Operations Performance Metrics Monthly Report




November 2018 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 08, 2018.

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November 2018 Operations Performance Highlights

- Peak load of 21,503 MW occurred on 11/15/2018 HB 17
- 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
- The following table identifies the estimated production cost savings associated with the Broader Regional Market initiatives.

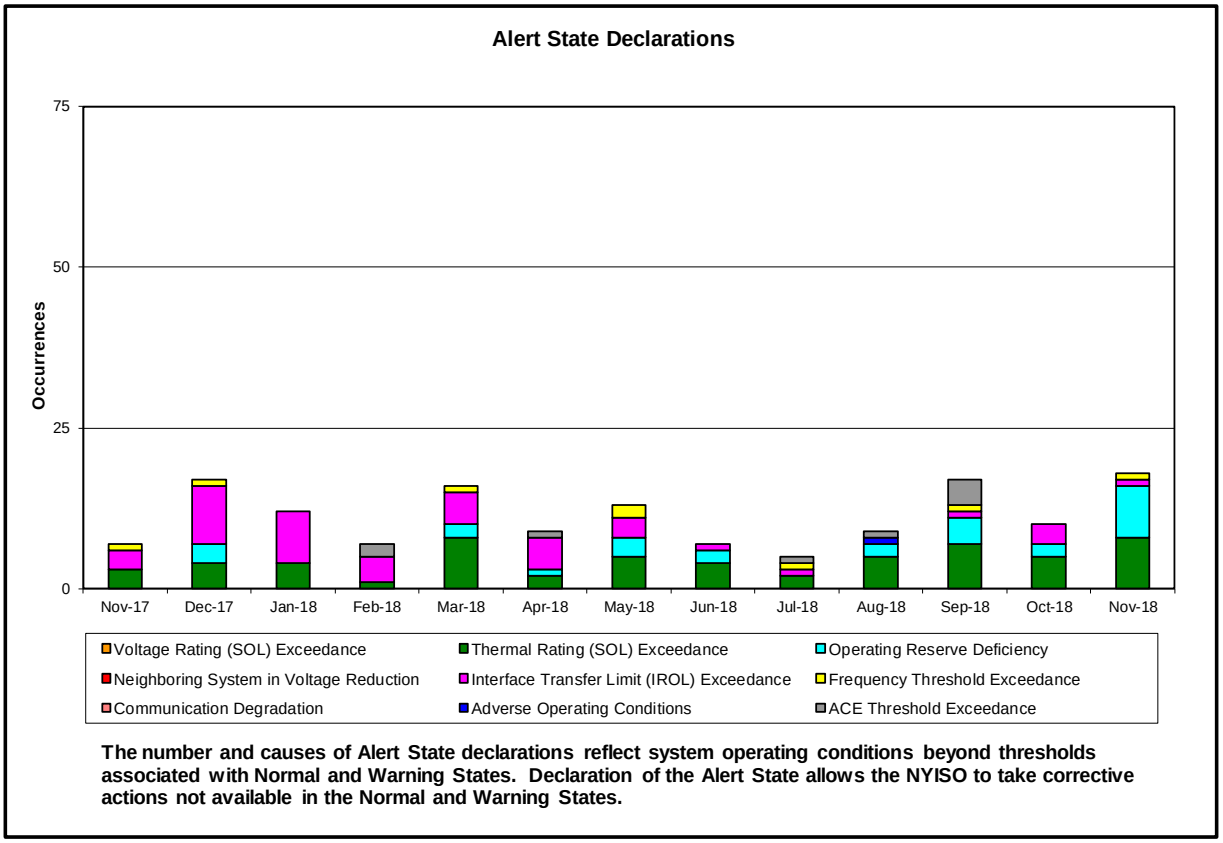
	Current Month Value ($M)	Year-to-Date Value ($M)
NY Savings from PJM-NY Congestion Coordination	($0.06)	$12.95
NY Savings from PJM-NY Coordinated Transaction Scheduling	($0.39)	($0.50)
NY Savings from NE-NY Coordinated Transaction Scheduling	$0.36	($0.09)
Total NY Savings	($0.09)	$12.36
Regional Savings from PJM-NY Coordinated Transaction Scheduling	$0.51	$3.99
Regional Savings from NE-NY Coordinated Transaction Scheduling	$0.03	$0.74
Total Regional Savings	$0.54	$4.73

- Statewide uplift cost monthly average was ($0.52)/MWh
- The following table identifies the Monthly ICAP spot market prices and the price delta.

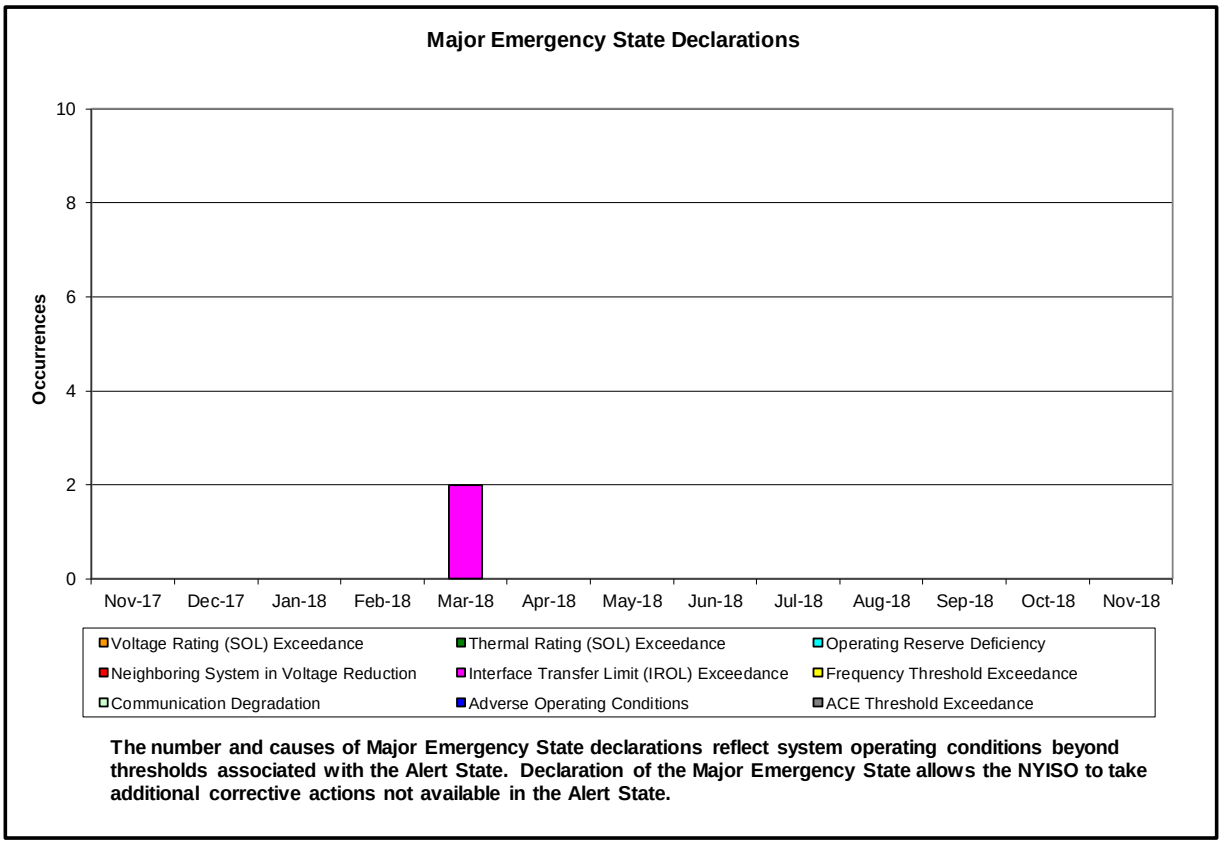
Spot Auction Price Results	NYCA	Lower Hudson Valley Zones	New York City Zone	Long Island Zone
December 2018 Spot Price	$0.10	$1.52	$1.52	$1.95
November 2018 Spot Price	$0.10	$1.59	$1.59	$0.67
Delta	$0.00	($0.07)	($0.07)	$1.28

  - LI - Price increase by $1.28 due to increase in unoffered capacity

Reliability Performance Metrics

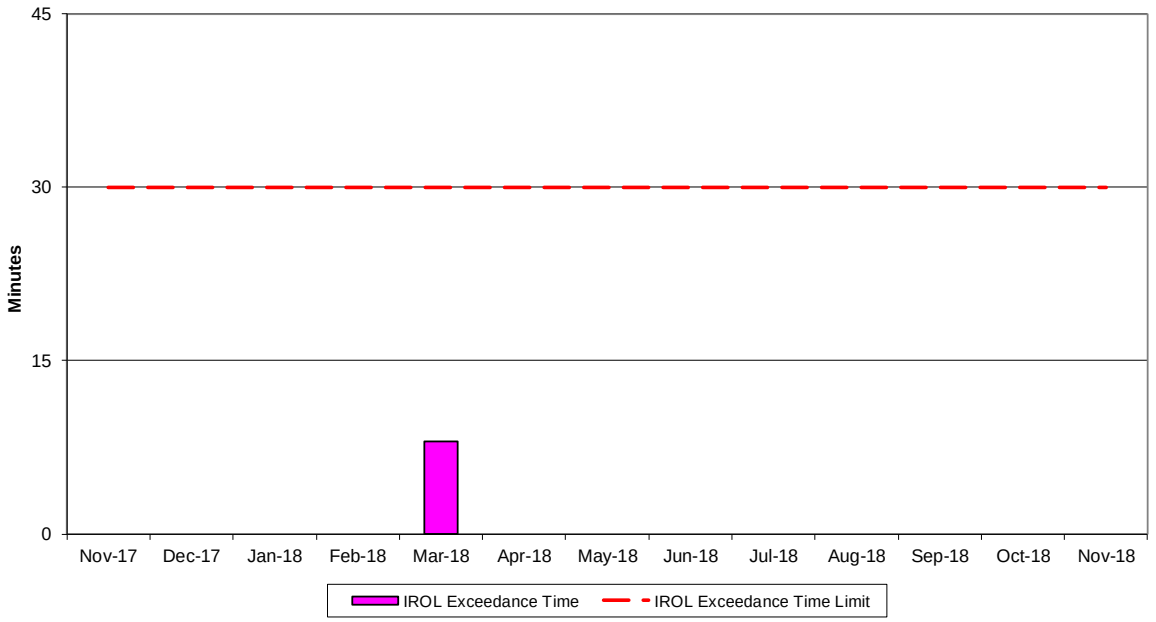


The number and causes of Alert State declarations reflect system operating conditions beyond thresholds associated with Normal and Warning States. Declaration of the Alert State allows the NYISO to take corrective actions not available in the Normal and Warning States.



