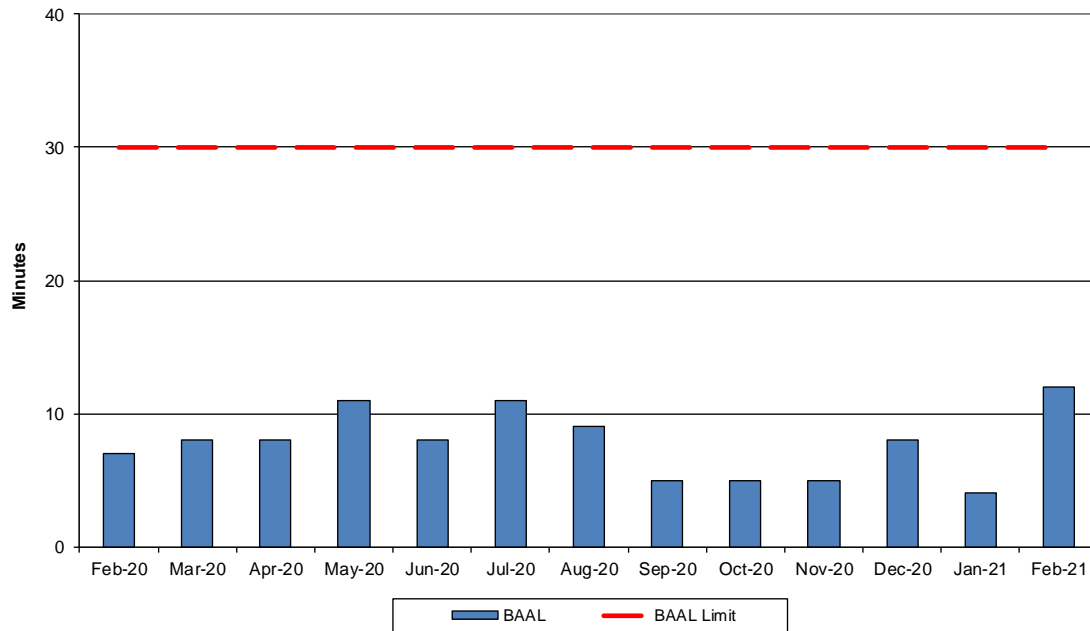
Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
March 2021 Spot Price	\$0.89	\$0.89	\$8.71	\$0.89
February 2021 Spot Price	\$0.89	\$0.89	\$8.76	\$0.89
Delta	\$0.00	\$0.00	(\$0.05)	\$0.00

Reliability Performance Metrics



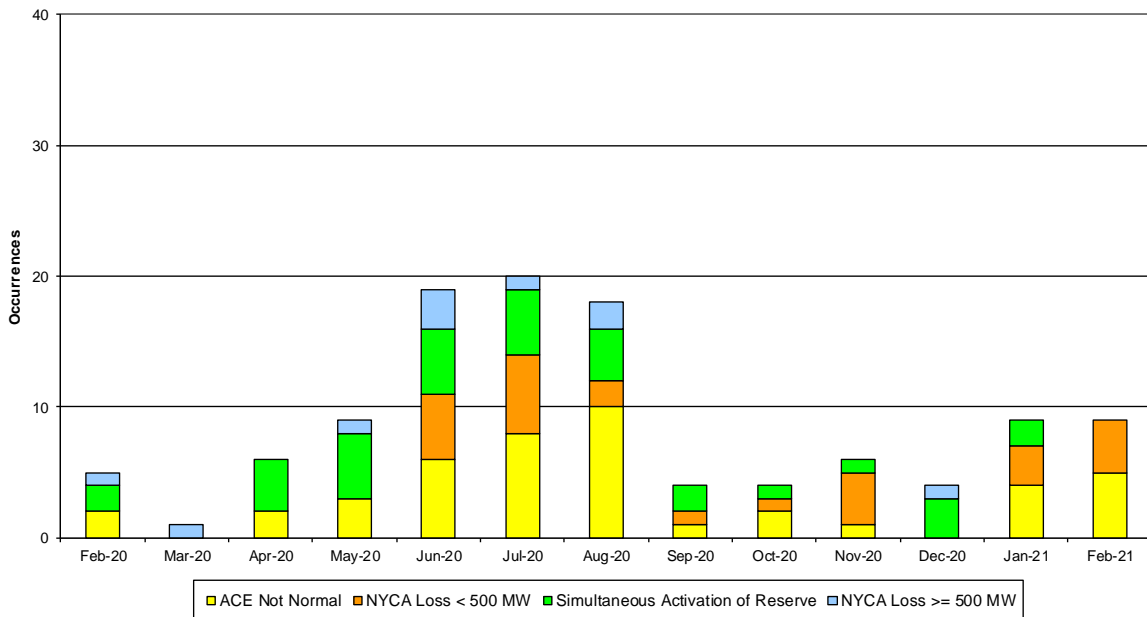


NERC Balancing Authority ACE Limit Standard



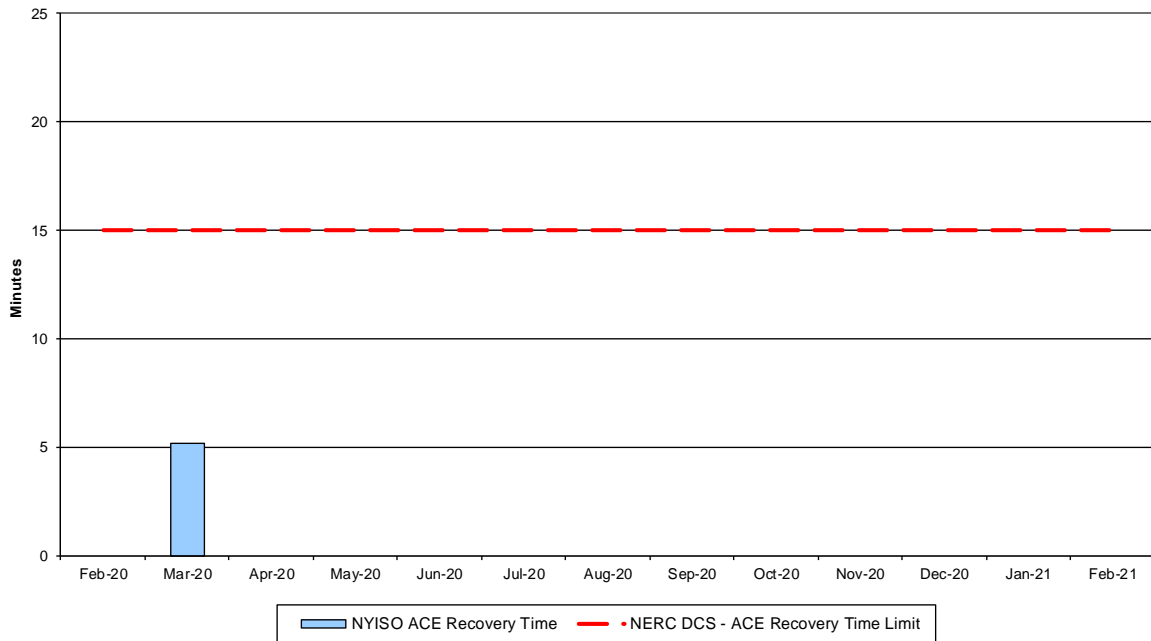
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



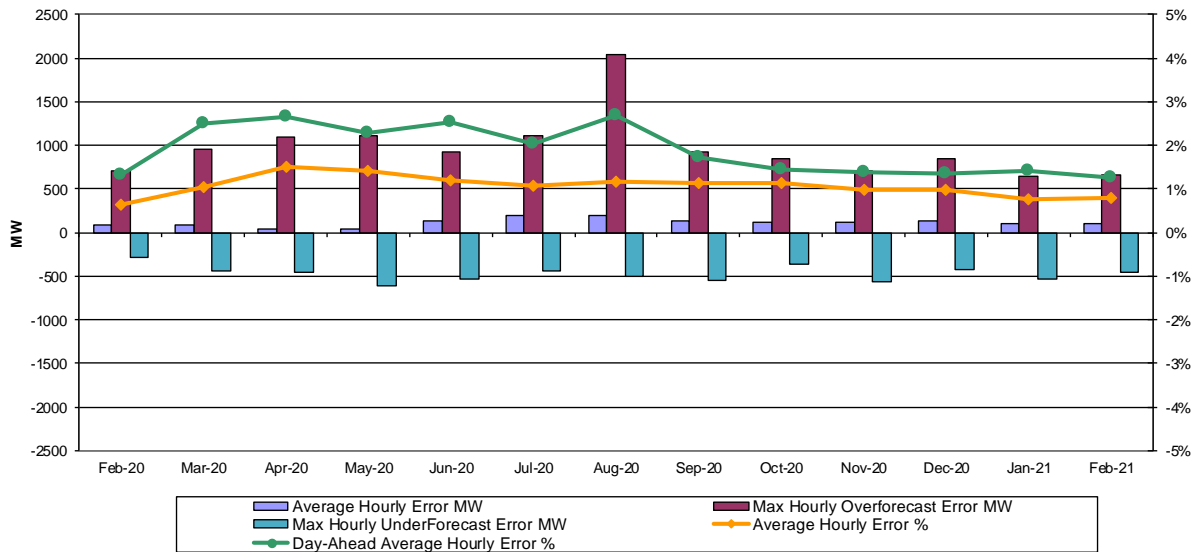
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

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

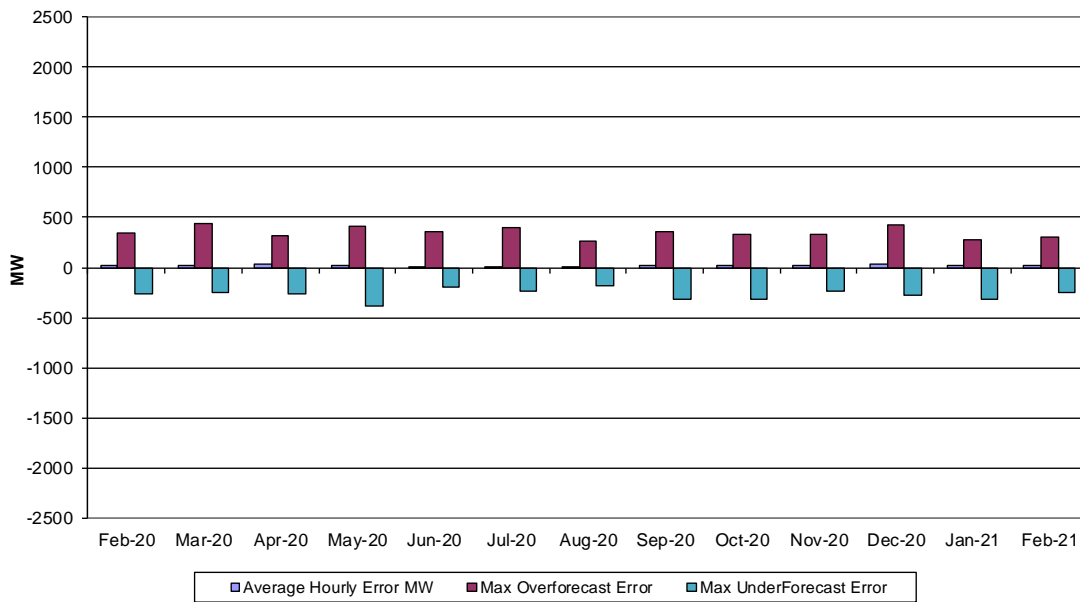


Hourly Error MW - Value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.

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

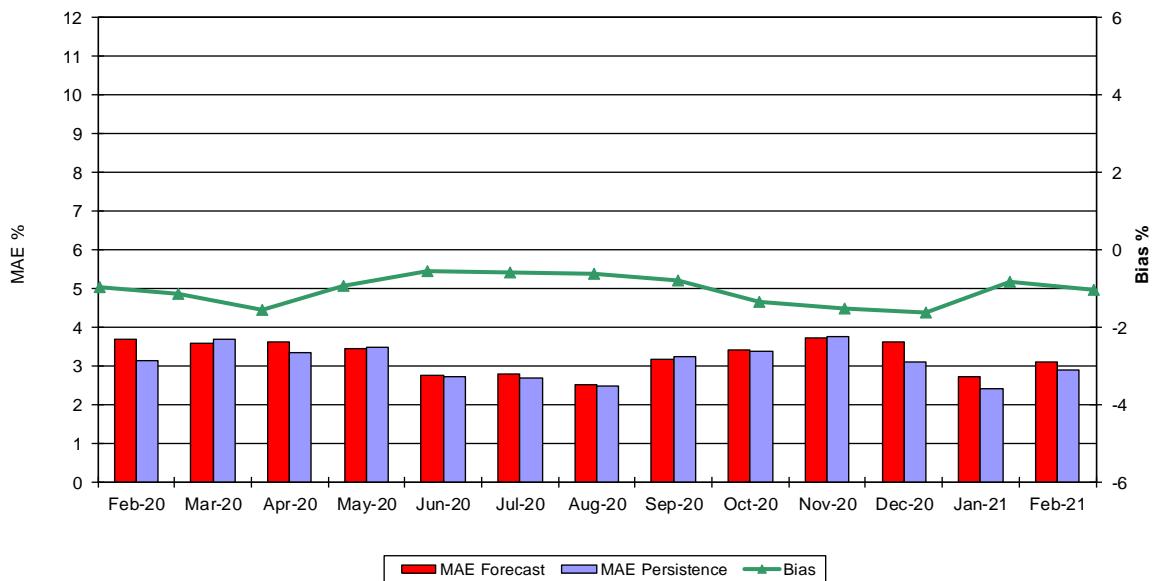
Day-Ahead Average Hourly Error % - Average across all hours of the month of the absolute value of the difference between actual load demand and the Day-Ahead forecast load demand, divided by the actual load demand.

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.