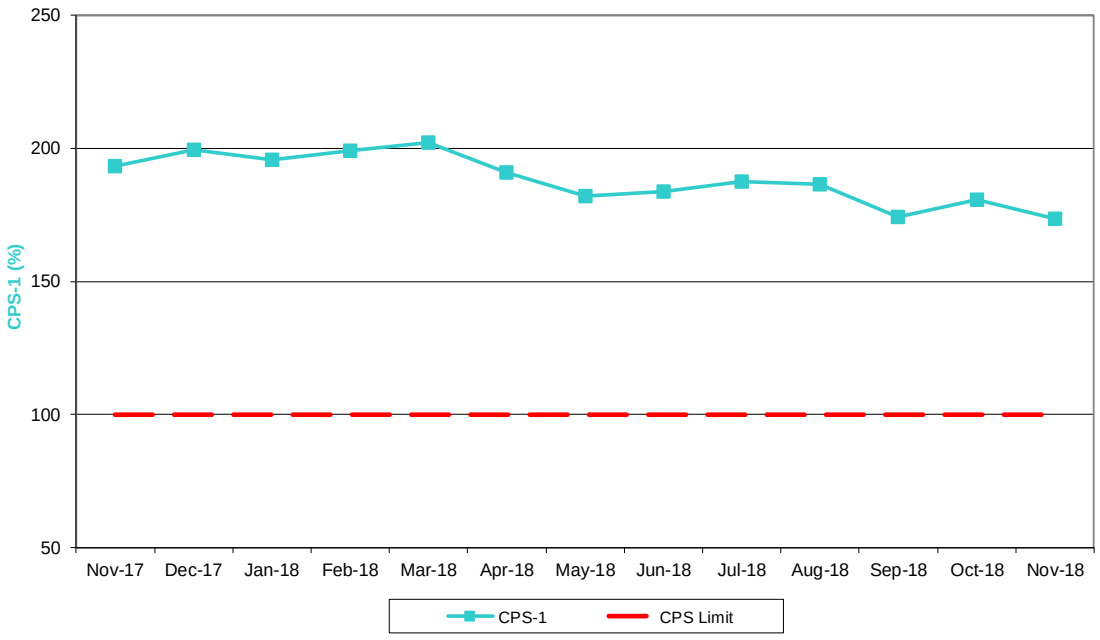
The number and causes of Major Emergency State declarations reflect system operating conditions beyond thresholds associated with the Alert State. Declaration of the Major Emergency State allows the NYISO to take additional corrective actions not available in the Alert State.

NERC IROL Time Over Limit



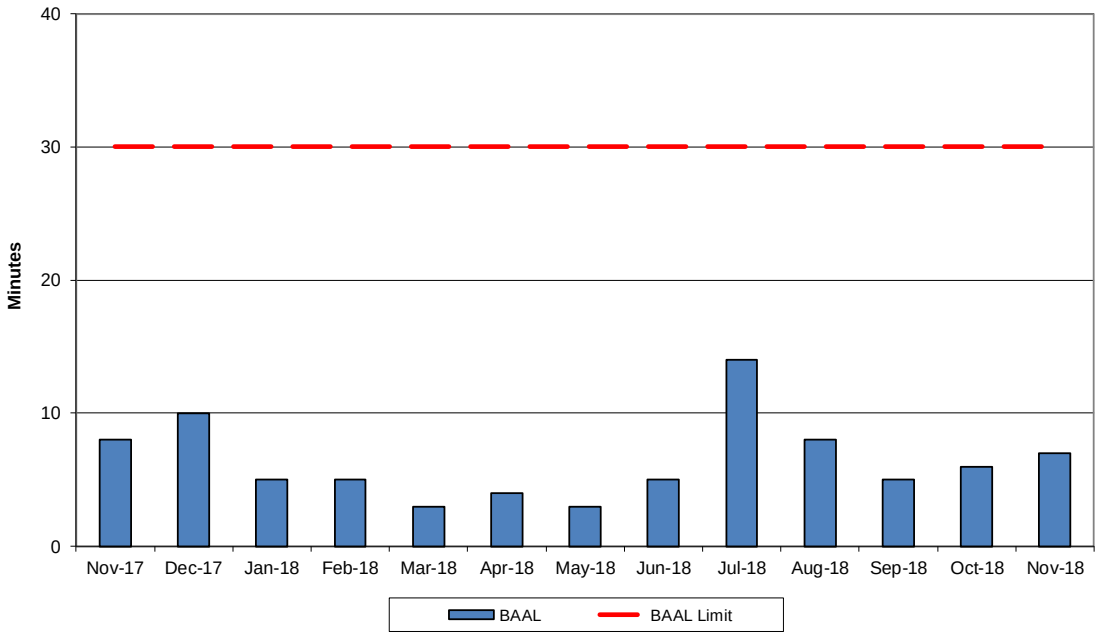
For IROL exceedances leading to Major Emergency State declarations, the maximum IROL exceedence time is identified. IROL exceedances of less than thirty minutes are considered NERC compliant.

NERC Control Performance Standards



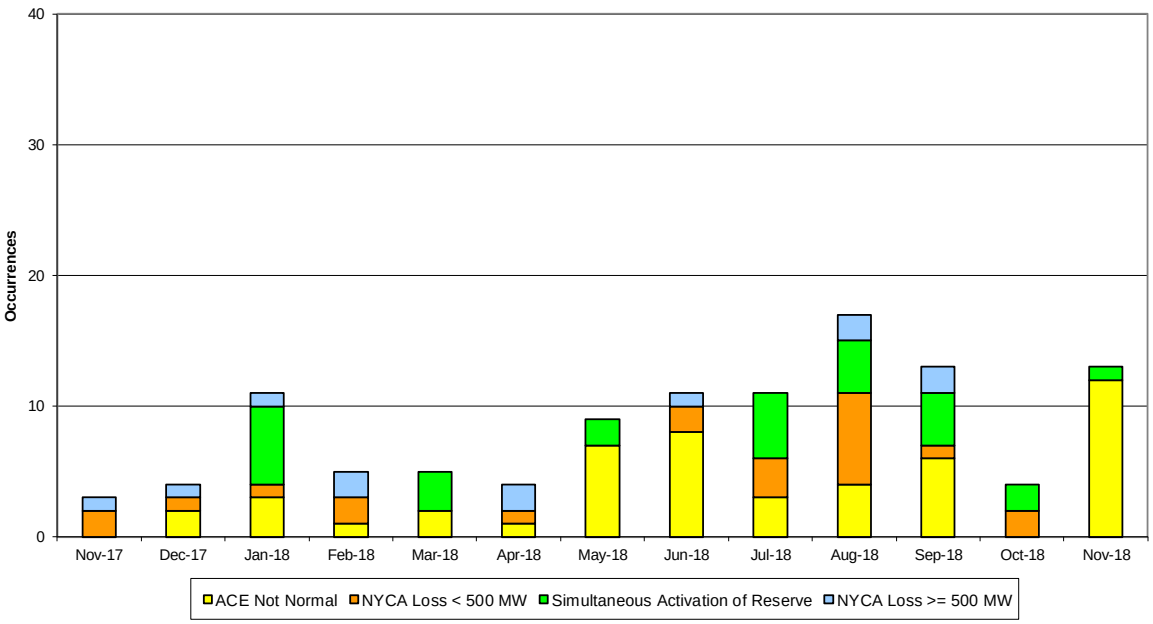
The value of NERC Control Performance Standards (CPS-1) is an indicator of the NYISO Area resource and demand balancing. Values exceeding the identified threshold are NERC compliant.

NERC Balancing Authority ACE Limit Standard



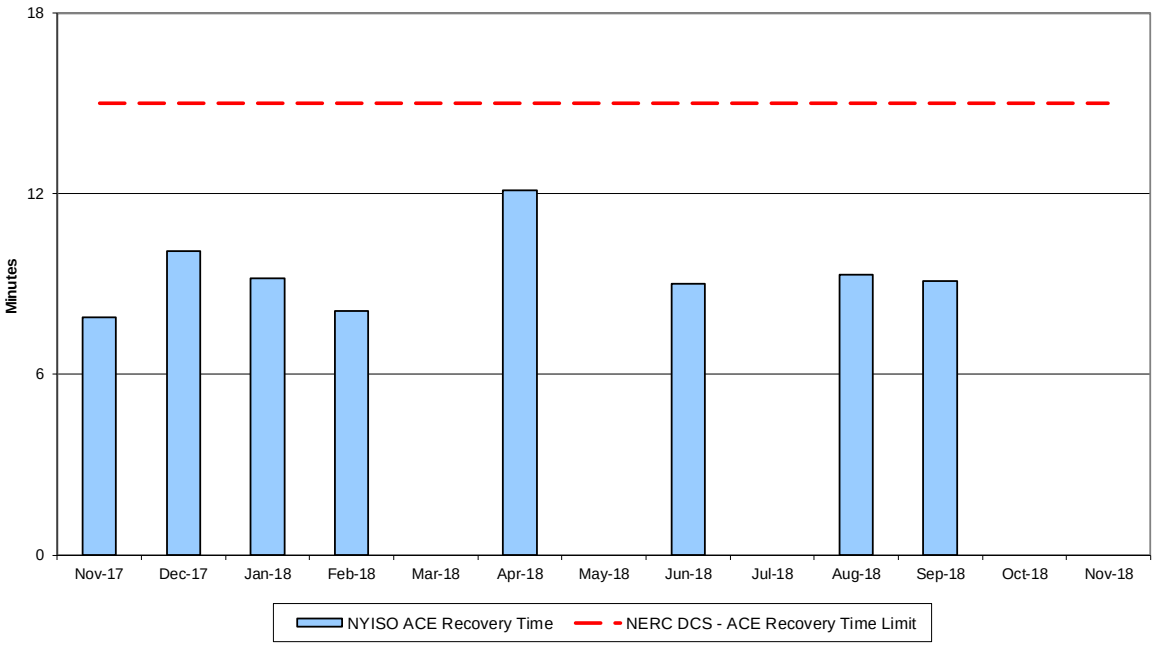
The amount of time the clock-minute average ACE exceeds the clock-minute Balancing Authority ACE Limit (BAAL) is an indicator of the NYISO Area resource and demand balancing. The maximum BAAL exceedance time is identified. BAAL exceedances of less than 30 consecutive clock-minutes are NERC compliant.

Reserve Activations



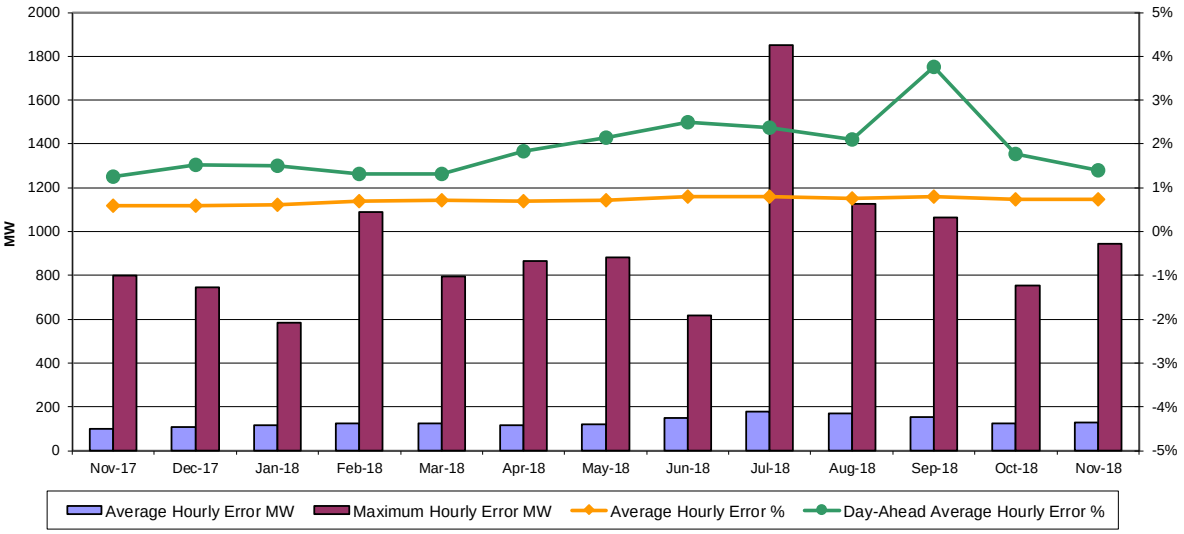
NYISO Reserve Activations are indicators of the need to respond to unexpected operational conditions within the NYISO Area or to assist a neighboring Area (Simultaneous Activation of Reserves) by activating an immediate resource and demand balancing operation.

DCS Event Time to ACE Recovery

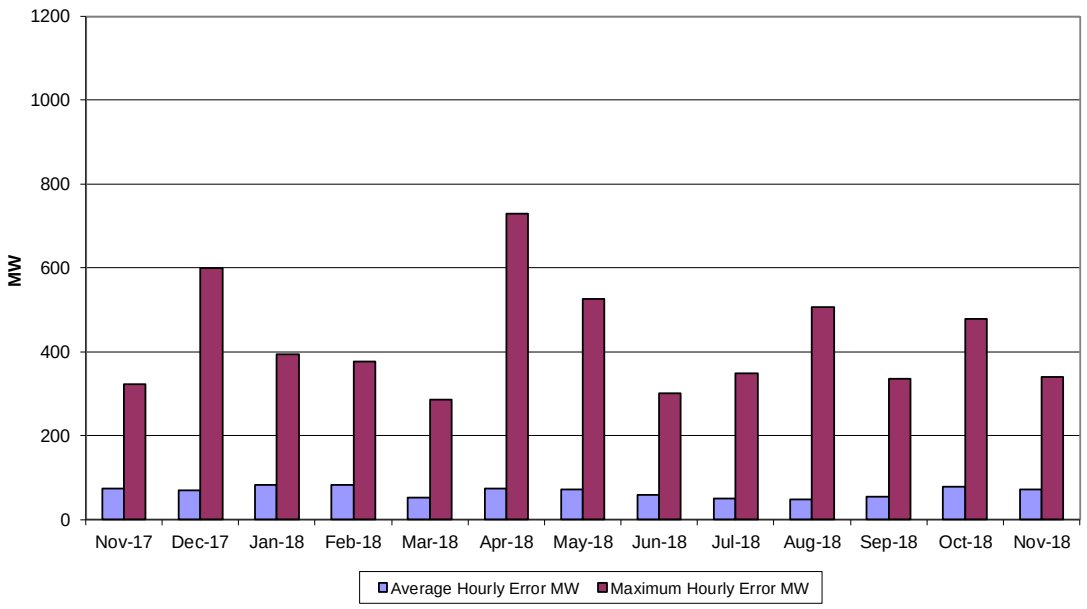


For NYISO initiated Reportable Disturbances, the maximum ACE recovery time is identified. Recovery times of less than 15 minutes are considered NERC compliant.