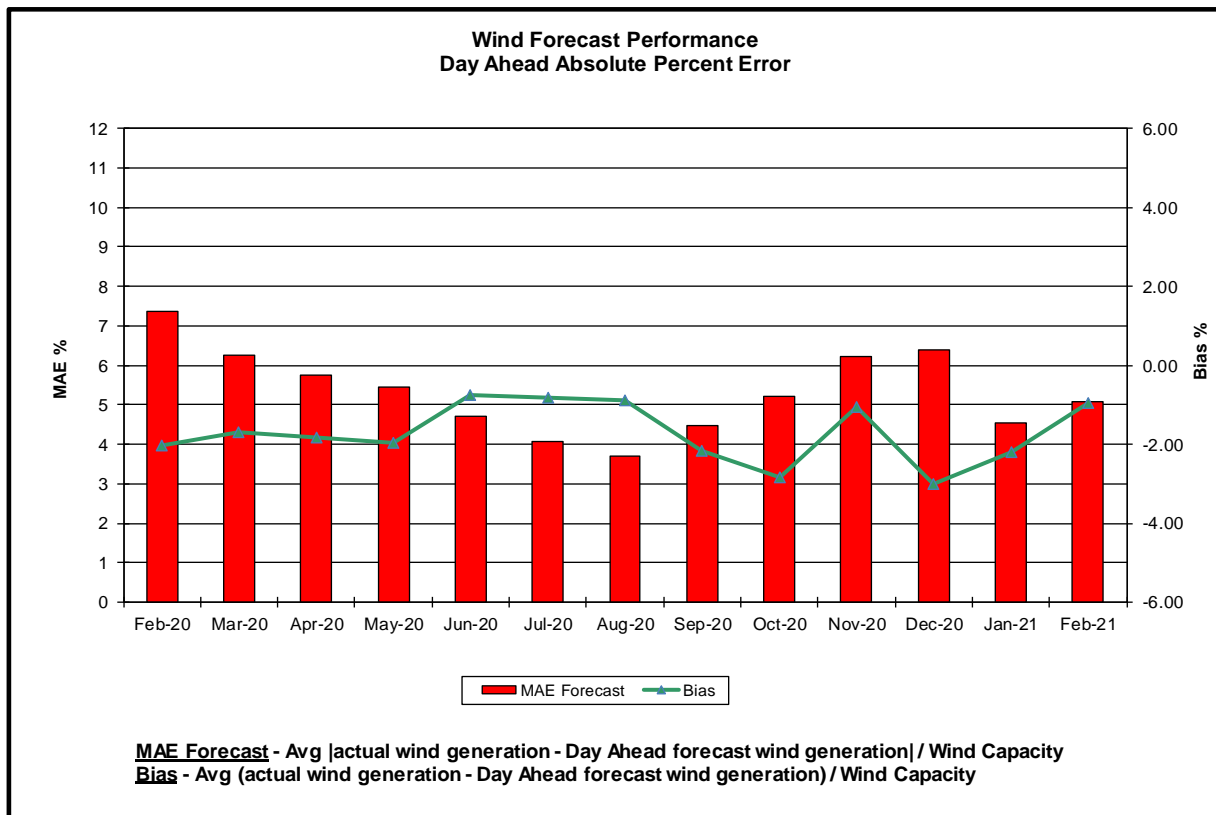
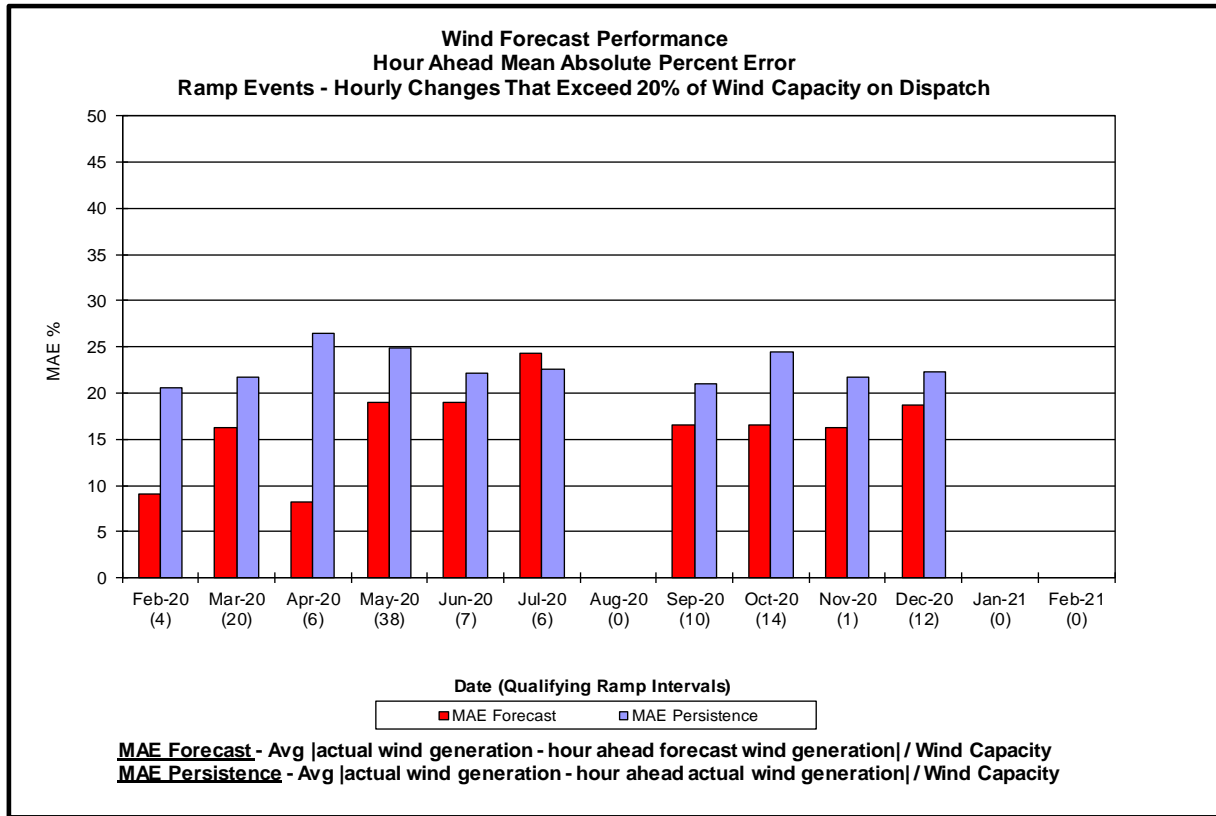
Wind Forecast Performance Hour Ahead Percent Error

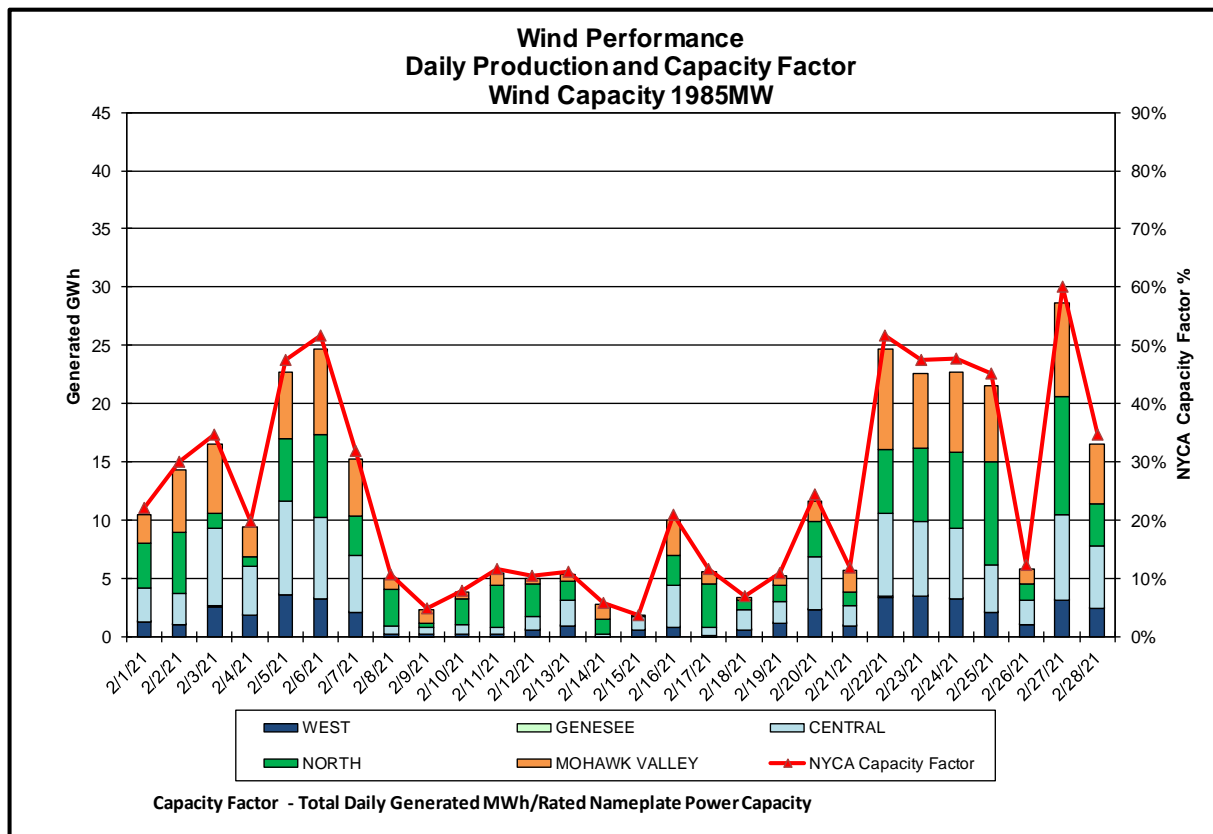
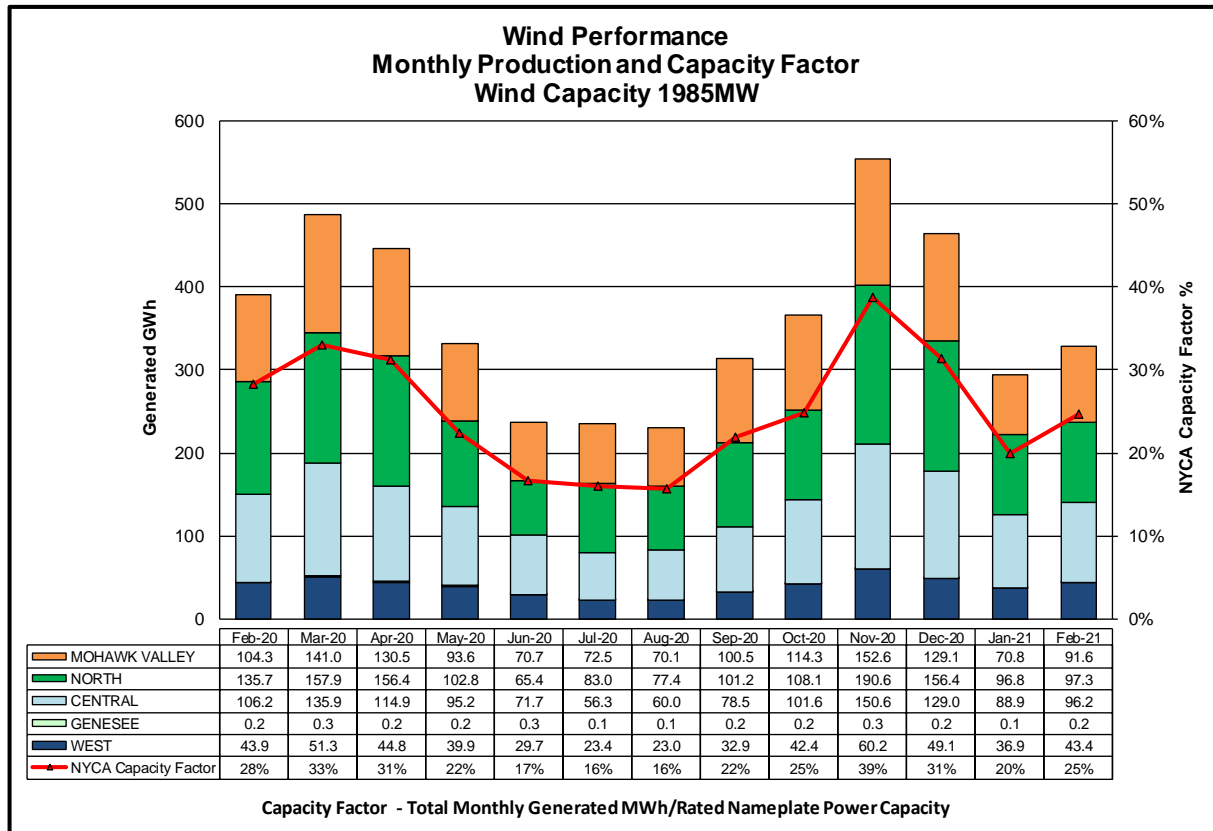


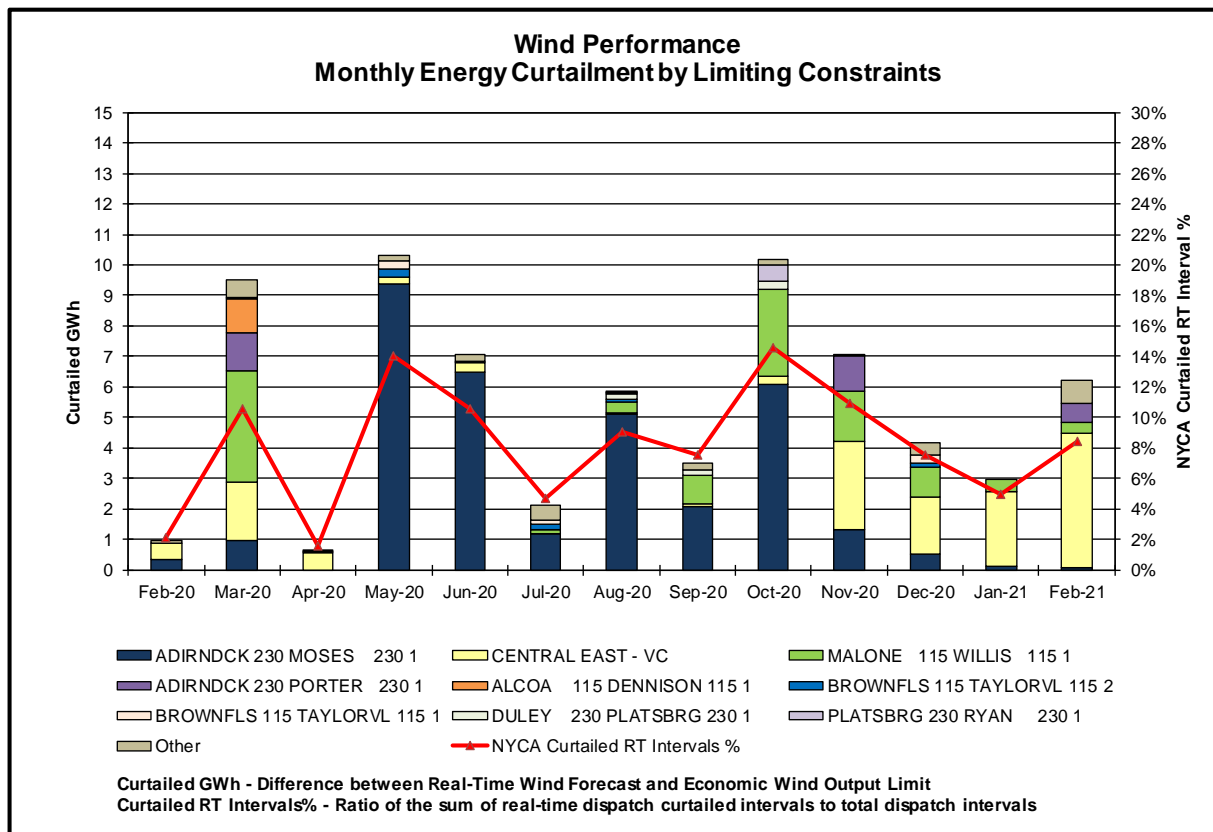
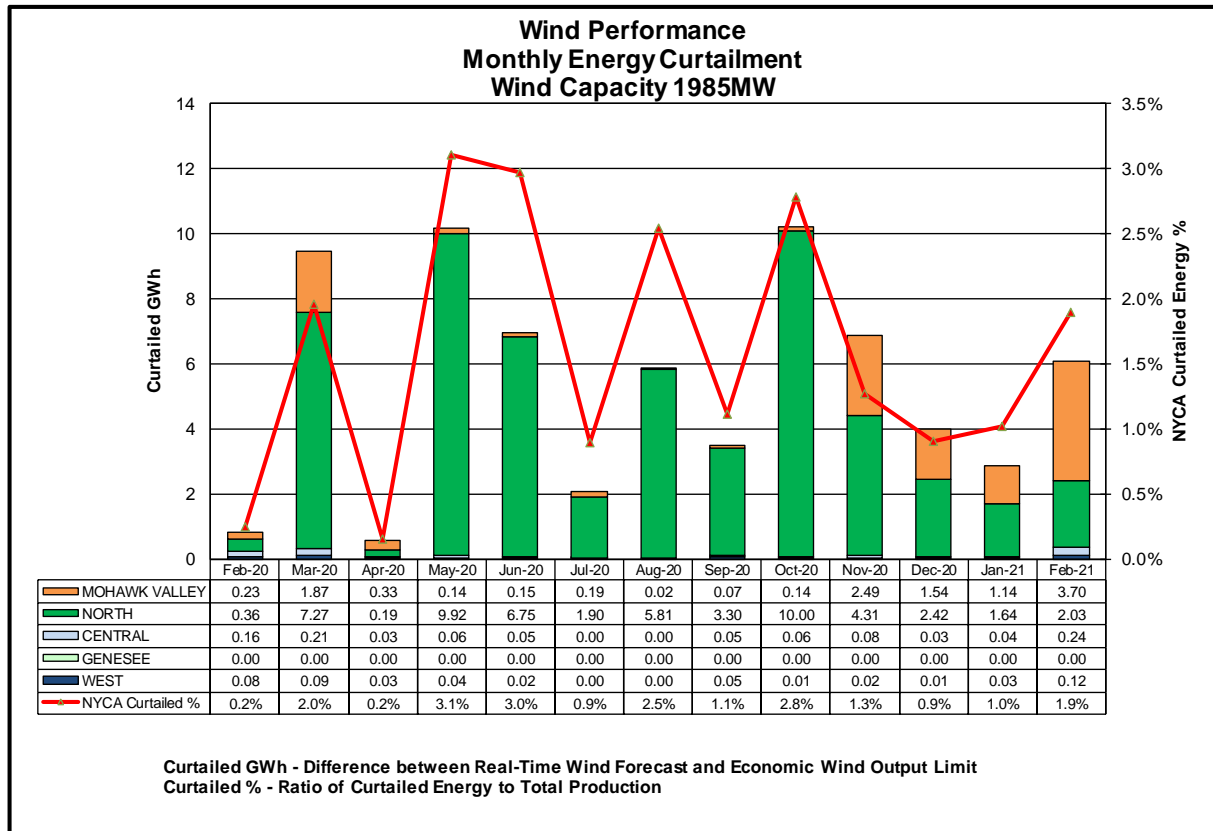
MAE Forecast - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity

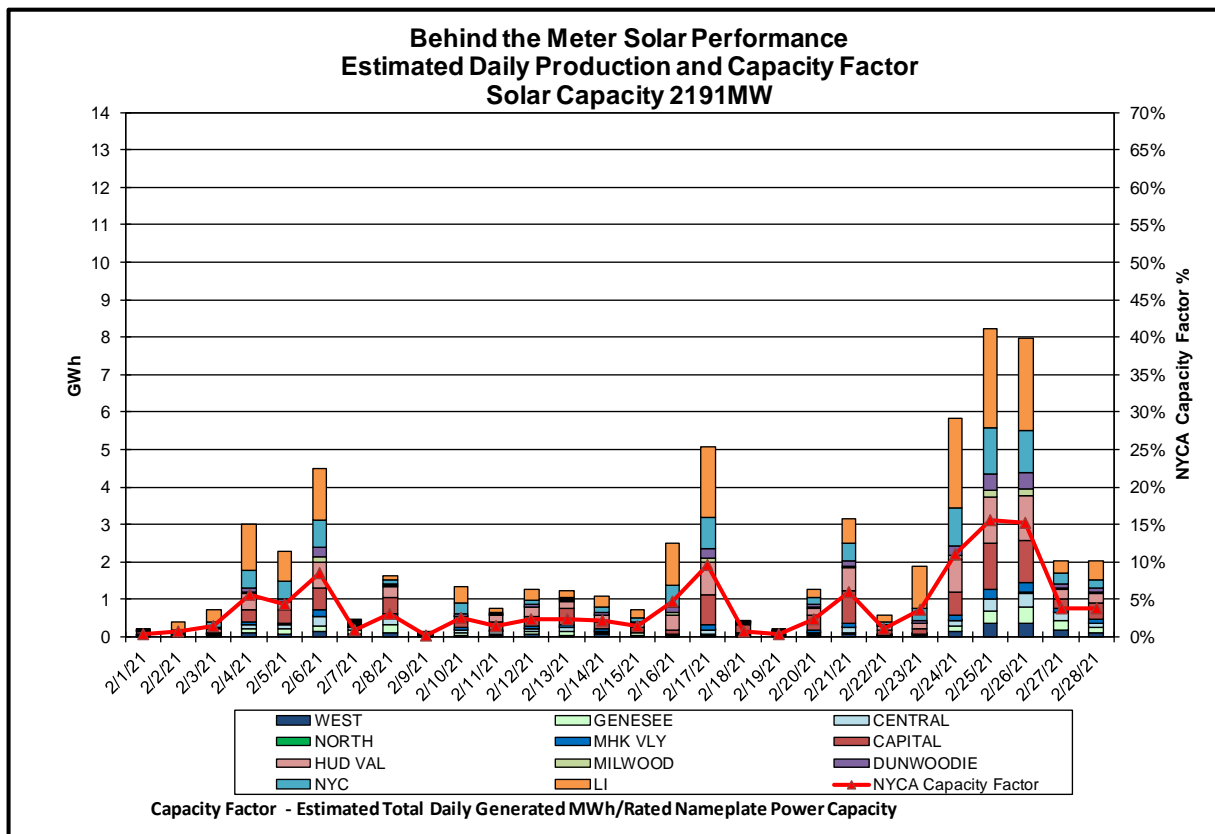
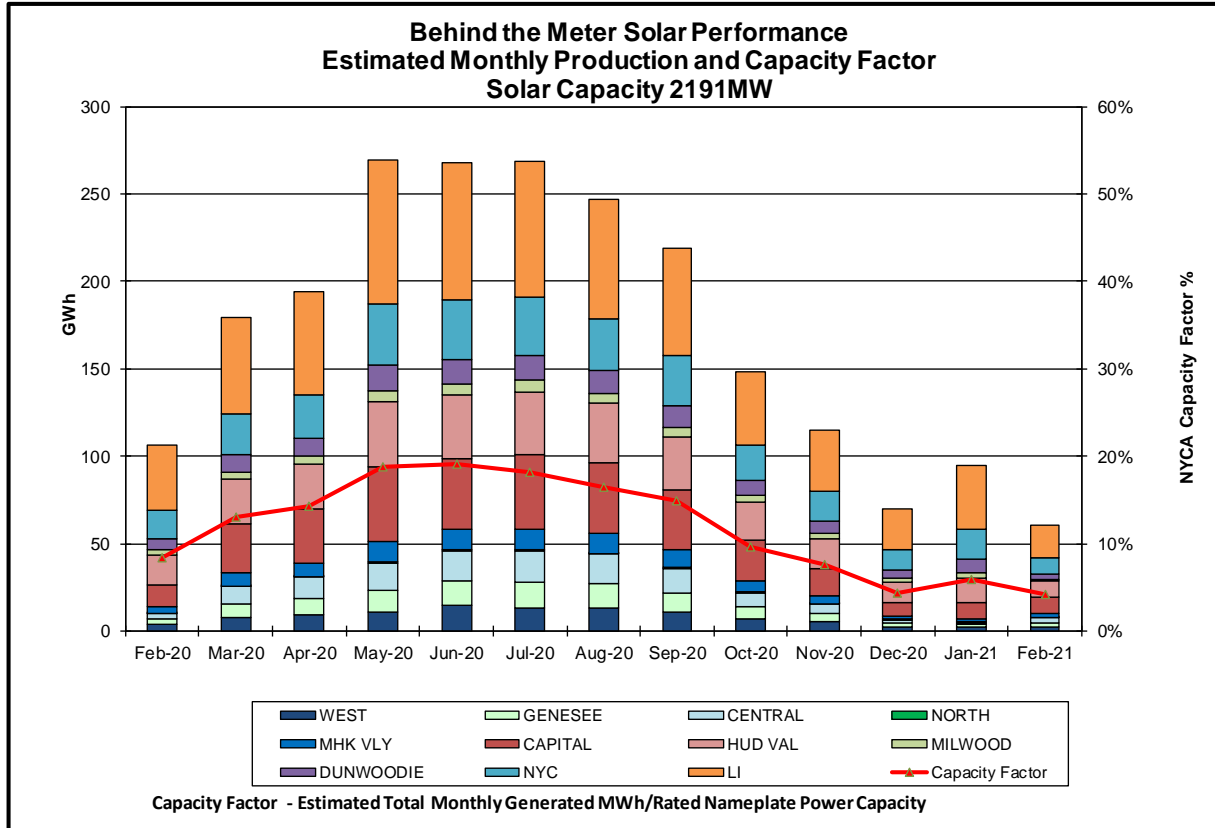
MAE Persistence - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity

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

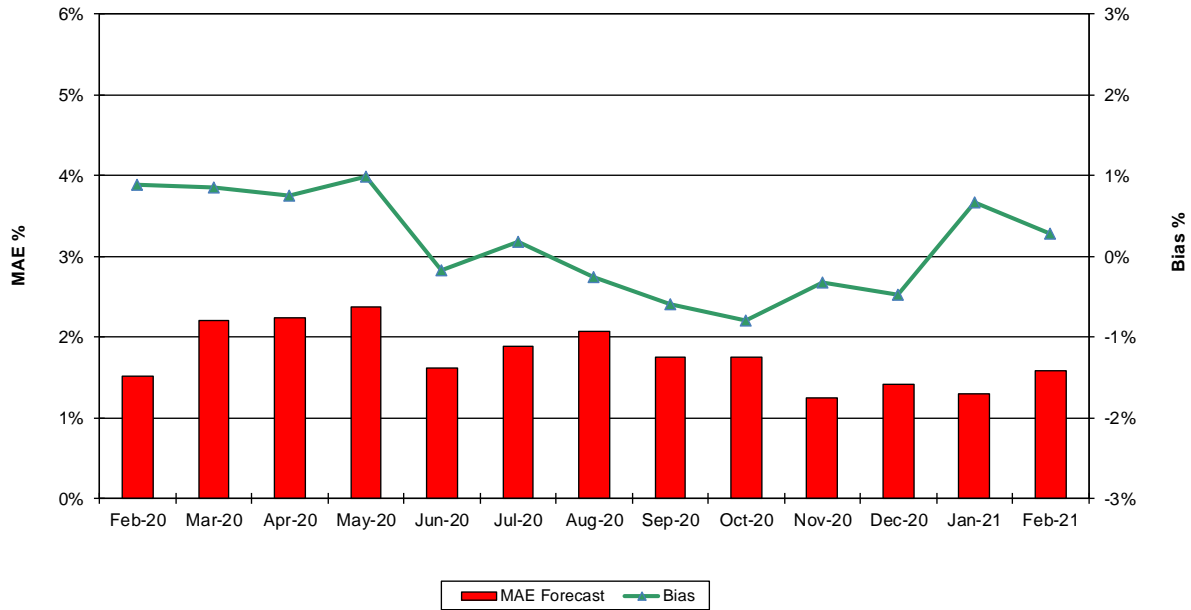






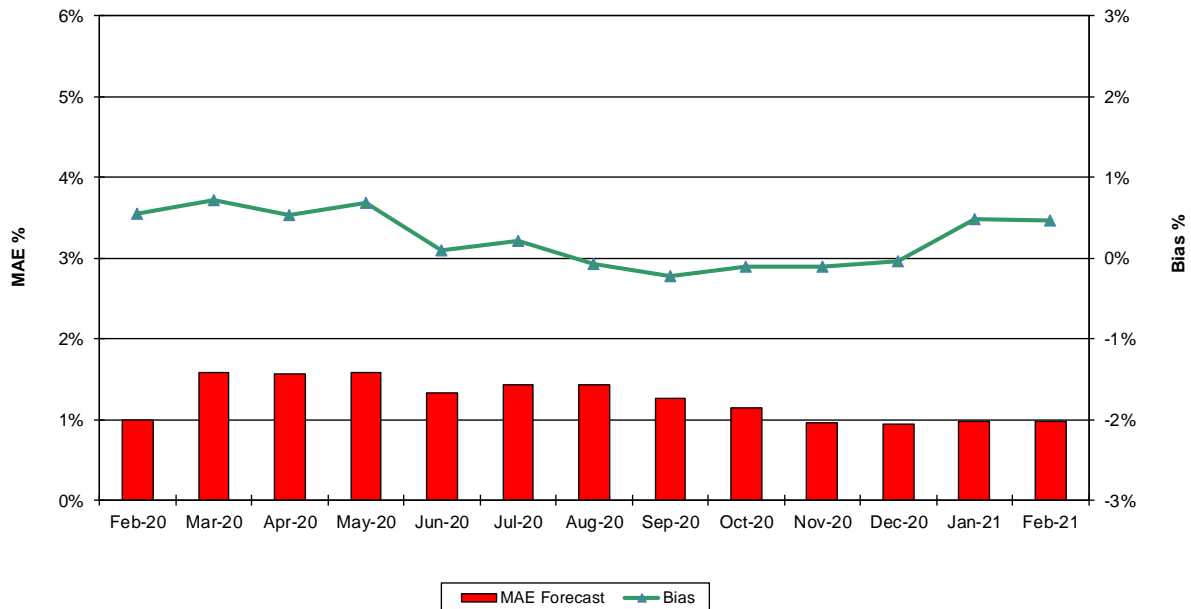


Behind the Meter Solar Forecast Performance Day Ahead Percent Error

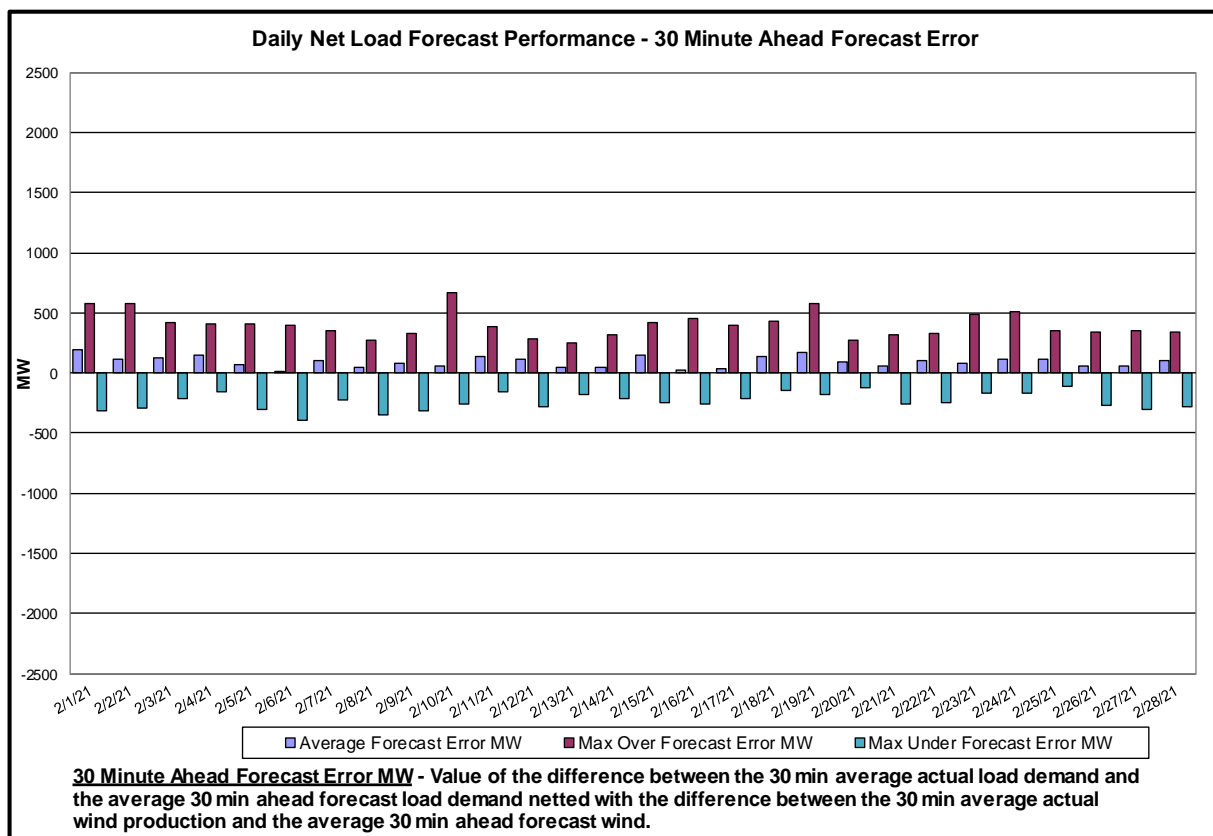
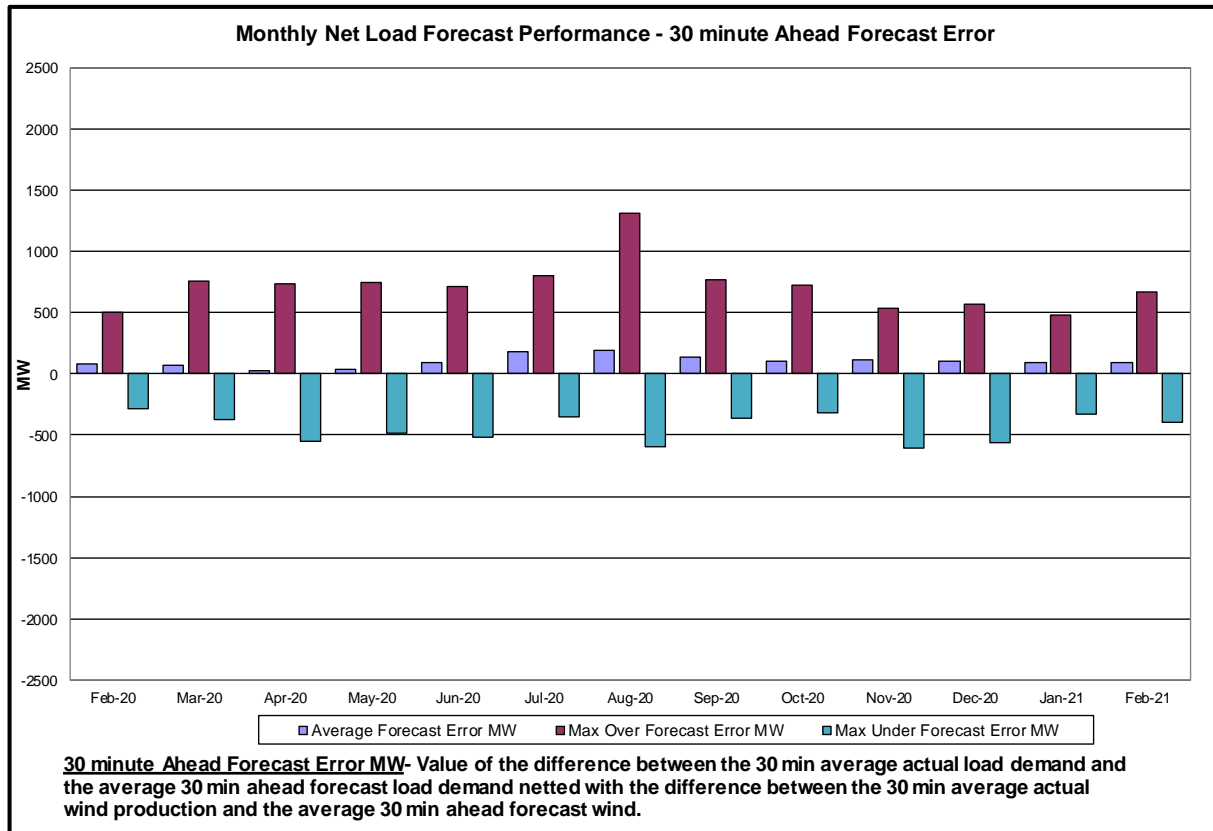