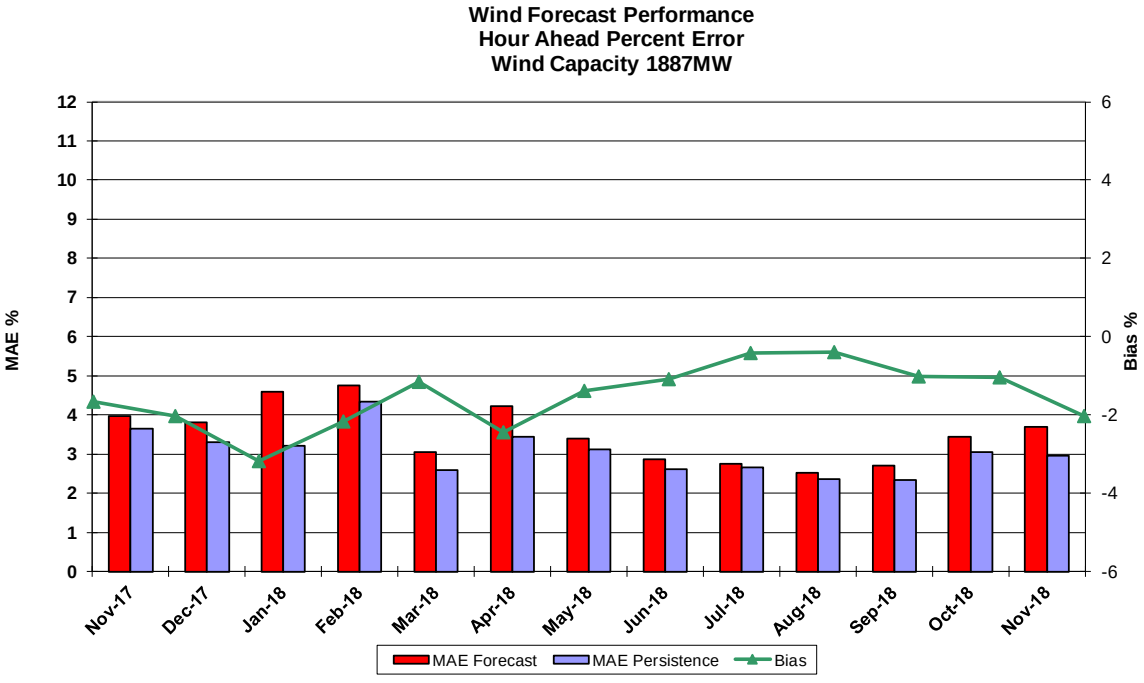
Load Forecast Performance



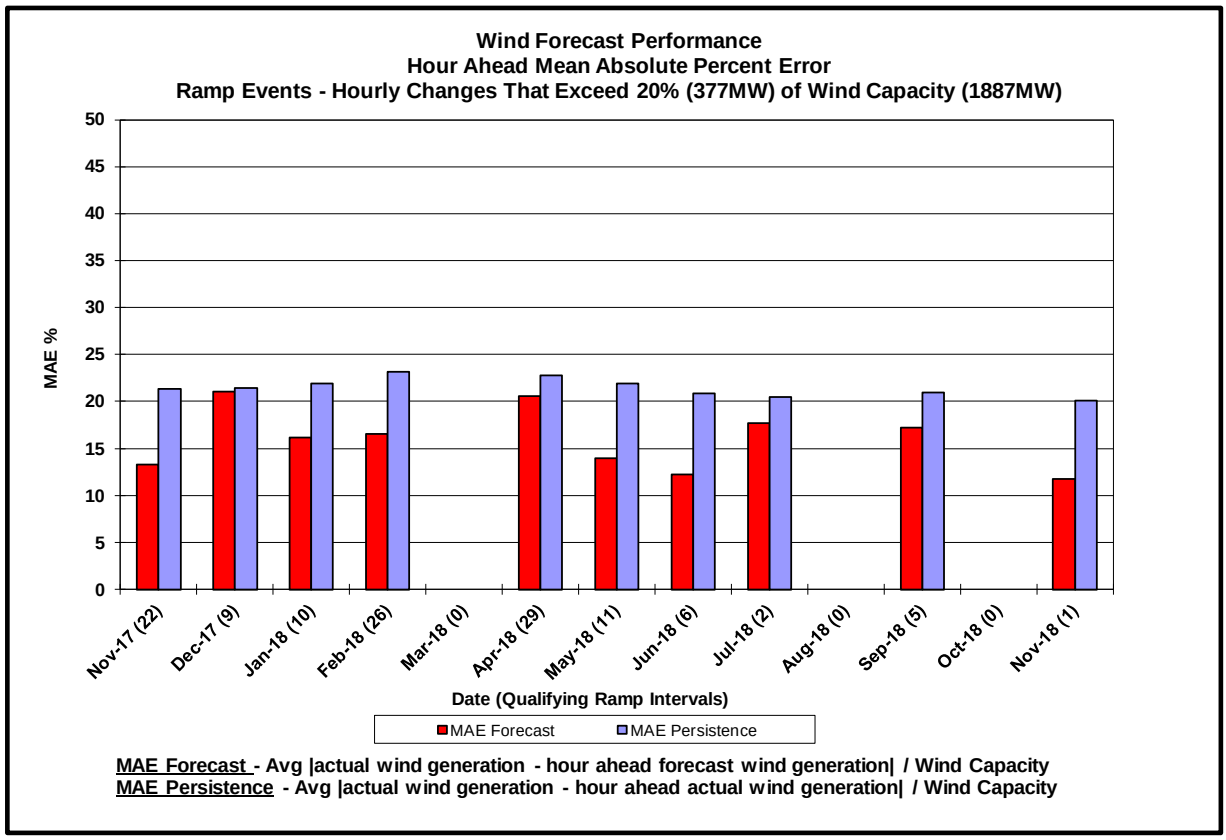
<u>Hourly Error MW</u> - Absolute value of the difference between the hourly average actual load demand and the average hour ahead forecast load demand.
<u>Average Hourly Error %</u> - Average value of the ratio of hourly average error magnitude to hourly average actual load demand.
<u>Day-Ahead Average Hourly Error %</u> - 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.



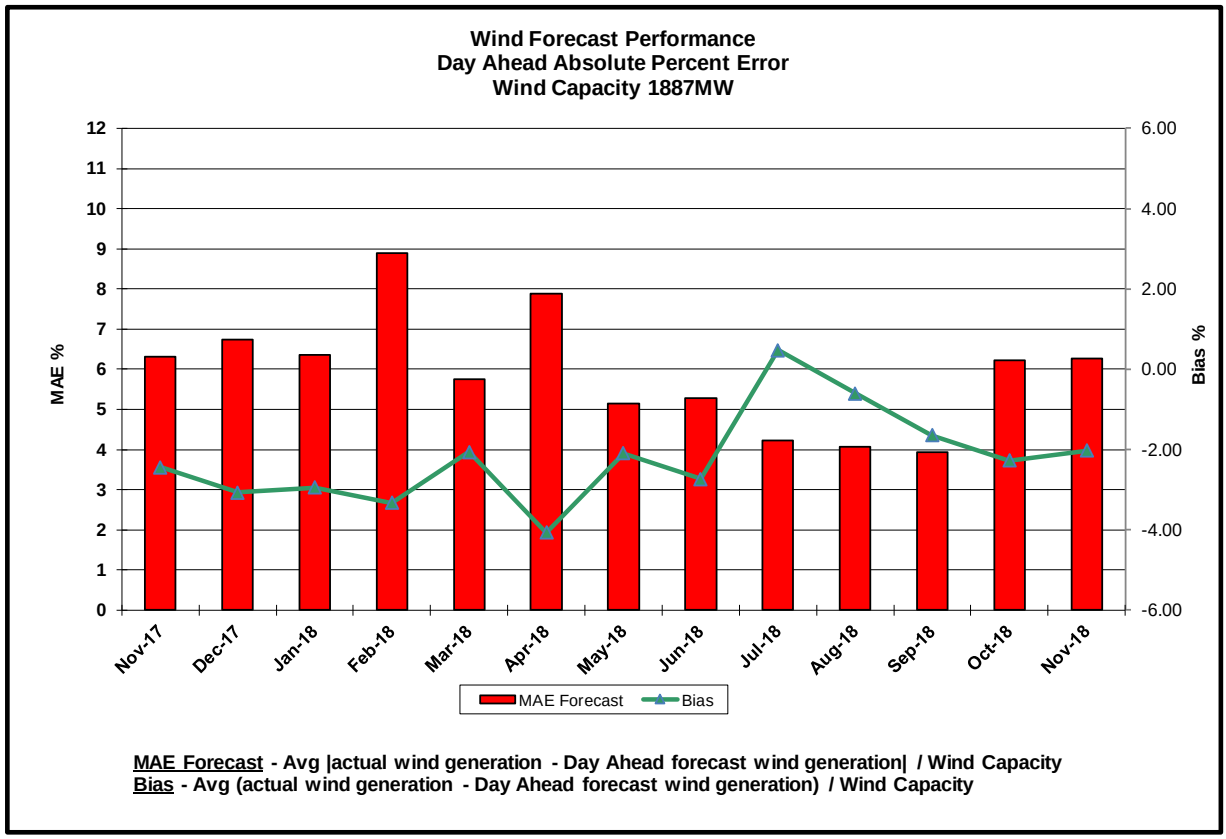
Hourly Error MW - Absolute value of the difference between the hourly average actual wind generation and the average hour ahead forecast wind generation.



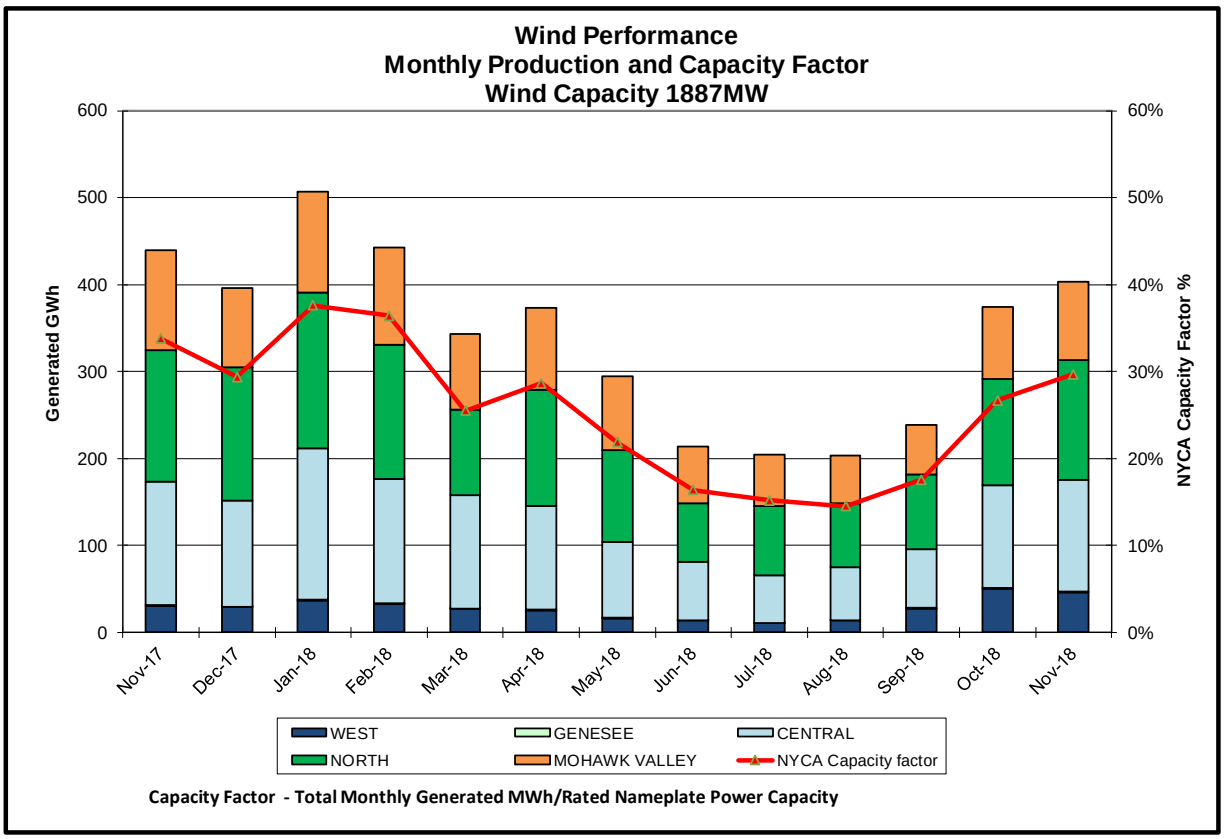
MAE Forecast - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity
MAE Persistence - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity
Bias - Avg (actual wind generation - hour ahead forecast wind generation) / Wind Capacity

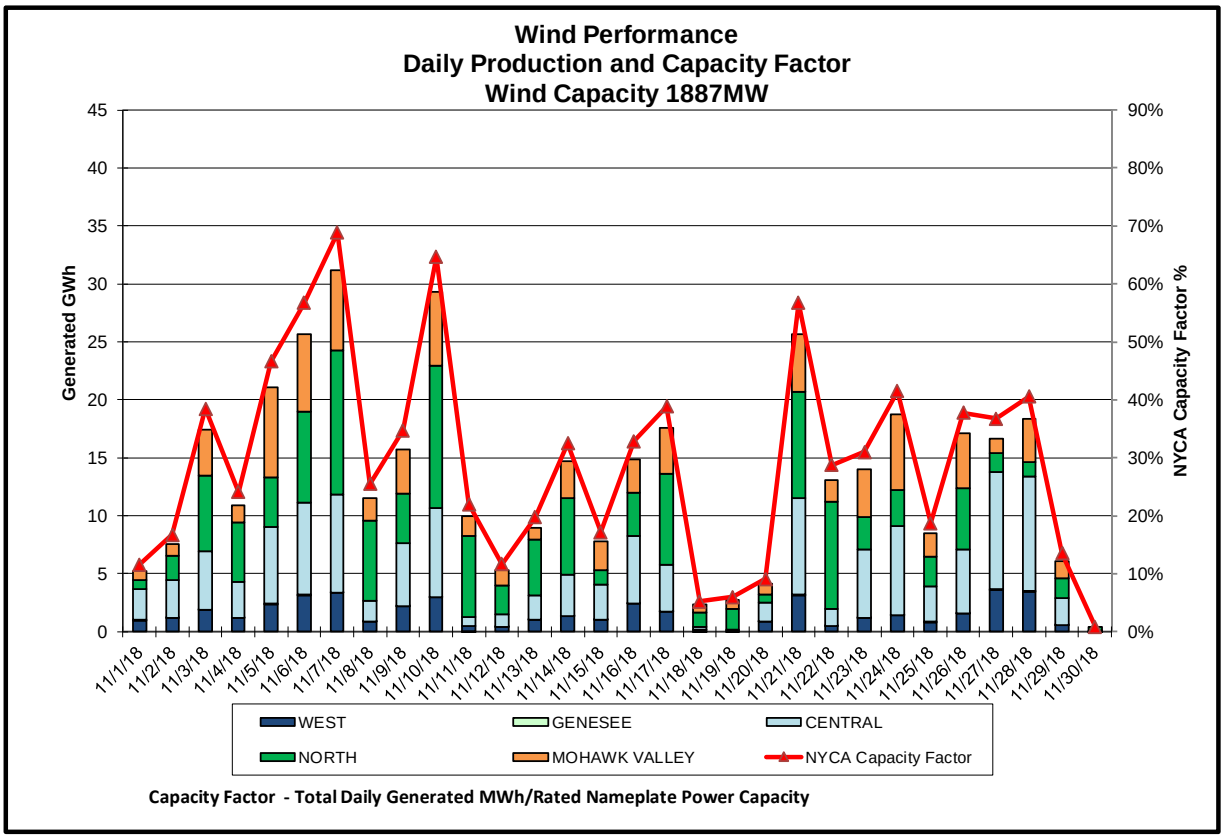


MAE Forecast - Avg |actual wind generation - hour ahead forecast wind generation| / Wind Capacity
MAE Persistence - Avg |actual wind generation - hour ahead actual wind generation| / Wind Capacity



MAE Forecast - Avg |actual wind generation - Day Ahead forecast wind generation| / Wind Capacity
Bias - Avg (actual wind generation - Day Ahead forecast wind generation) / Wind Capacity


Wind Performance
Monthly Production and Capacity Factor
Wind Capacity 1887MW
Generated GWh
NYCA Capacity Factor %
600
500
400
300
200
100
0
60%
50%
40%
30%
20%
10%
0%
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
WEST
GENESEE
CENTRAL
NORTH
MOHAWK VALLEY
NYCA Capacity factor
Capacity Factor - Total Monthly Generated MWh/Rated Nameplate Power Capacity