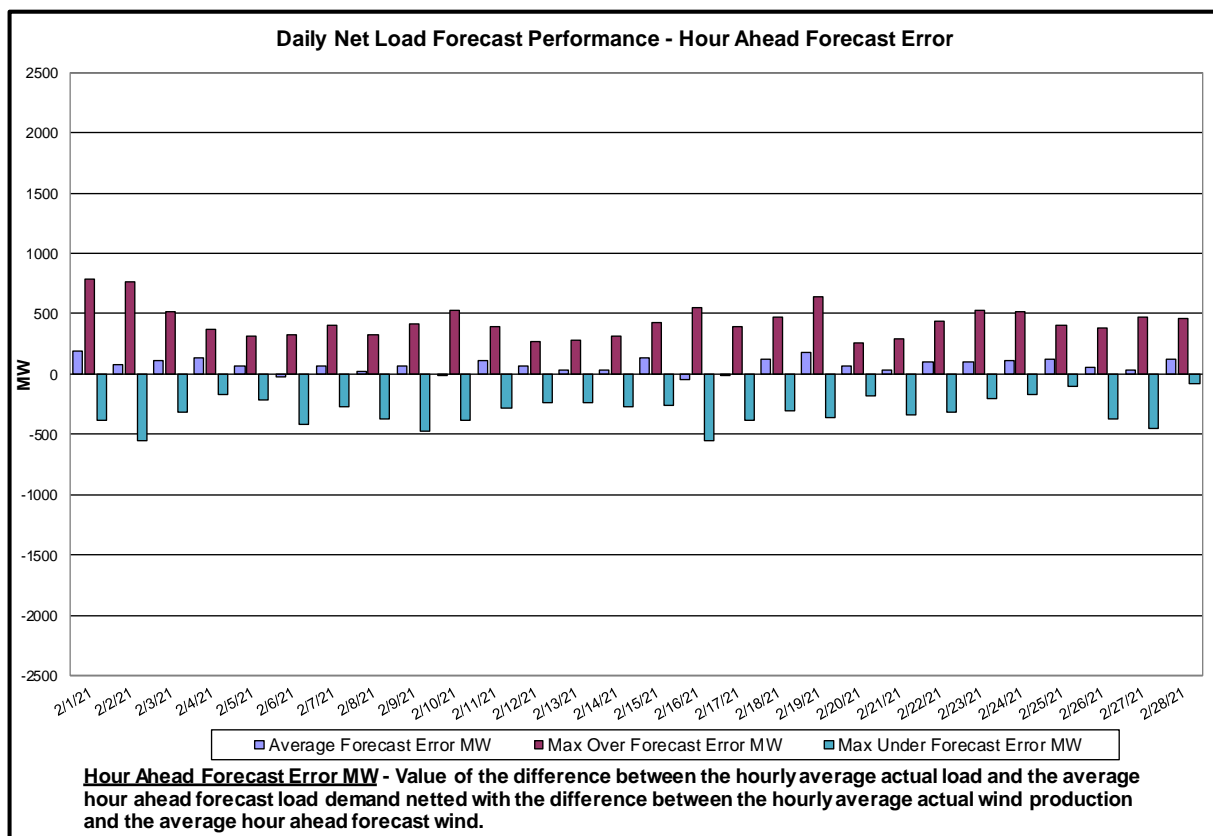
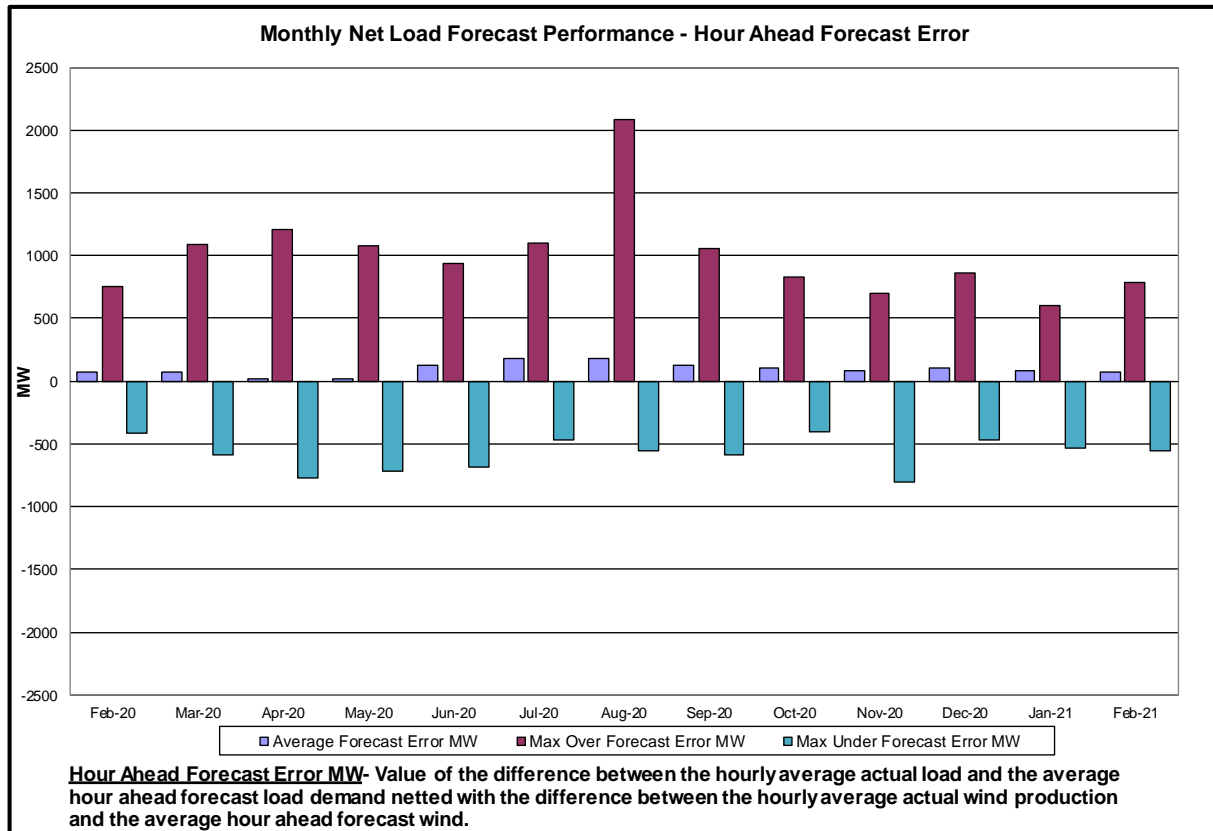
MAE Forecast - Avg |est. actual solar generation - Day Ahead forecast solar generation| / Solar Capacity
Bias - Avg (est. actual solar generation - Day Ahead forecast solar generation) / Solar Capacity

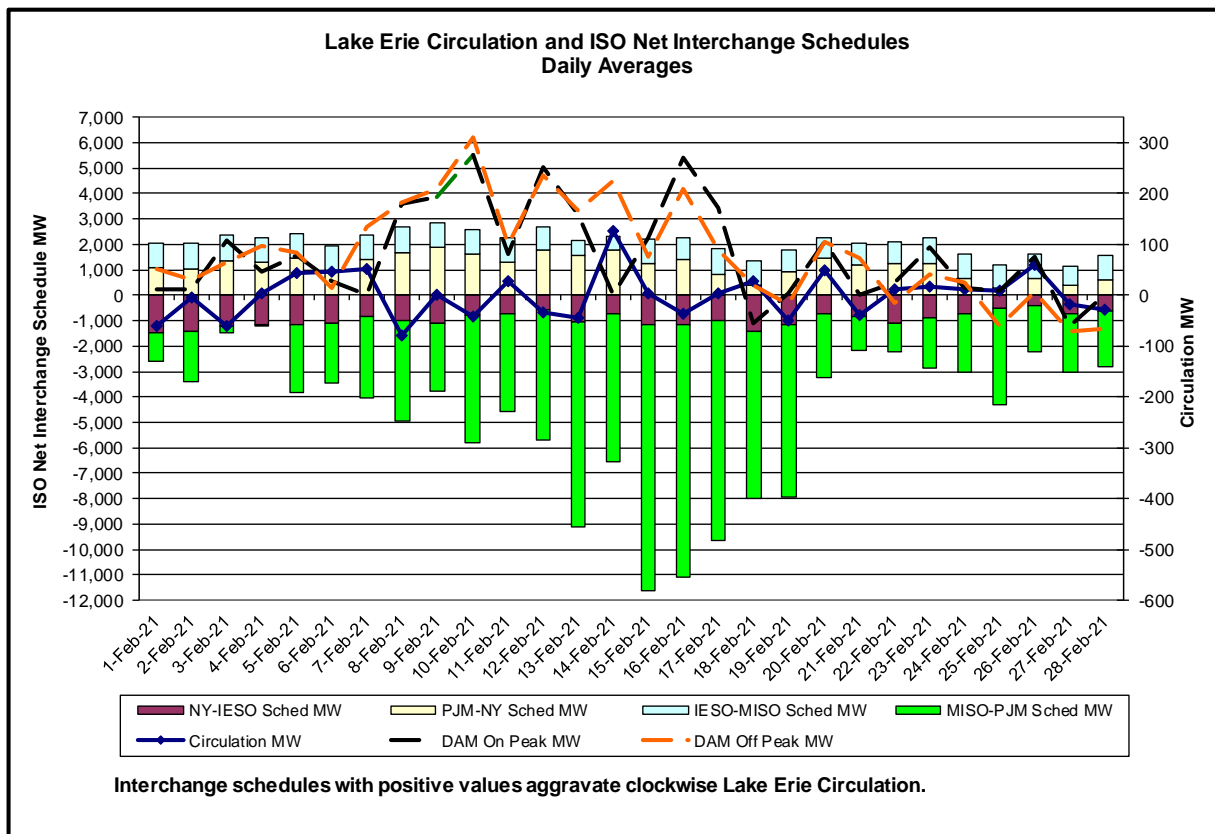
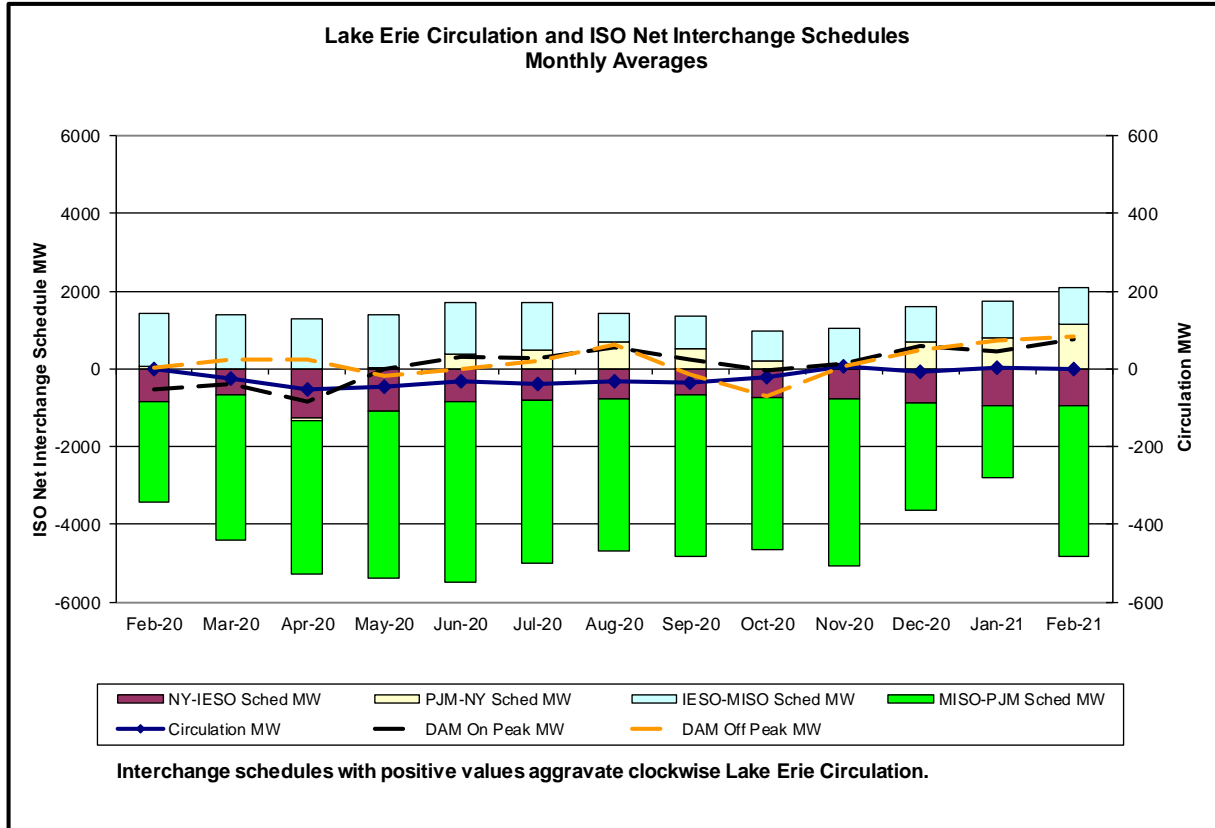
Behind the Meter Solar Forecast Performance Hour Ahead Percent Error