Wind Performance
Daily Production and Capacity Factor
Wind Capacity 1887MW
Generated GWh
NYCA Capacity Factor %
45
40
35
30
25
20
15
10
5
0
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
11/1/18
11/2/18
11/3/18
11/4/18
11/5/18
11/6/18
11/7/18
11/8/18
11/9/18
11/10/18
11/11/18
11/12/18
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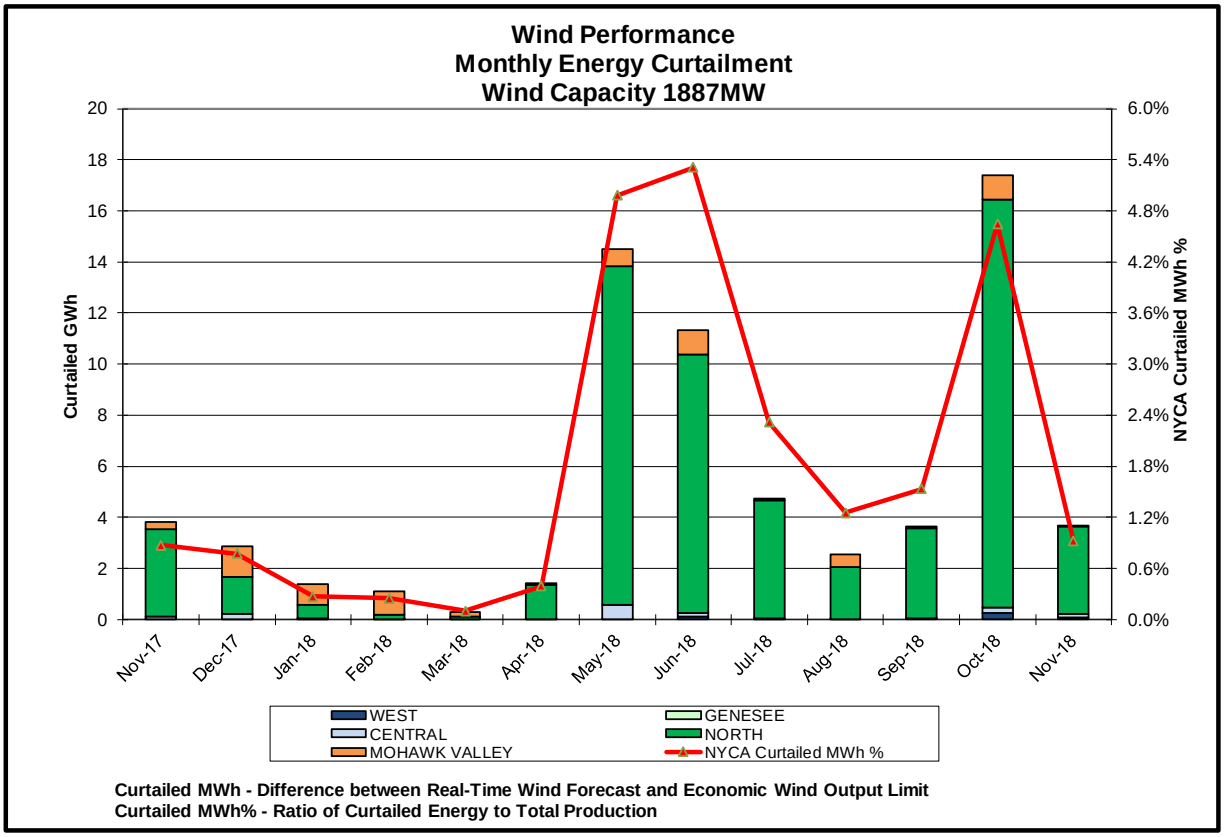
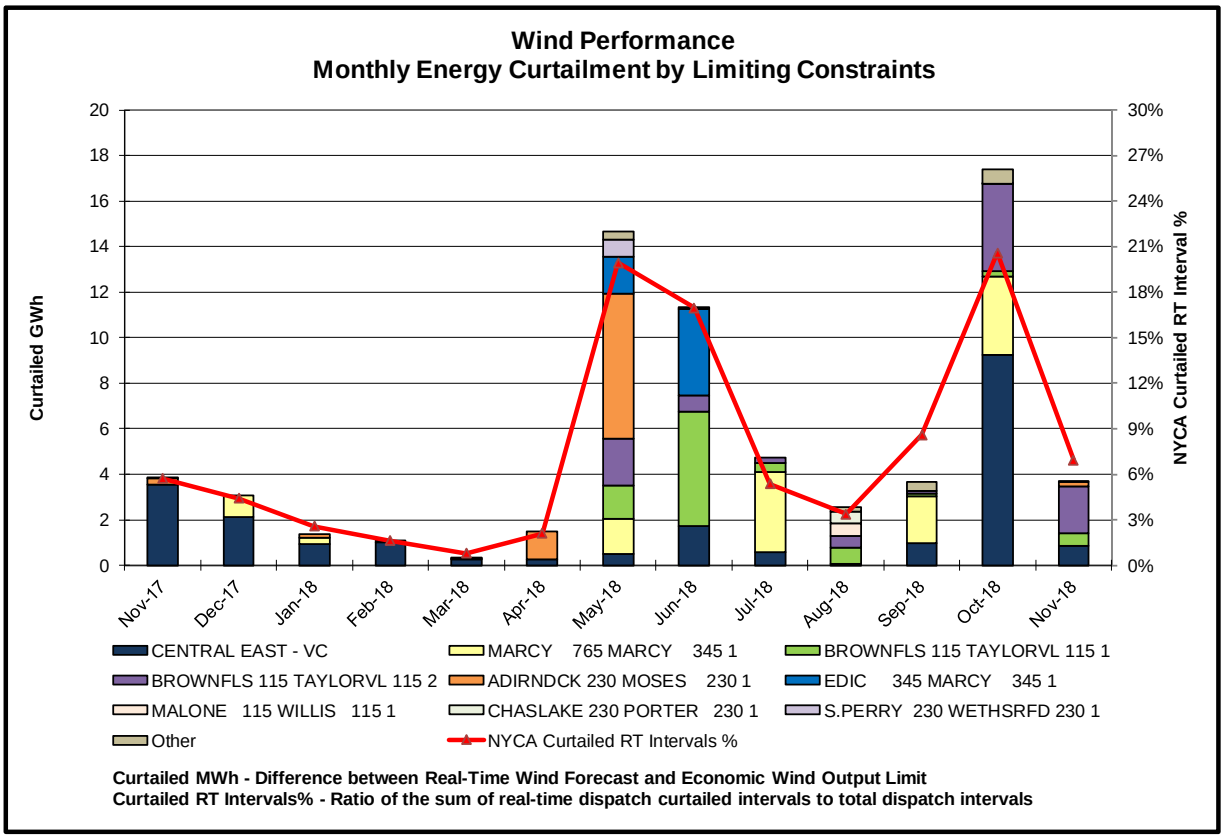
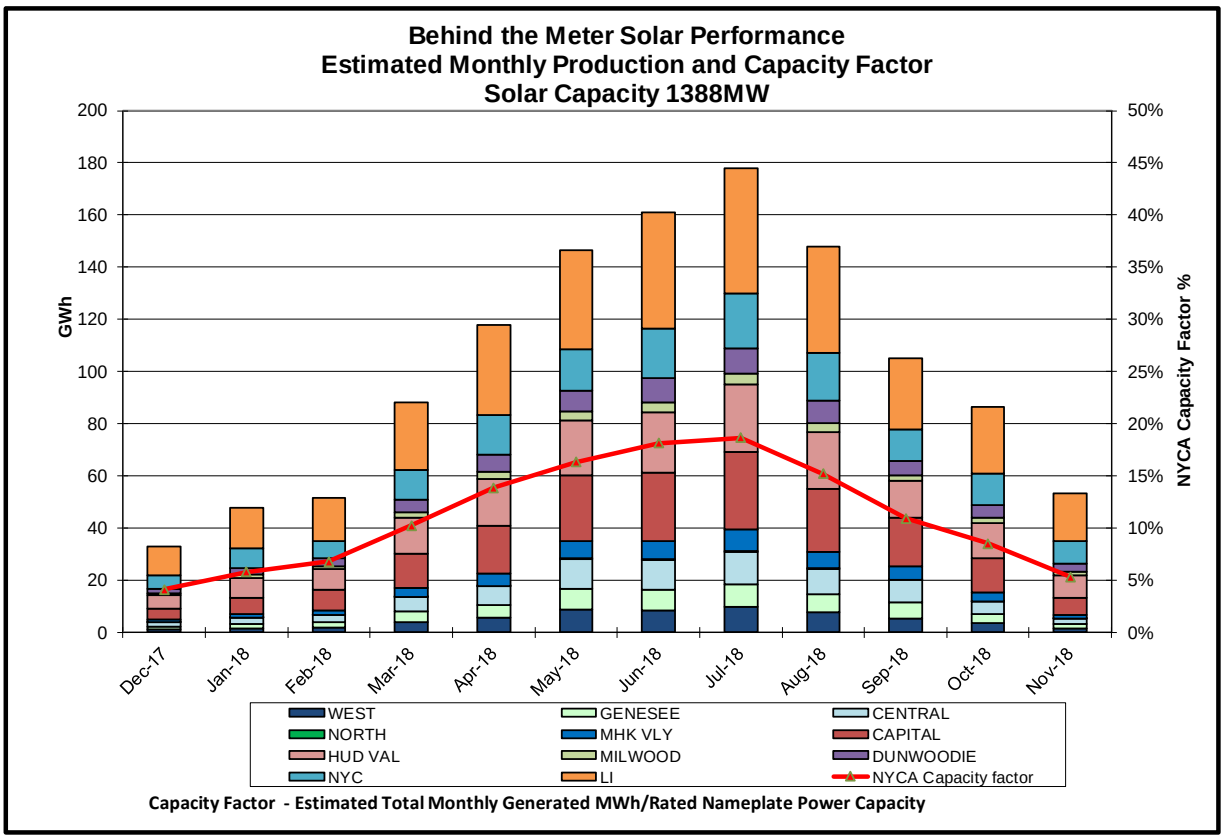
11/17/18
11/18/18
11/19/18
11/20/18
11/21/18
11/22/18
11/23/18
11/24/18
11/25/18
11/26/18
11/27/18
11/28/18
11/29/18
11/30/18
WEST
GENESEE
CENTRAL
NORTH
MOHAWK VALLEY
NYCA Capacity Factor
Capacity Factor - Total Daily Generated MWh/Rated Nameplate Power Capacity

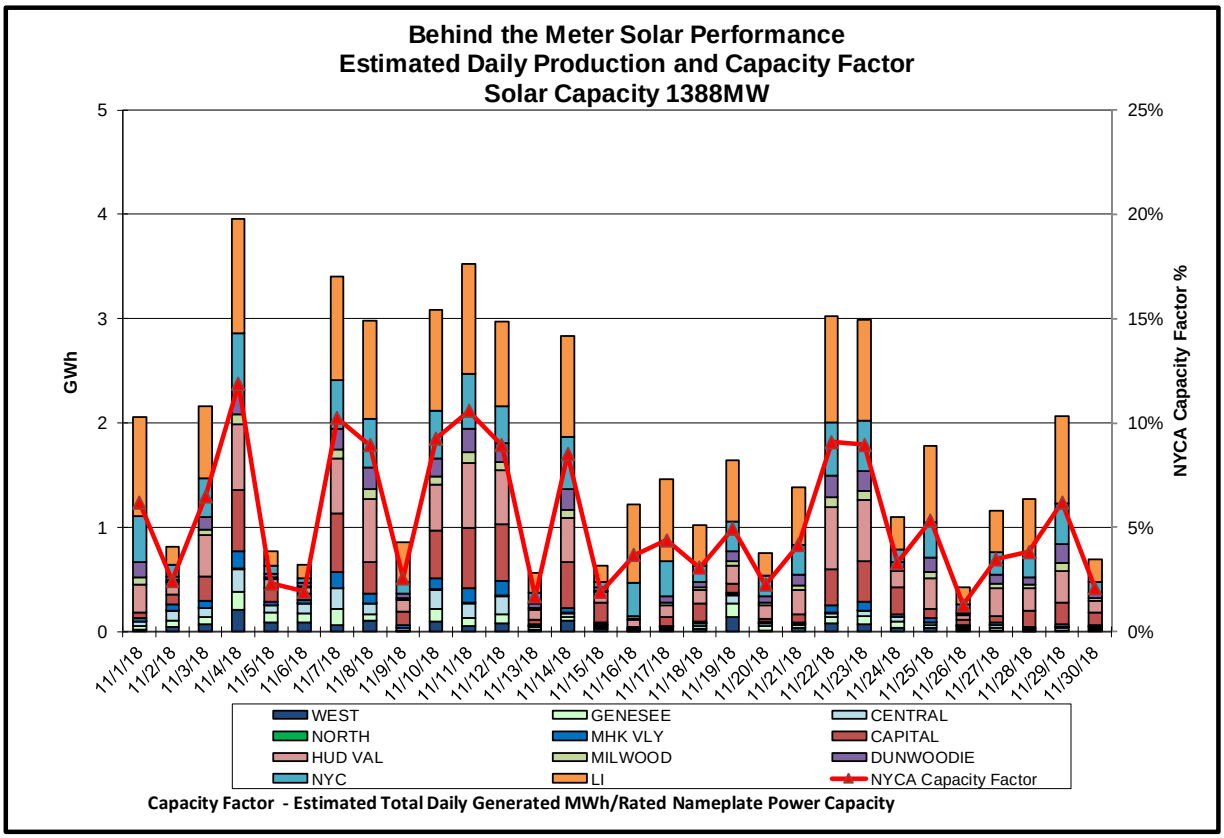


Curtailed MWh - Difference between Real-Time Wind Forecast and Economic Wind Output Limit
Curtailed MWh% - Ratio of Curtailed Energy to Total Production



Curtailed MWh - Difference between Real-Time Wind Forecast and Economic Wind Output Limit
Curtailed RT Intervals% - Ratio of the sum of real-time dispatch curtailed intervals to total dispatch intervals


Behind the Meter Solar Performance
Estimated Monthly Production and Capacity Factor
Solar Capacity 1388MW
GWh
NYCA Capacity Factor %
200
180
160
140
120
100
80
60
40
20
0
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
WEST
GENESEE
CENTRAL
NORTH
MHK VLY
CAPITAL
HUD VAL
MILWOOD
DUNWOODIE
NYC
LI
NYCA Capacity factor
Capacity Factor - Estimated Total Monthly Generated MWh/Rated Nameplate Power Capacity


Behind the Meter Solar Performance
Estimated Daily Production and Capacity Factor
Solar Capacity 1388MW
GWh
NYCA Capacity Factor %
5
4
3
2
1
0
25%
20%
15%
10%
5%
0%
11/1/18
11/2/18
11/3/18
11/4/18
11/5/18
11/6/18
11/7/18
11/8/18
11/9/18
11/10/18
11/11/18
11/12/18
11/13/18
11/14/18
11/15/18
11/16/18
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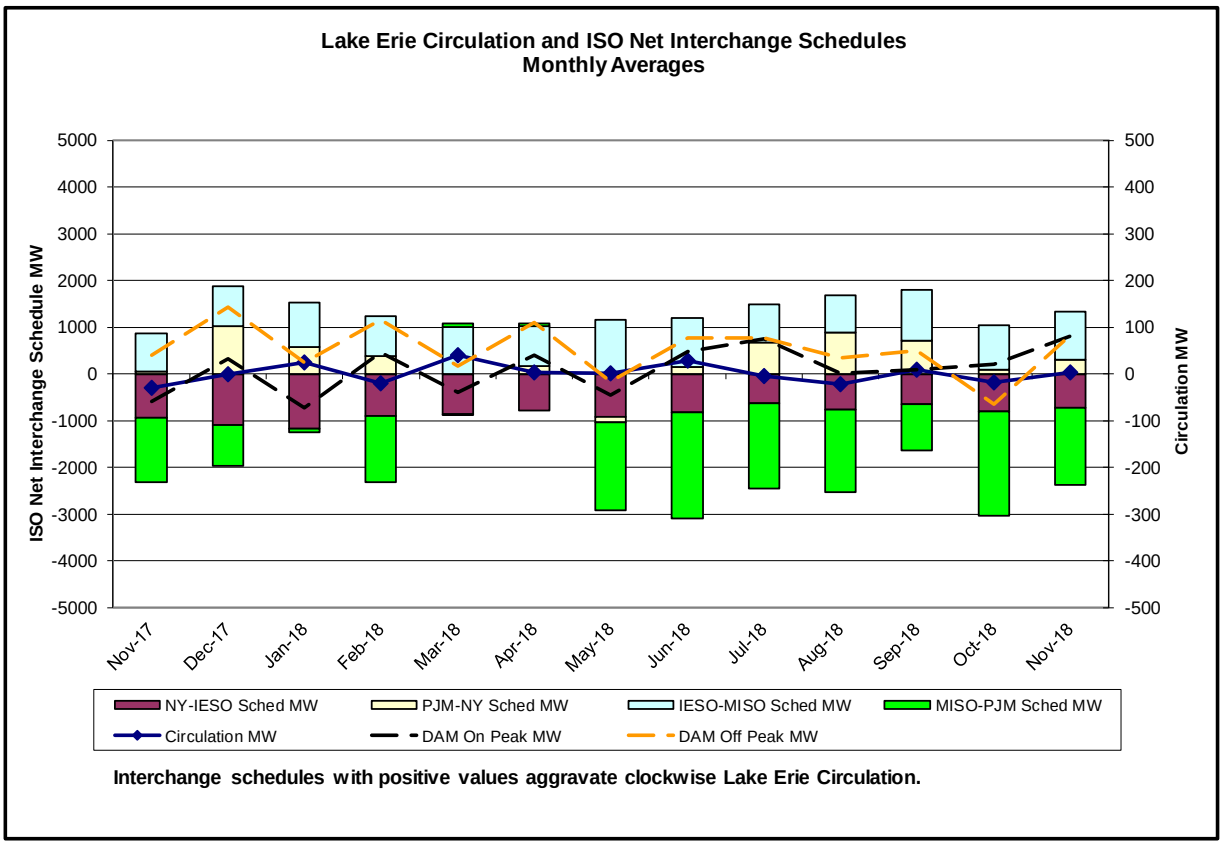
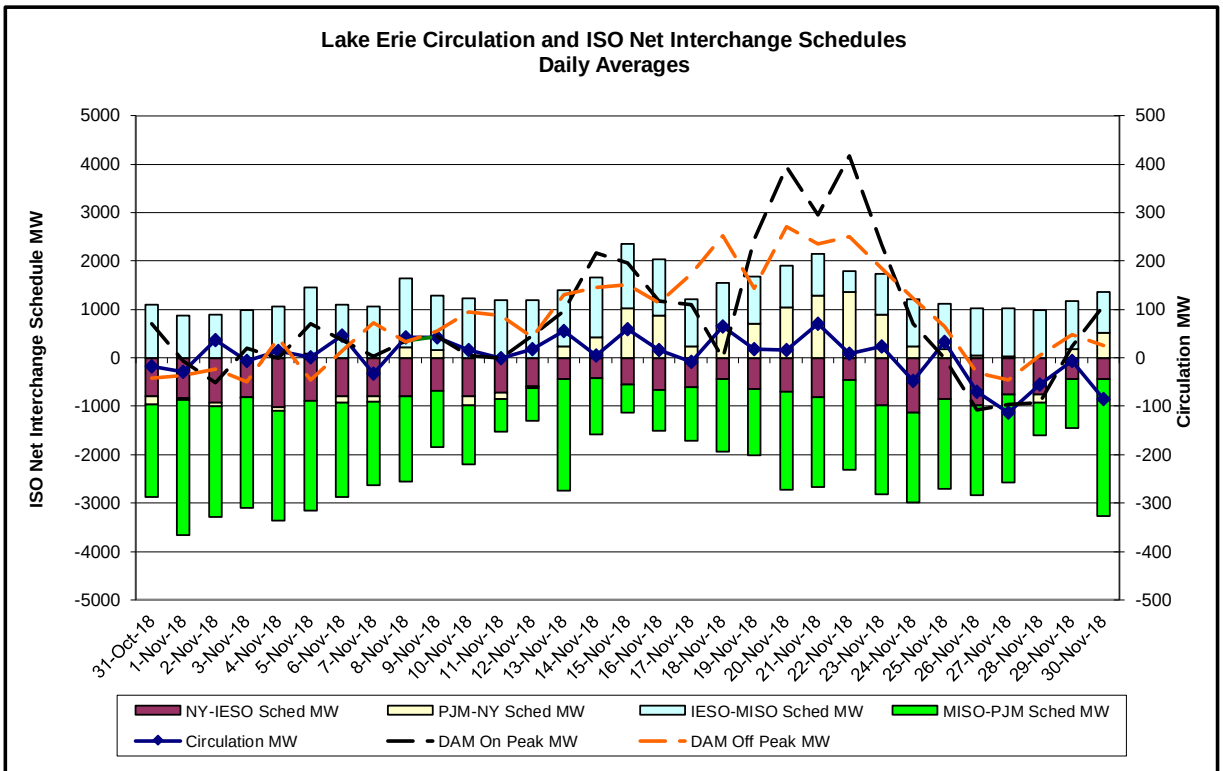
11/19/18
11/20/18
11/21/18
11/22/18
11/23/18
11/24/18
11/25/18
11/26/18
11/27/18
11/28/18
11/29/18
11/30/18
WEST
GENESEE
CENTRAL
NORTH
MHK VLY
CAPITAL
HUD VAL
MILWOOD
DUNWOODIE
NYC
LI
NYCA Capacity Factor
Capacity Factor - Estimated Total Daily Generated MWh/Rated Nameplate Power Capacity