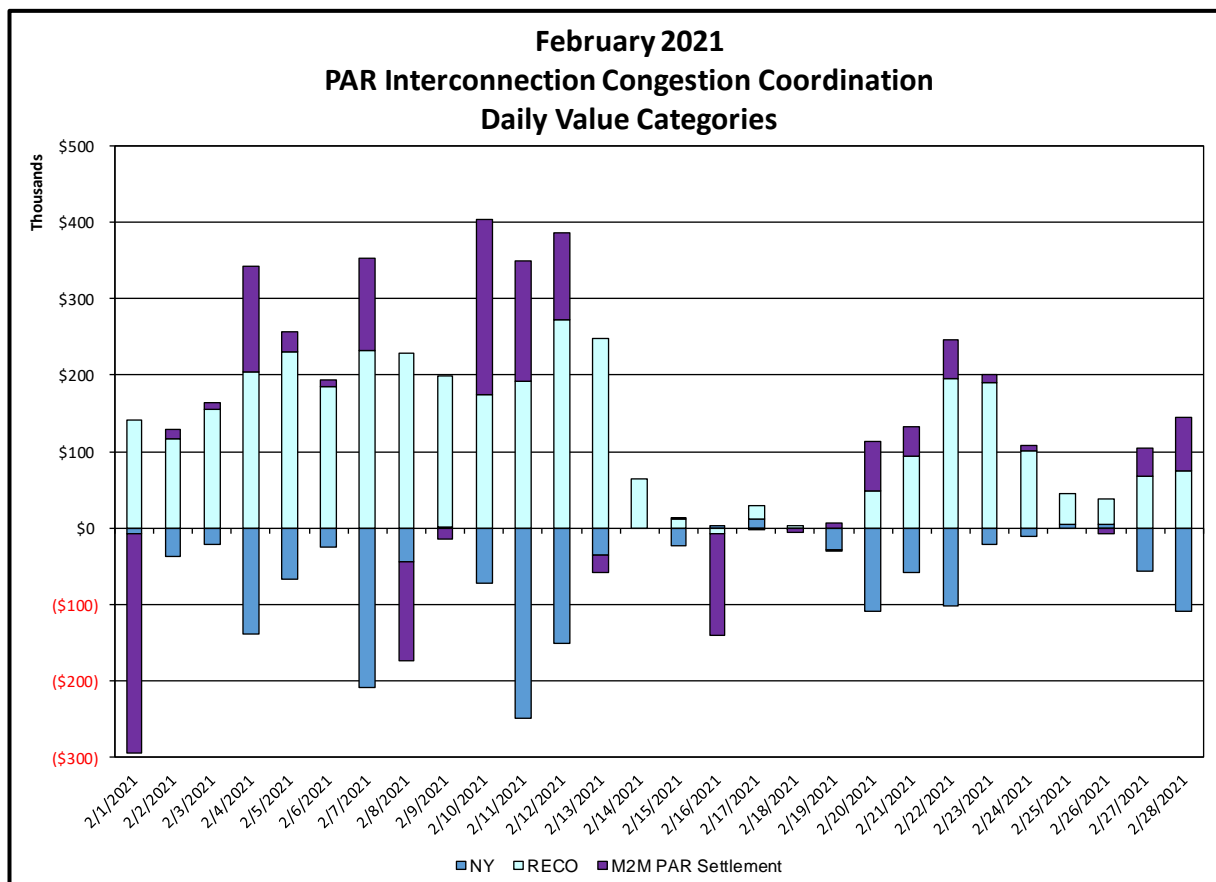
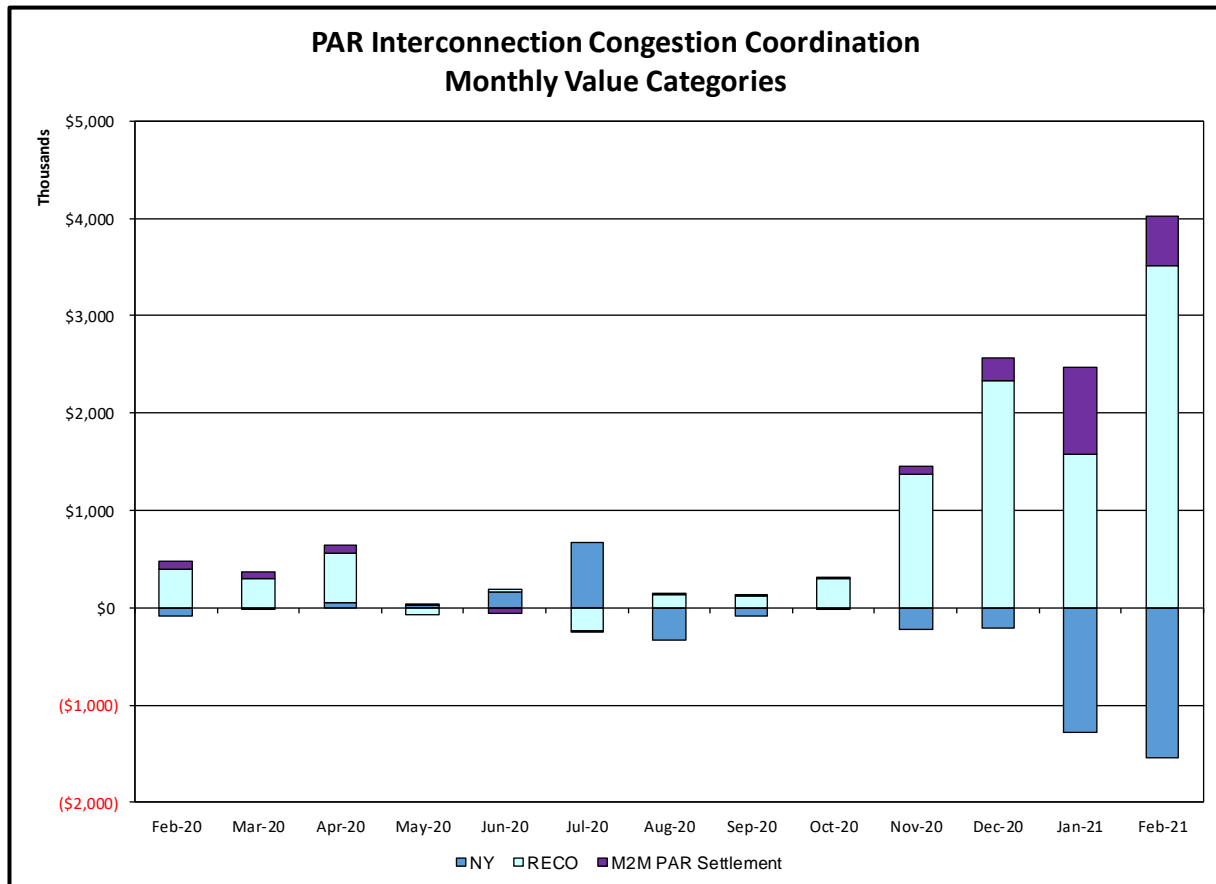
MAE Forecast - Avg |est. actual solar generation - Day Ahead forecast solar generation| / Solar Capacity
Bias - Avg (est. actual solar generation - Day Ahead forecast solar generation) / Solar Capacity







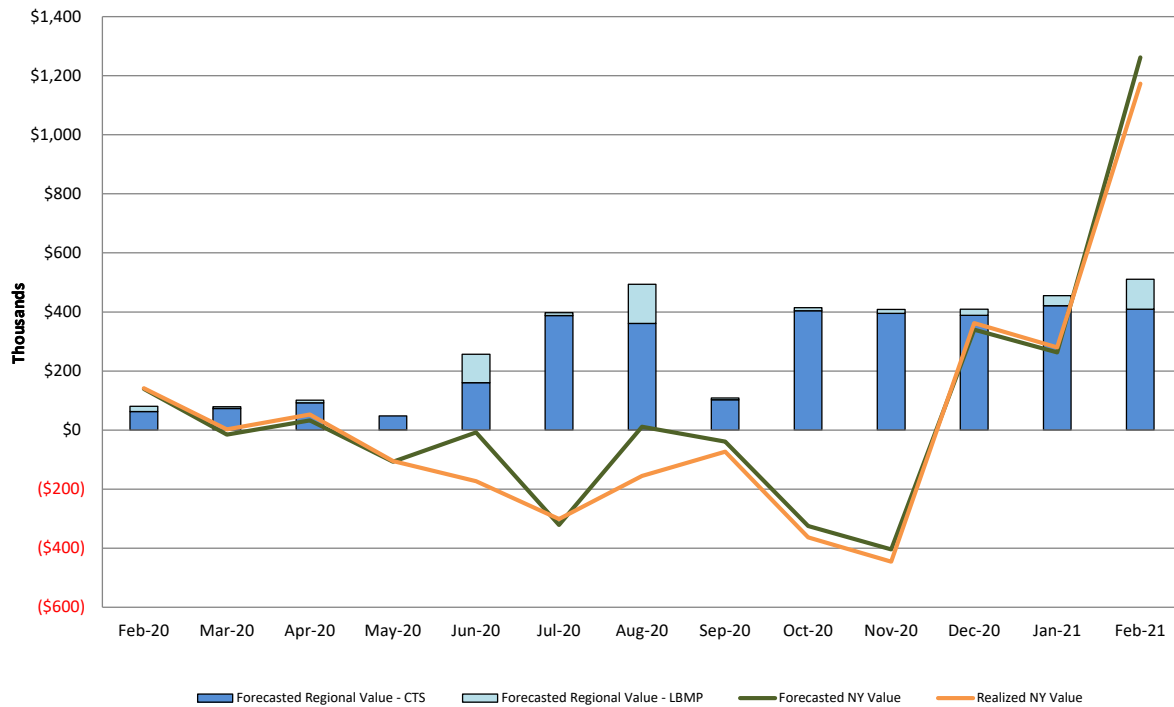
Broader Regional Market Performance Metrics



PAR Interconnection Congestion Coordination

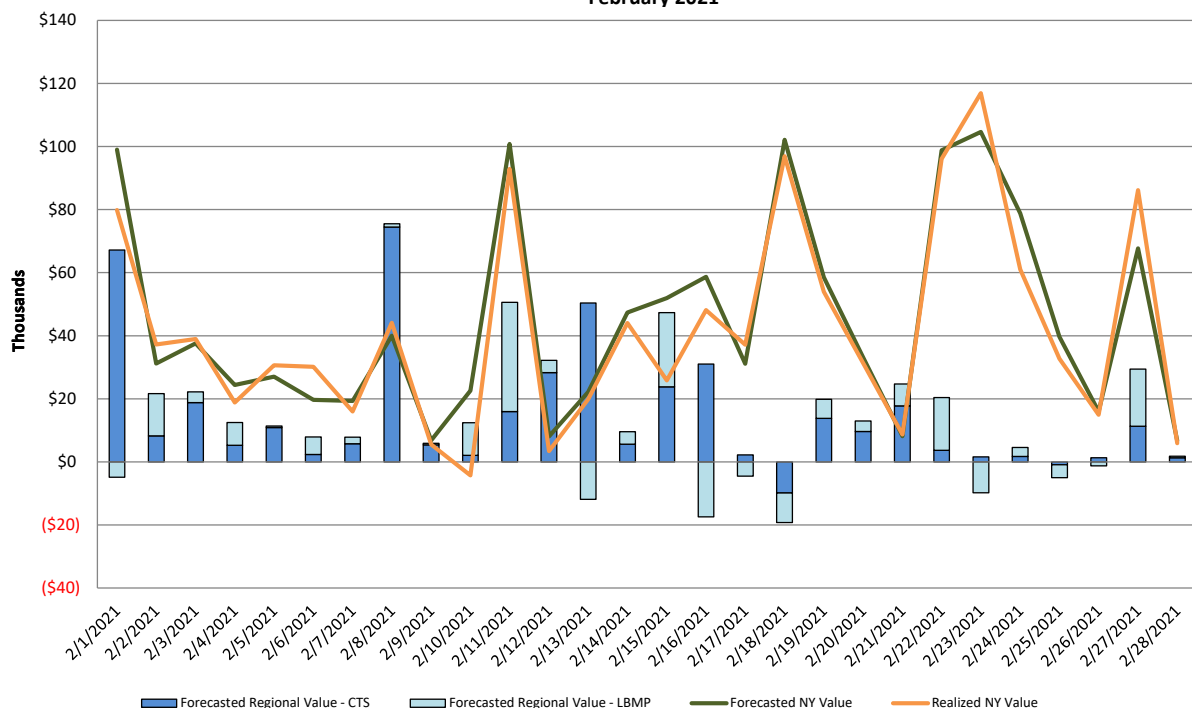
<u>Category</u>	<u>Description</u>
NY	Represents the value NY realizes from Market-to-Market PAR Coordination when experiencing congestion. This is the estimated savings to NY for additional deliveries into NY
RECO	Represents the value of PJM's obligation to deliver 80% of service to RECO load over Ramapo 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

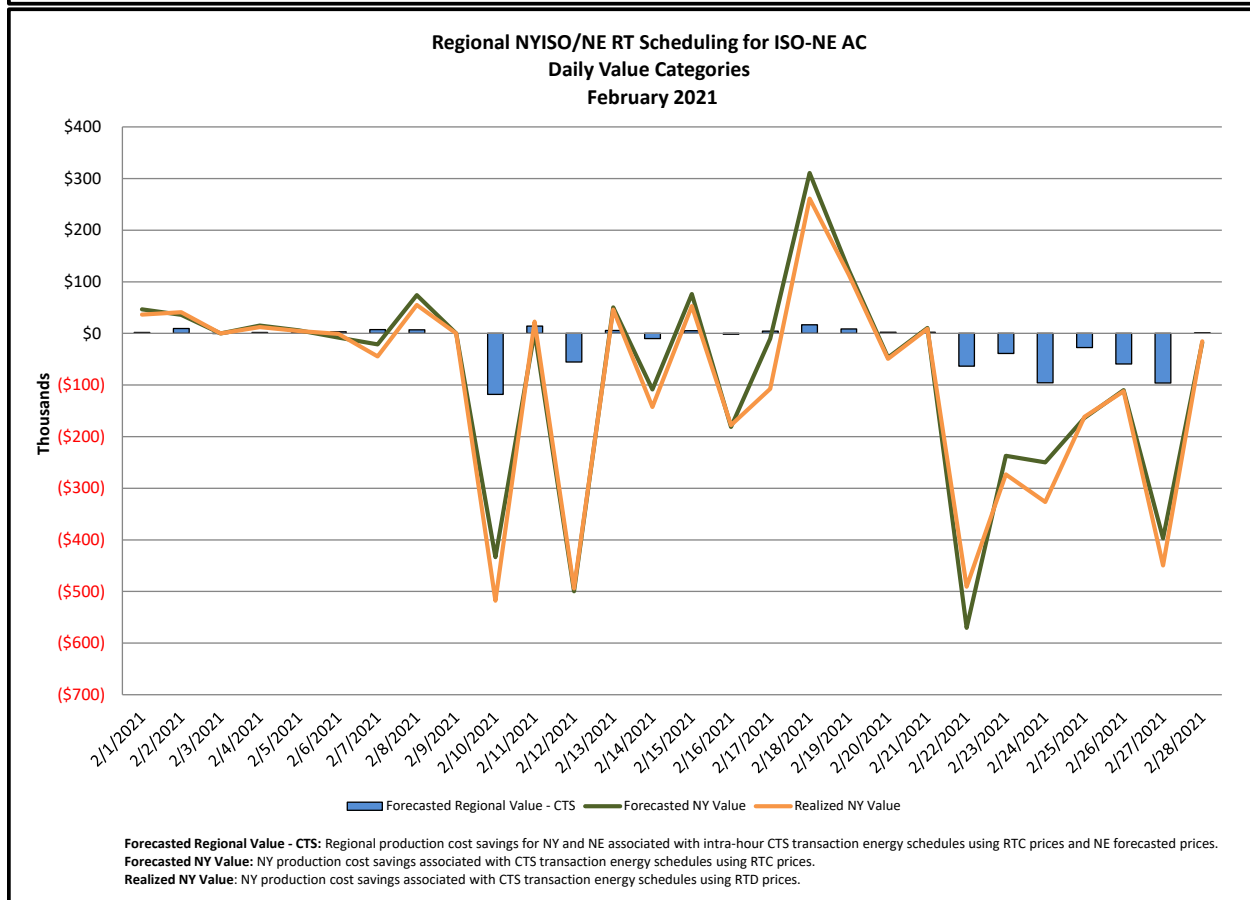
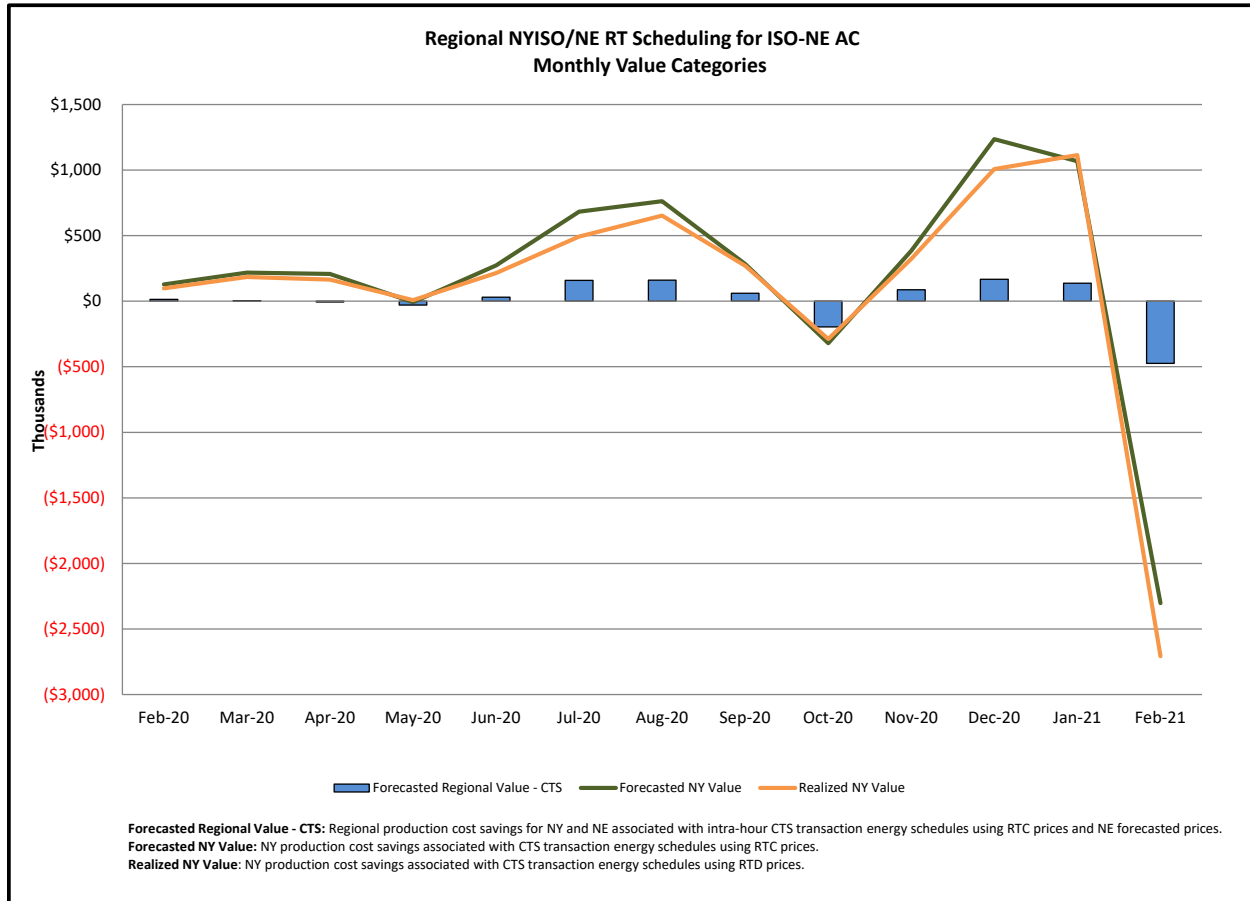


Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCEd prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules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

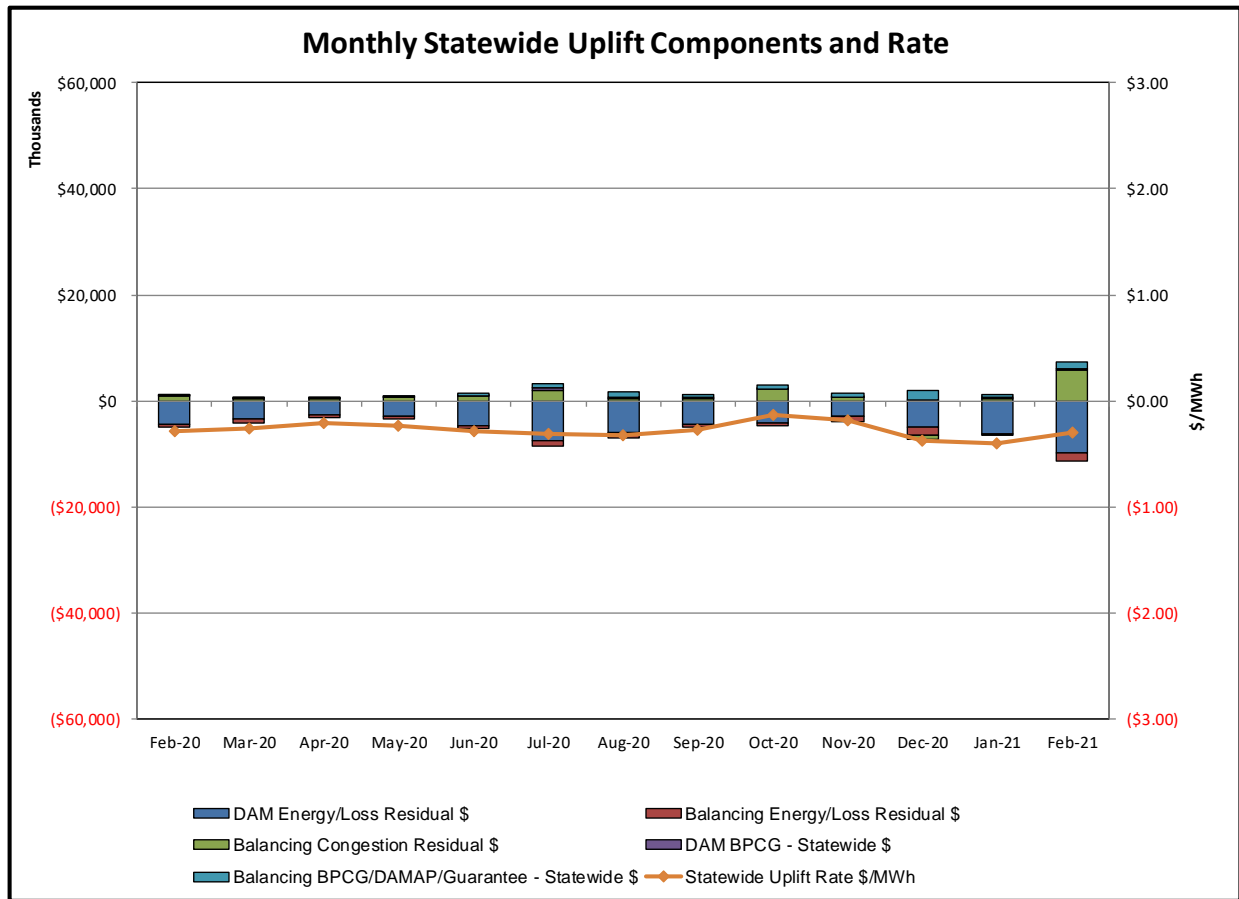
Regional NYISO/PJM RT Scheduling for All PJM Proxies Daily Value Categories February 2021

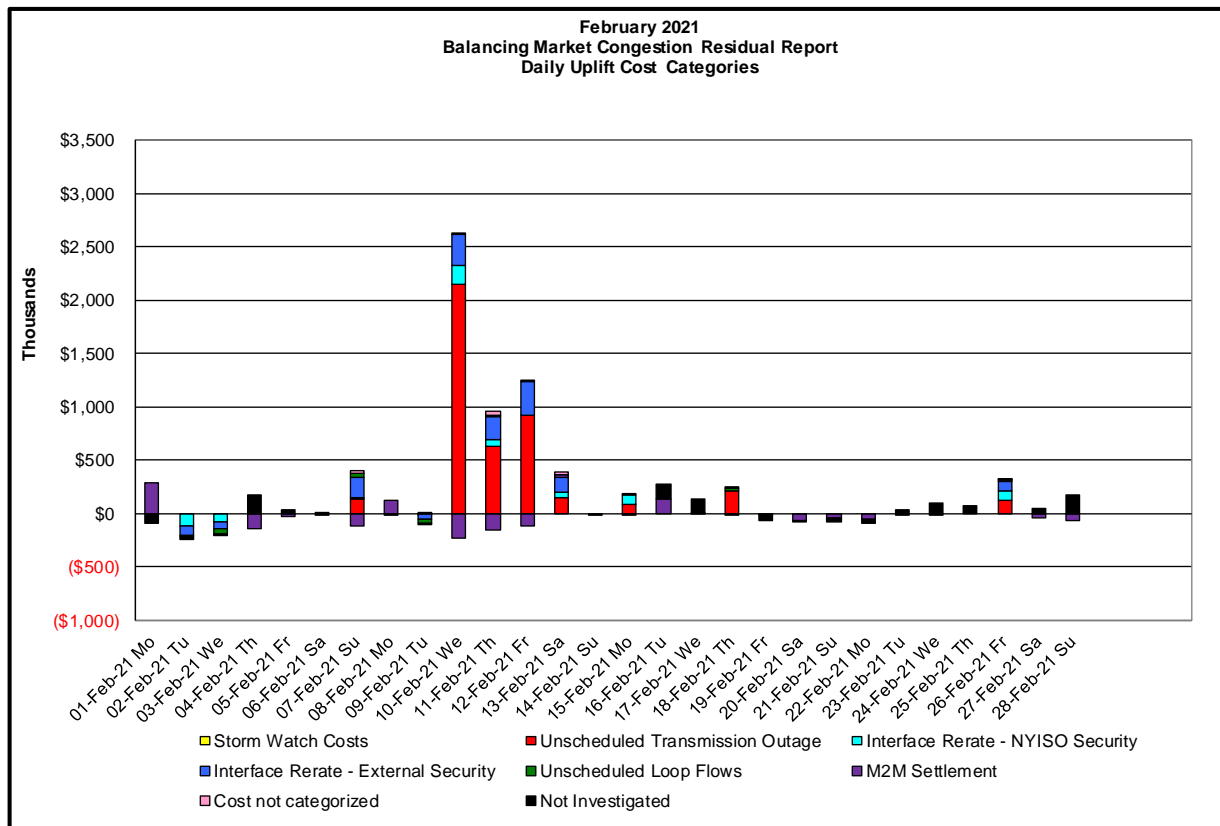
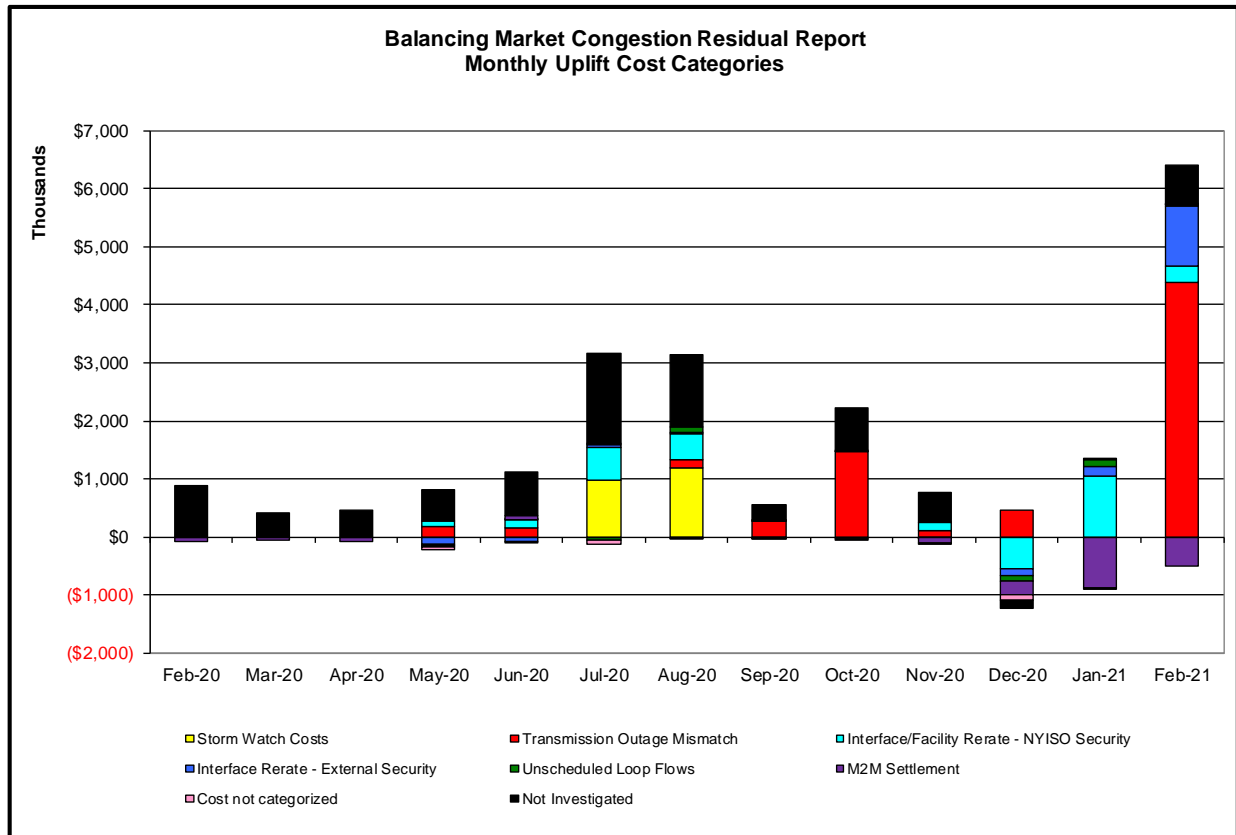


Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCEd prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules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





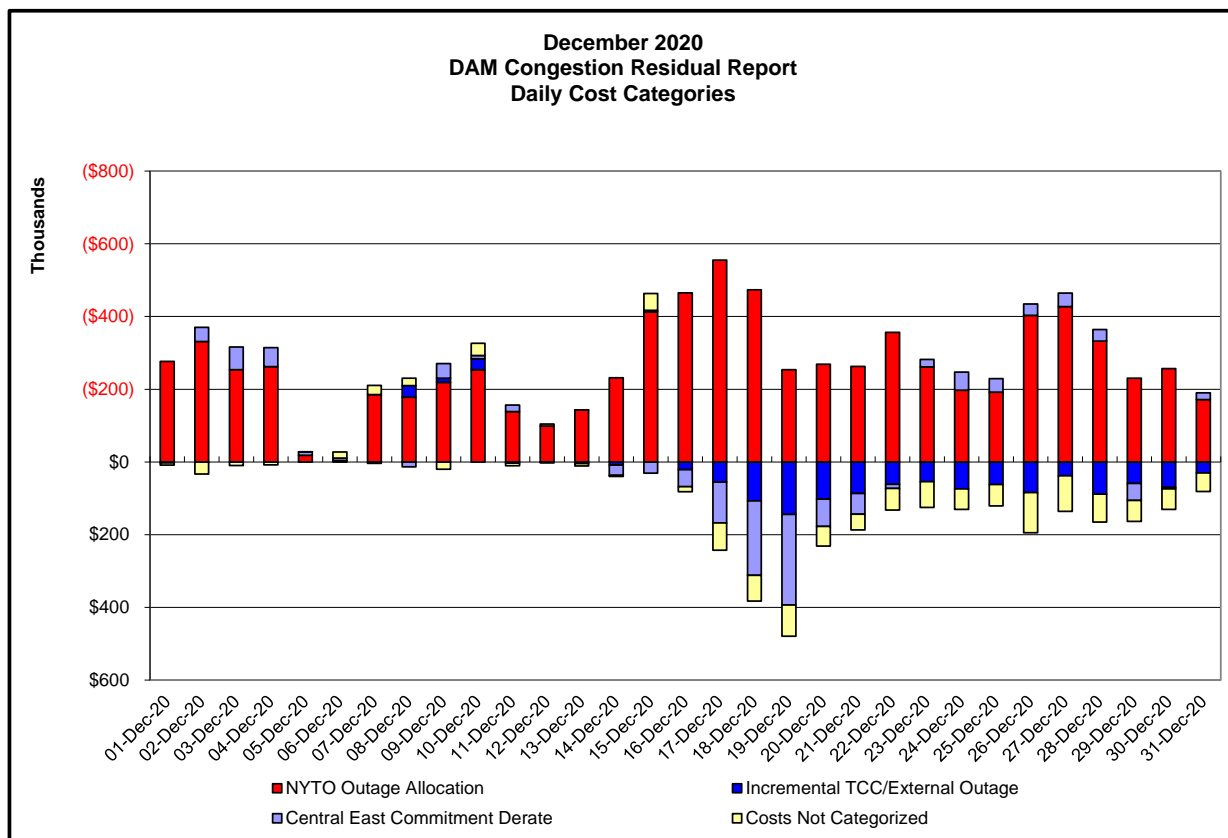
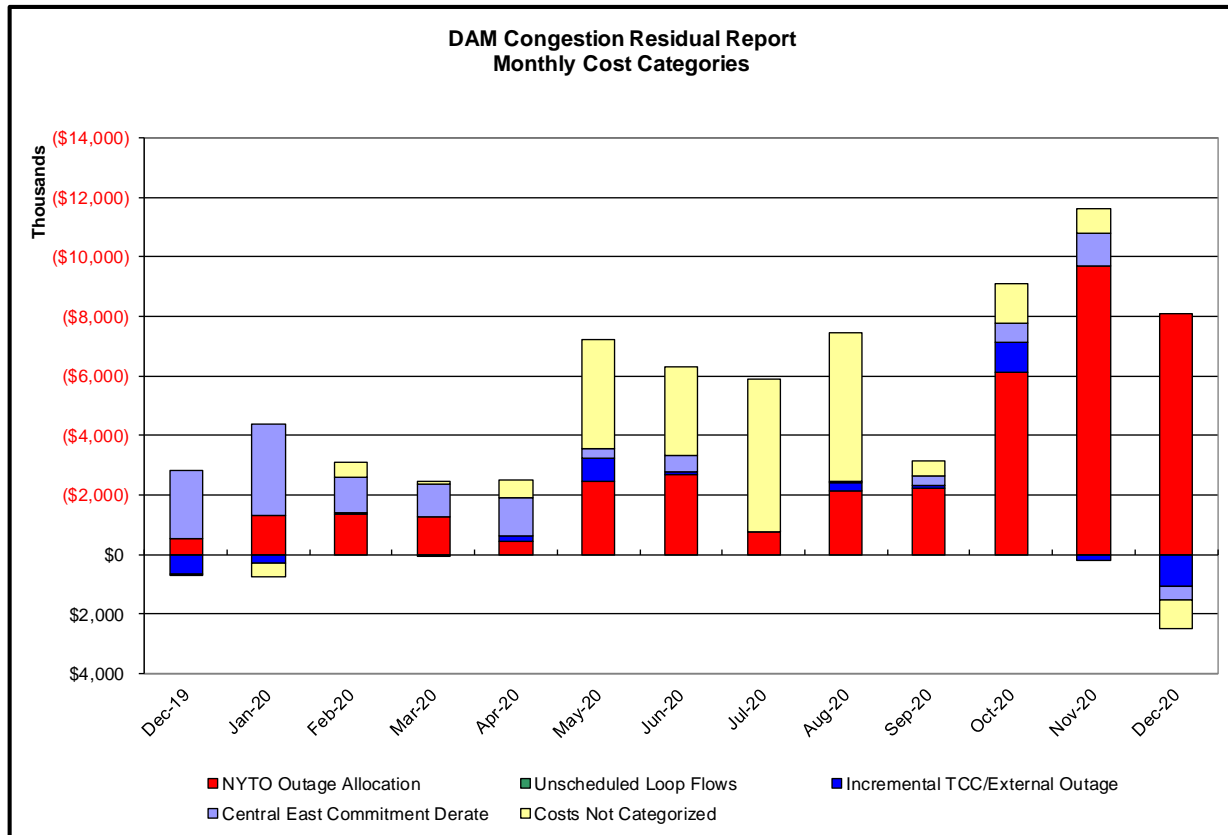
Day's investigated in February: 2,3,7,9,10,11,12,13,15,18,26			
Event	Date (yyyymmdd)	Hours	Description
	2/2/2021	12,13	NYCA DNI Ramp Limit
	2/2/2021	0-3,6-10,12-14,17-23	Uprate Central East
	2/2/2021	10,12-14	Uprate Freshkills-Willowbrook 138kV (#29211)
	2/2/2021	0,1,6-10,17-23	NE_AC - NY Scheduling Limit
	2/2/2021	7,8,17,18	IESO_AC - NY Scheduling Limit
	2/2/2021	6,8,17,20,21	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	2/2/2021	8	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	2/3/2021	0-4,6,10,14,18,23	Uprate Central East
	2/3/2021	10	Uprate Freshkills-Willowbrook 138kV (#29211)
	2/3/2021	10	Uprate East 179th Street-Hell Gate 138kV (#15055)
	2/3/2021	0-4,6,10,18,23	NE_AC - NY Scheduling Limit
	2/3/2021	1,2,4,6,10,14,18	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	2/7/2021	18-20	Forced outage of New Scotland-Leeds 345kV (#93)
	2/7/2021	18-20	Forced outage of Edic-New Scotland 345kV (#14)
	2/7/2021	22,23	Derate Central East
	2/7/2021	10,15,17	Uprate Central East
	2/7/2021	15	Uprate Freshkills-Willowbrook 138kV (#29211)
	2/7/2021	18-22	NE_AC ACTIVE DNI Ramp Limit
	2/7/2021	10,15,17,19,20	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	2/9/2021	11,12	Uprate Central East
	2/9/2021	14,17-20	Derate Dunwoodie-Shore Road 345kV (#Y50)
	2/9/2021	12	NE_NNC1385 - NY Scheduling Limit
	2/9/2021	11,12,16	HQ_CHAT-NY Scheduling Limit
	2/9/2021	12	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	2/10/2021	1-10,12-23	Forced outage of Edic-New Scotland 345kV (#14)
	2/10/2021	4,5,9,10,18,23	NYCA DNI Ramp Limit
	2/10/2021	2	Derate New Scotland 345/115kV (BK 1) for I/O BUS:ROTTDRM 31&38&BK7&C4
	2/10/2021	2-5,9,10,18,19,21,22	NE_AC DNI Ramp Limit
	2/10/2021	2,3	PJM_AC DNI Ramp Limit
	2/11/2021	0-5,21-23	Forced outage of Edic-New Scotland 345kV (#14)
	2/11/2021	21,23	NYCA DNI Ramp Limit
	2/11/2021	11-13,17	Uprate Central East
	2/11/2021	12,13	NE_NNC1385 - NY Scheduling Limit
	2/11/2021	0,23	PJM_AC DNI Ramp Limit
	2/11/2021	15,21-23	NE_AC DNI Ramp Limit
	2/11/2021	11,12,17,23	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Central East
	2/12/2021	0-20,22,23	Forced outage of Edic-New Scotland 345kV (#14)
	2/12/2021	20,22,23	HQ_CEDARS - NY Scheduling Limit
	2/12/2021	9,18,19	HQ_CHAT-NY Scheduling Limit
	2/12/2021	0,7-9,11-14,17,19,23	NE_AC DNI Ramp Limit
	2/13/2021	0	Forced outage of Edic-New Scotland 345kV (#14)
	2/13/2021	9-18	Extended outage Sprainbrook-East Garden City 345kV (#Y49)
	2/13/2021	0,9	NYCA DNI Ramp Limit
	2/13/2021	9-16,18	HQ_CEDARS - NY Scheduling Limit
	2/13/2021	9-16,18	HQ_CHAT-NY Scheduling Limit
	2/13/2021	17	NE_NNC1385 - NY Scheduling Limit
	2/13/2021	0	NE_AC DNI Ramp Limit
	2/15/2021	21-23	Forced outage East 13th Street-Farragut 345kV (#46)
	2/15/2021	23	NYCA DNI Ramp Limit
	2/15/2021	21-23	Derate Greenbush-Regeneron 115kV (#9)
	2/18/2021	8-12,14-17	Forced outage East 13th Street-Farragut 345kV (#46)
	2/18/2021	12,14,15,17	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	2/26/2021	5-19	Forced outage Chateaugay DC Converter GC1
	2/26/2021	10-13	Forced outage Hopatcong-Ramapo 500kV (#5018)
	2/26/2021	9,14,22	NYCA DNI Ramp Limit
	2/26/2021	21,22	Derate Central East
	2/26/2021	13,15,16	Derate Greenbush-Regeneron 115kV (#9)
	2/26/2021	5-13	Derate Packard 230/115 Bk3 for I/o TWR:PACKARD 77 & 78
	2/26/2021	19	NE_NNC1385 - NY Scheduling Limit
	2/26/2021	16-23	NE_AC DNI Ramp Limit
	2/26/2021	6	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; West
	2/26/2021	22	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
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	

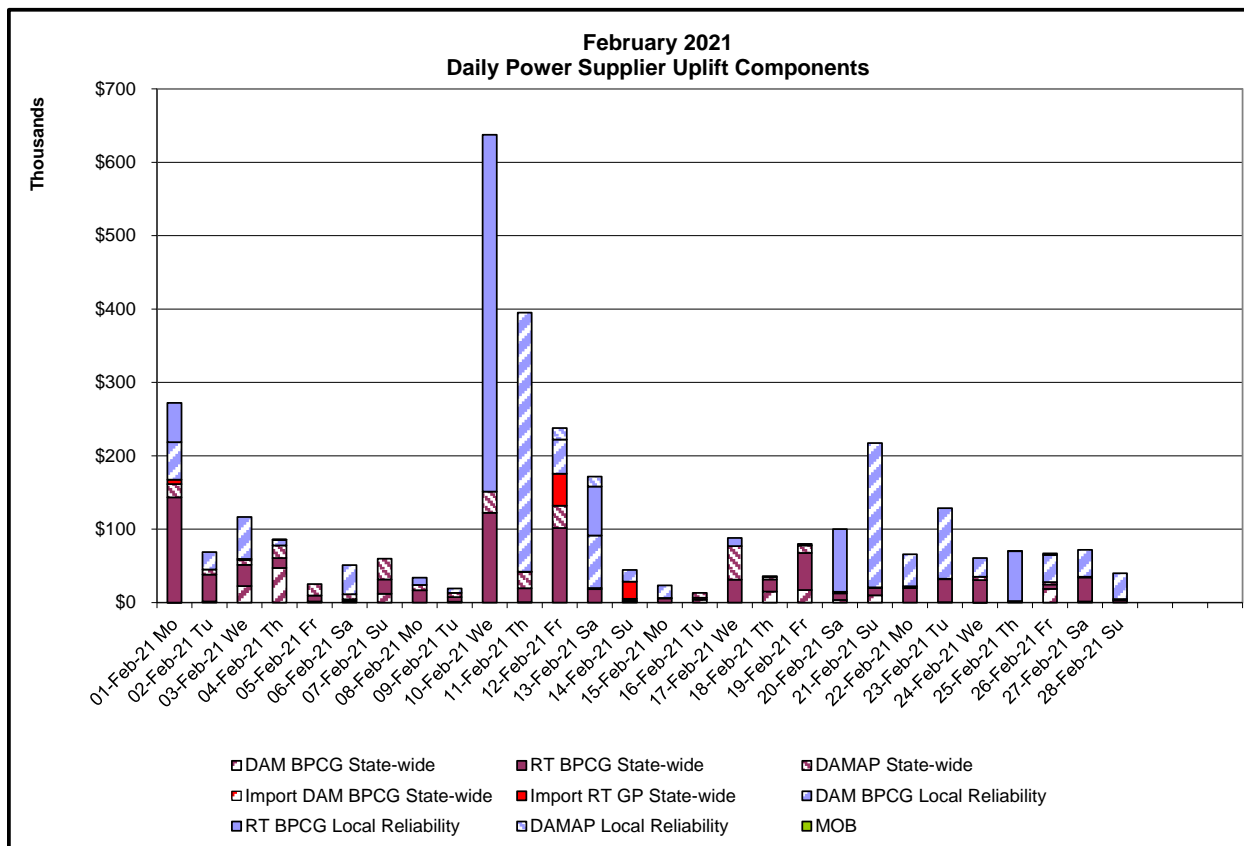
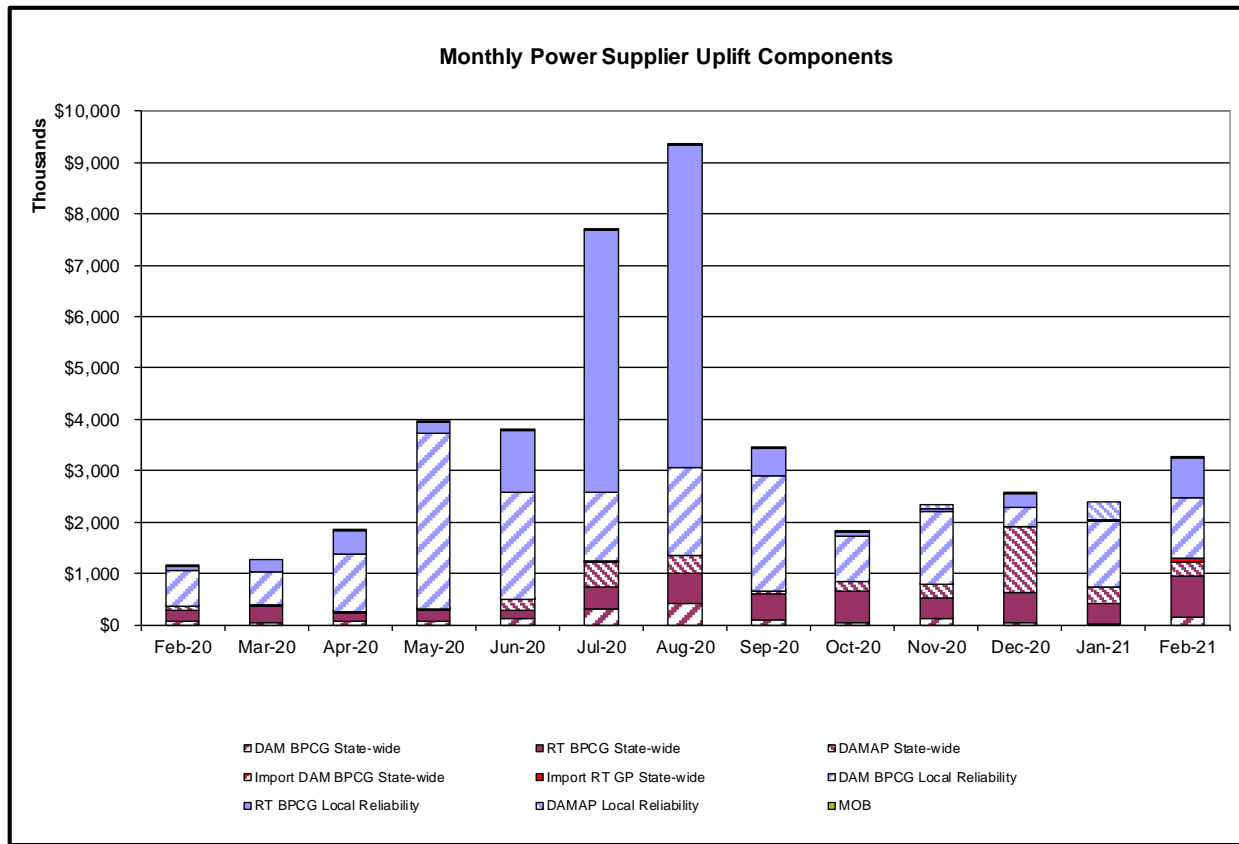
Monthly Balancing Market Congestion Report Assumptions/Notes

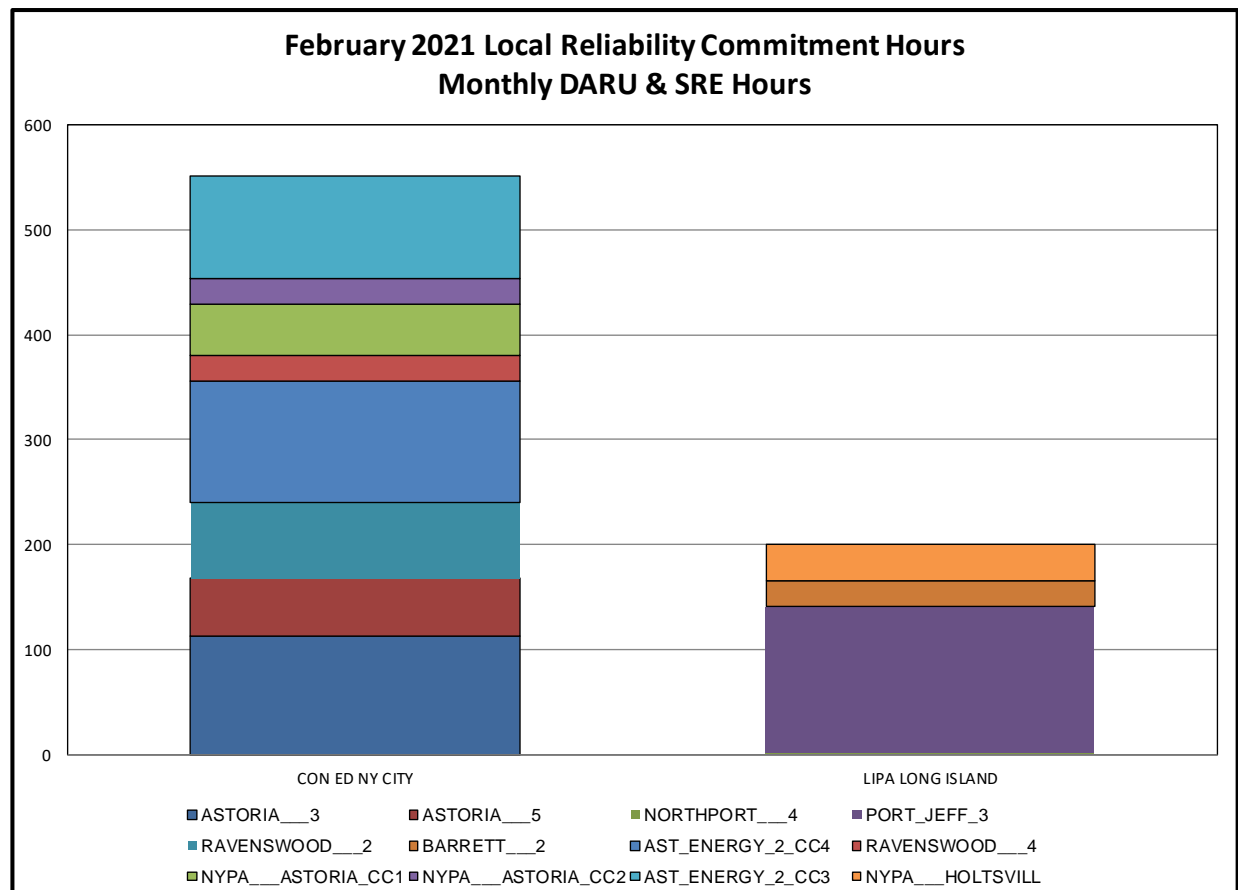
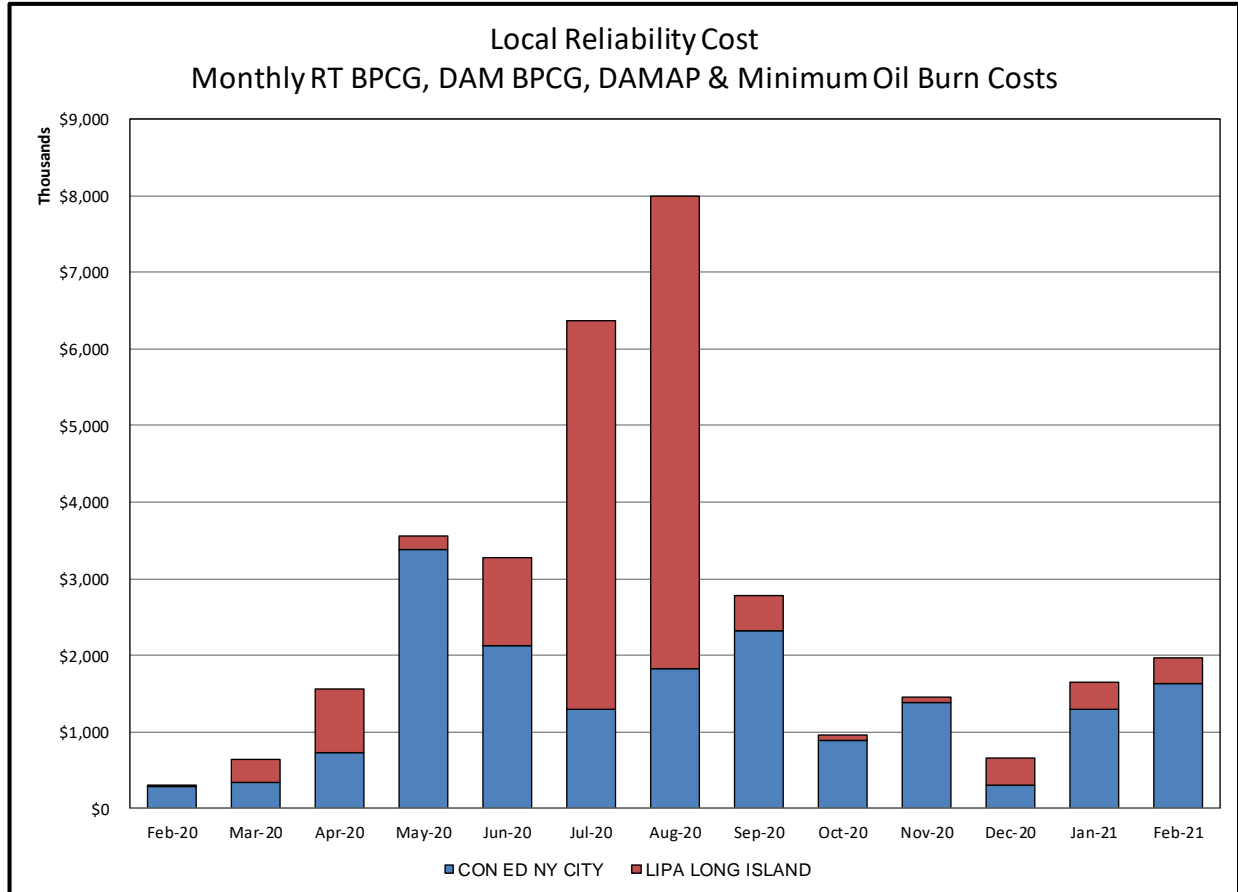
- 1) Storm Watch Costs are identified as daily total uplift costs
- 2) Days with a value of BMCR less M2M Settlement of \$100K/HR, shortfall of \$200K/Day or more, or surplus of \$100K/Day or more are investigated.
- 3) Uplift costs associated with multiple event types are apportioned equally by hour

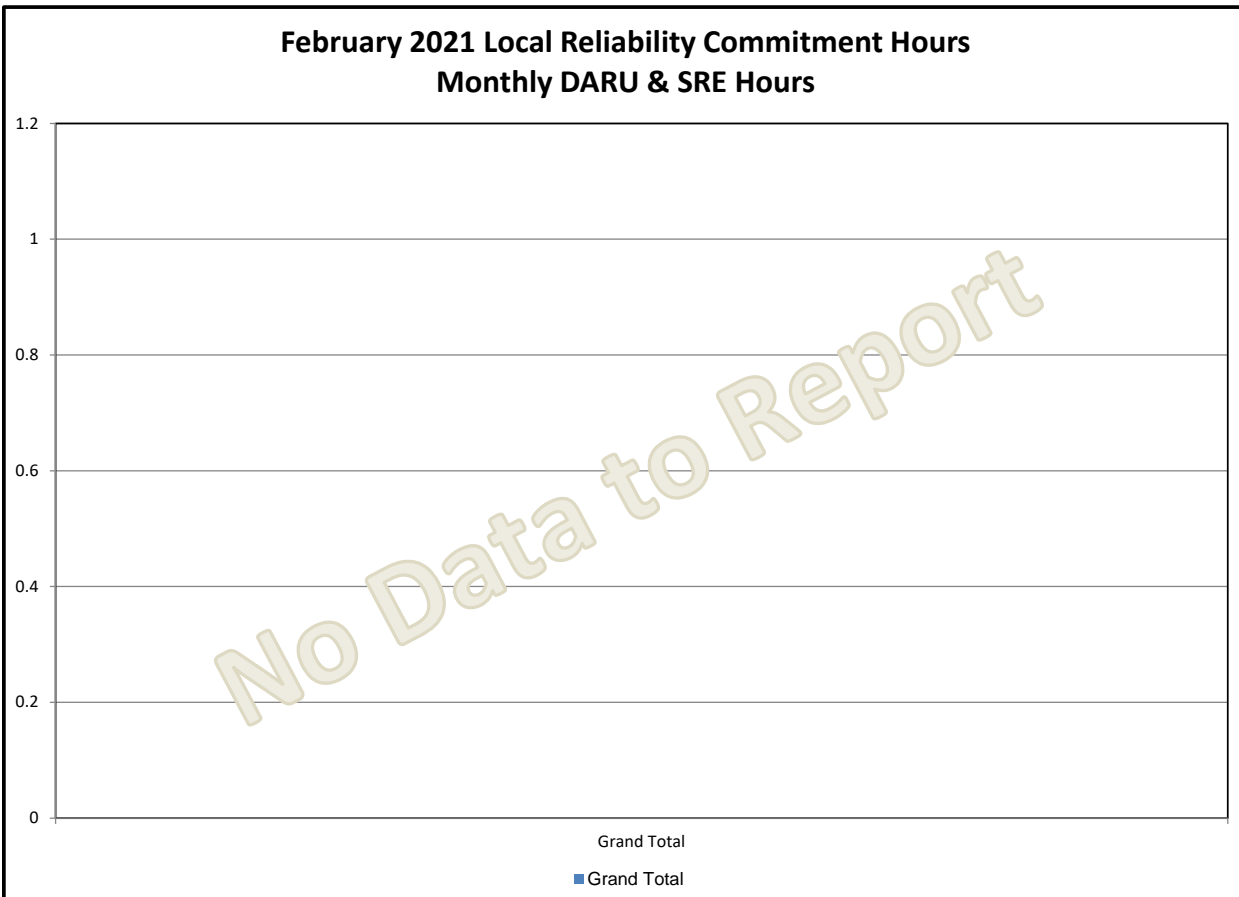
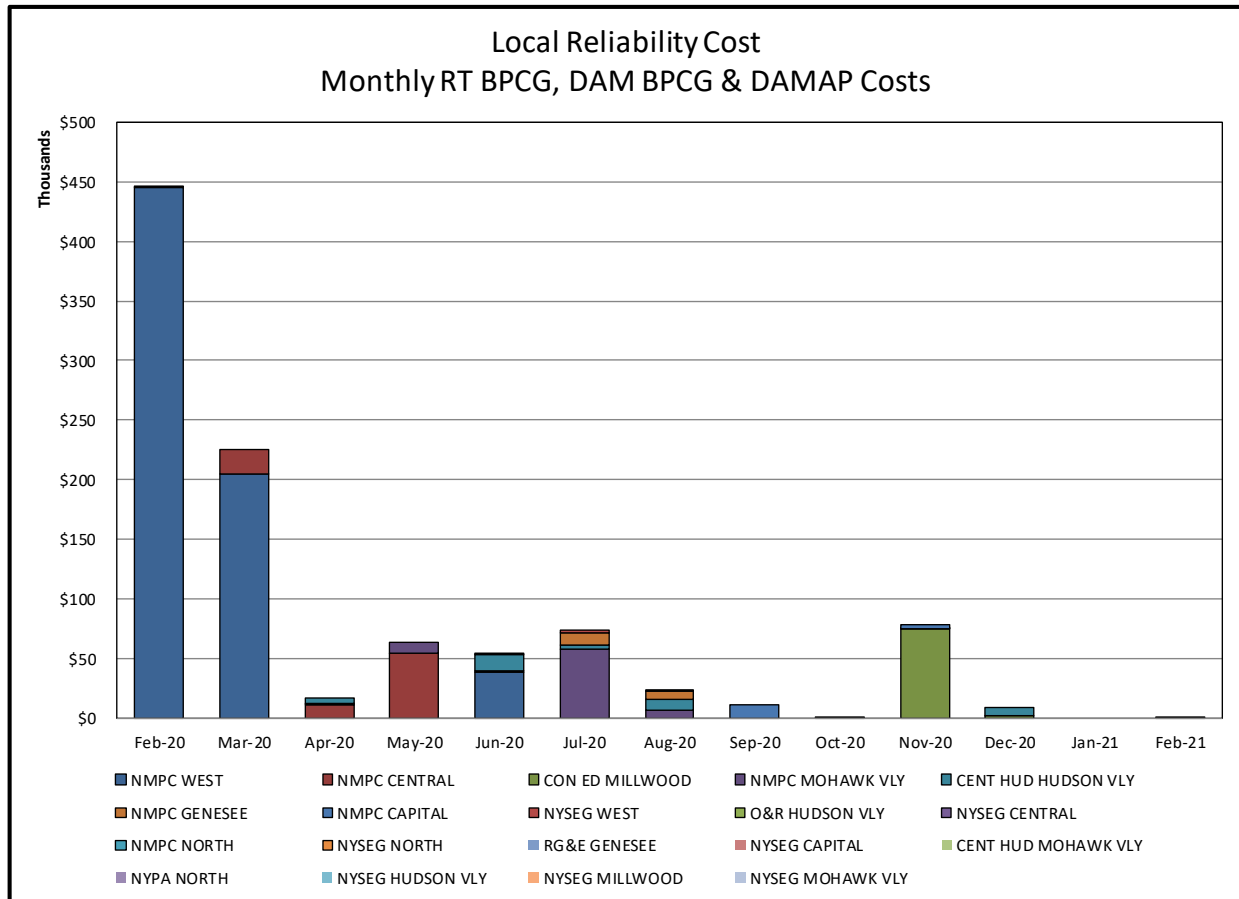


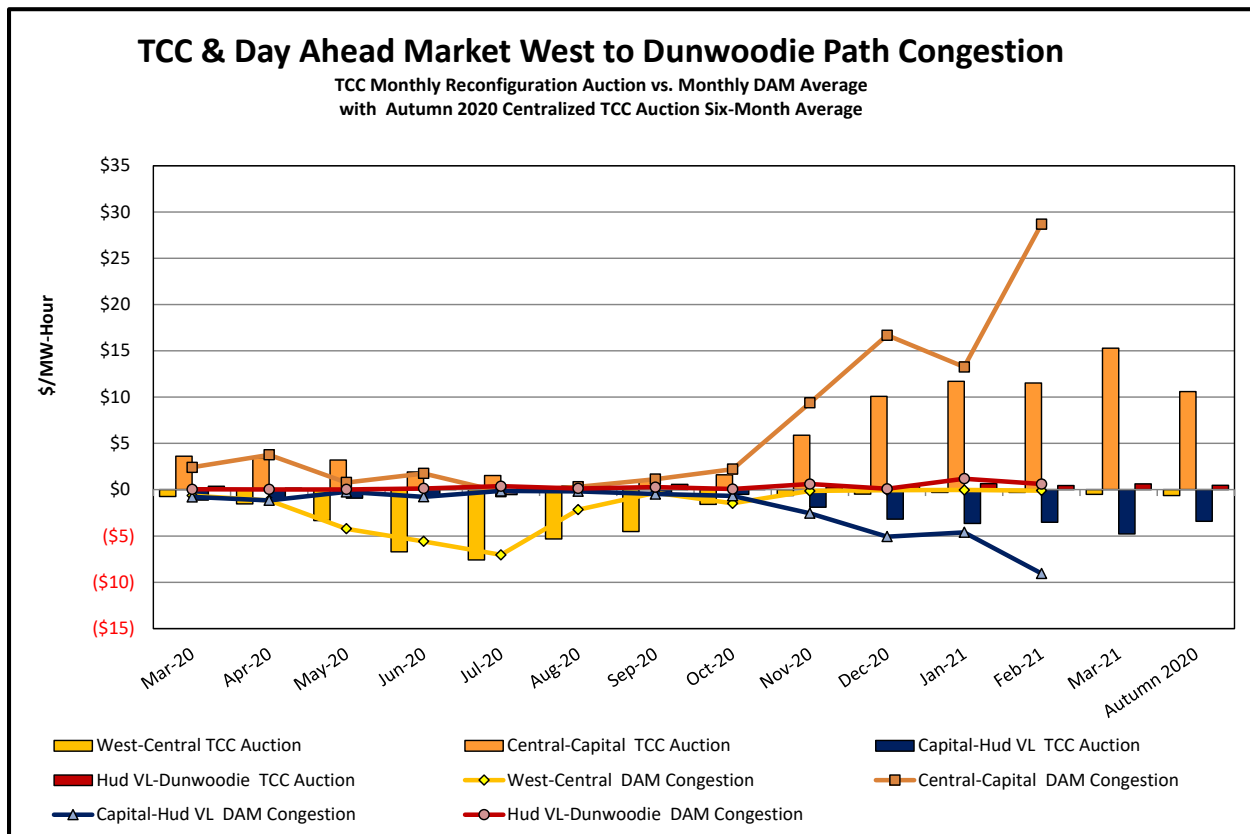
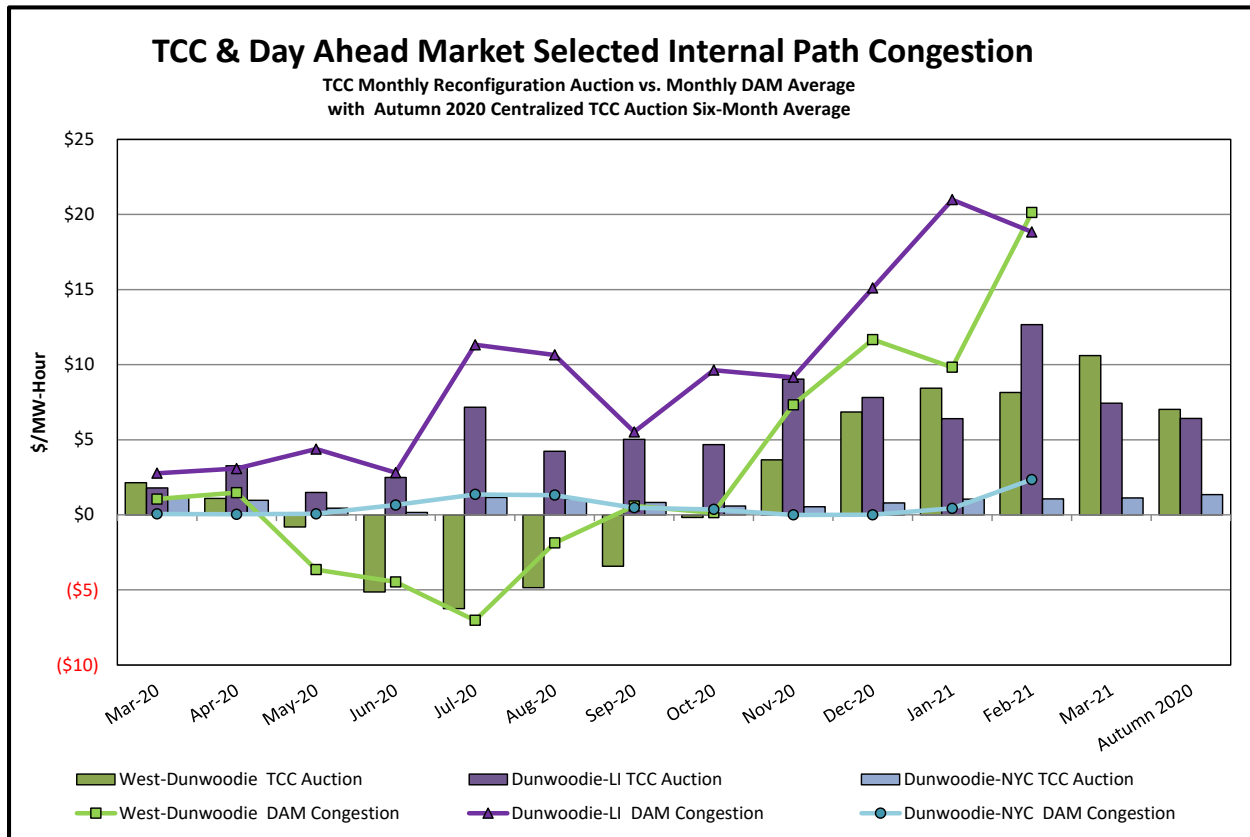
Day-Ahead Market Congestion Residual Categories

<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 West to Dunwoodie Path Congestion

TCC Monthly Reconfiguration Auction vs. Monthly DAM Average
with Autumn 2020 Centralized TCC Auction Six-Month Average