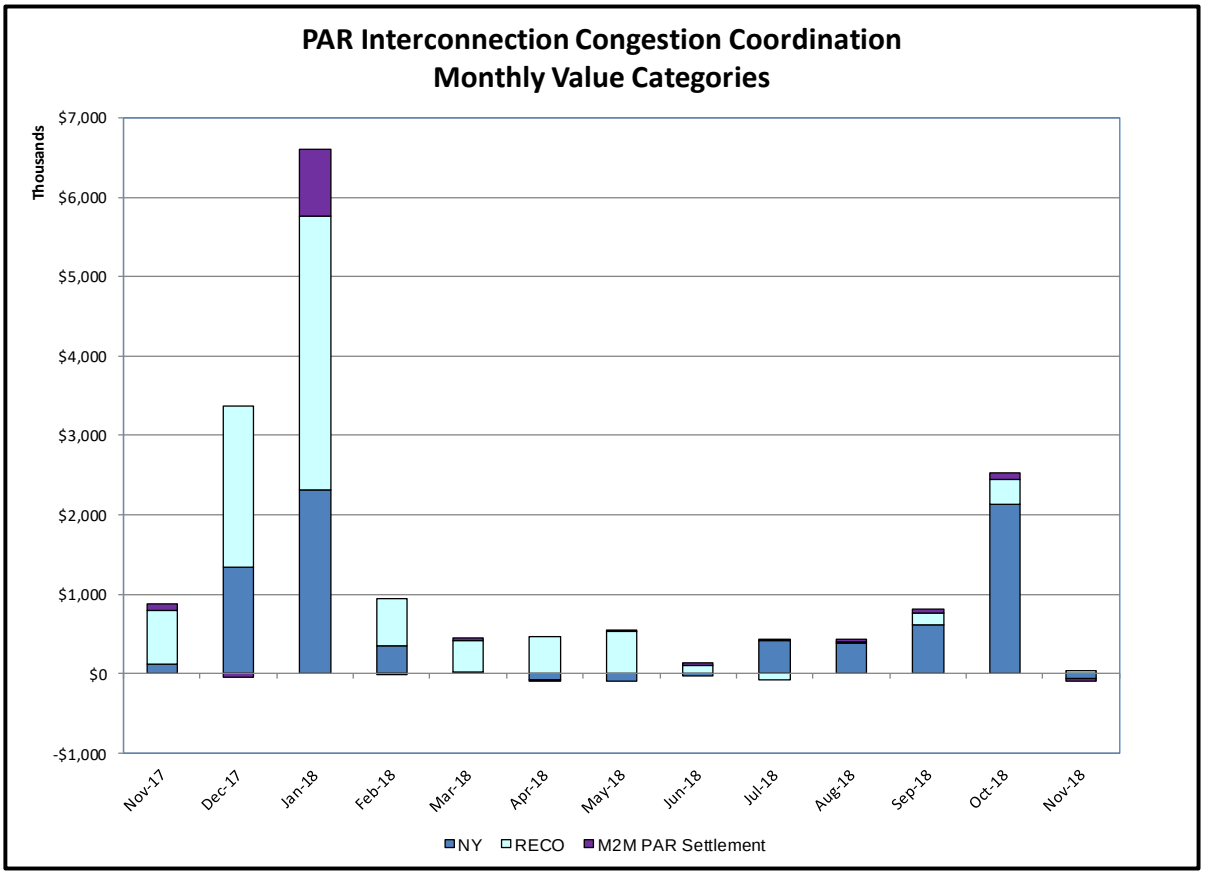


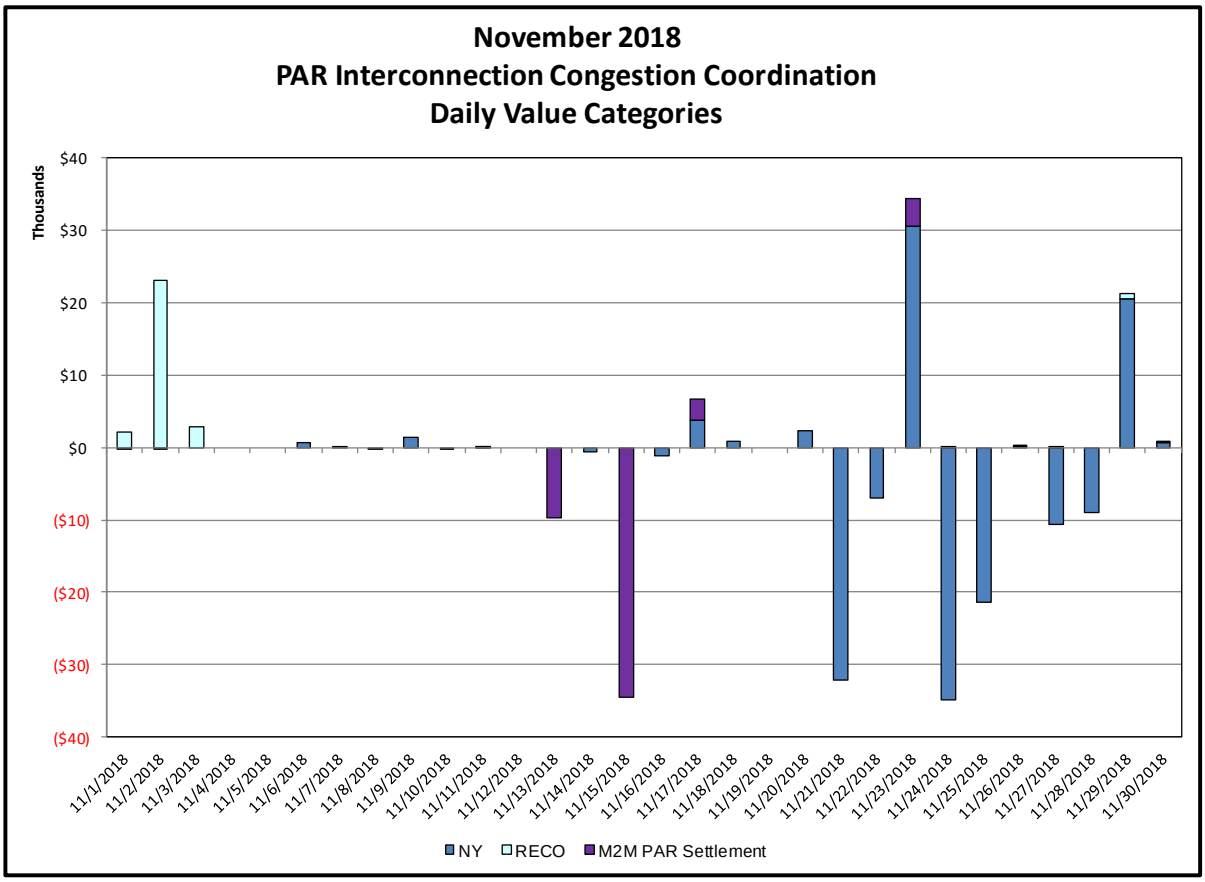
Interchange schedules with positive values aggravate clockwise Lake Erie Circulation.



Interchange schedules with positive values aggravate clockwise Lake Erie Circulation.

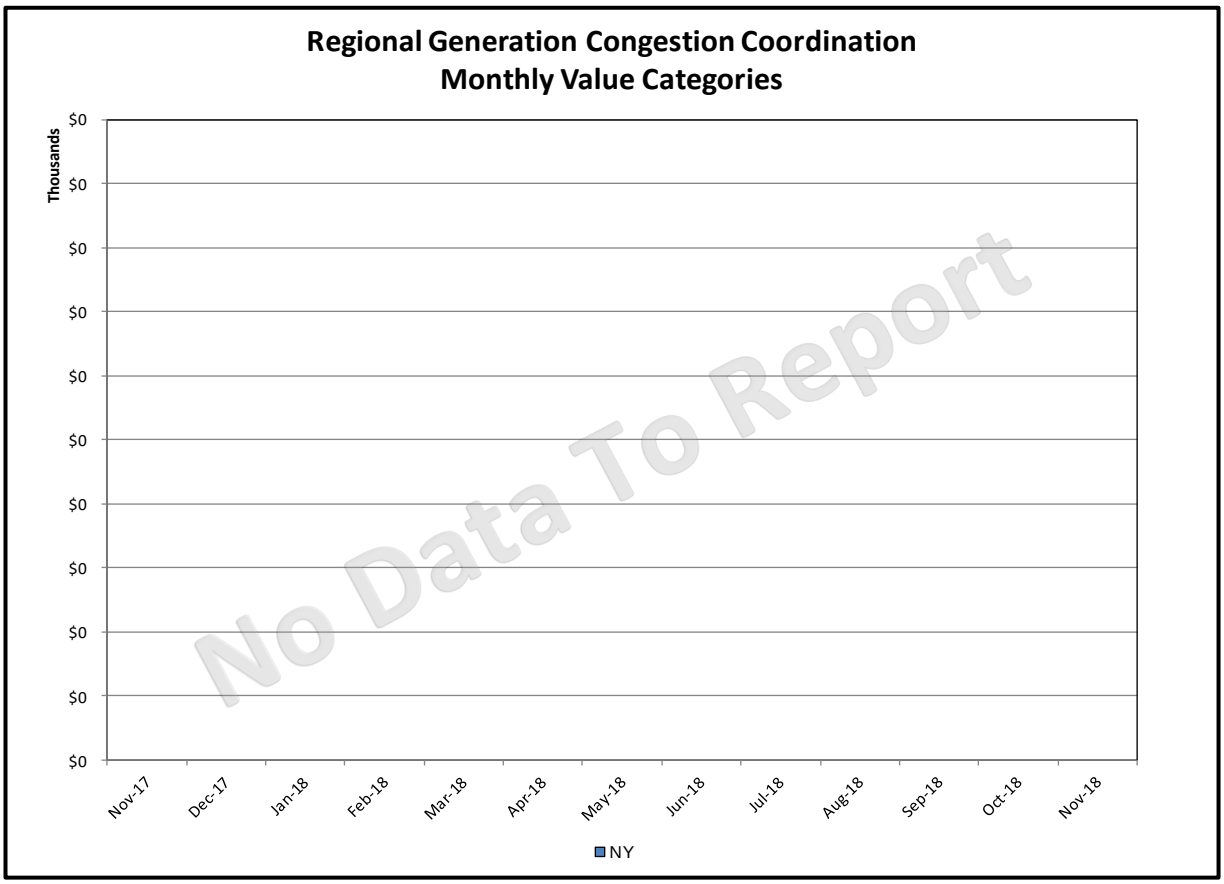
Broader Regional Market Performance Metrics

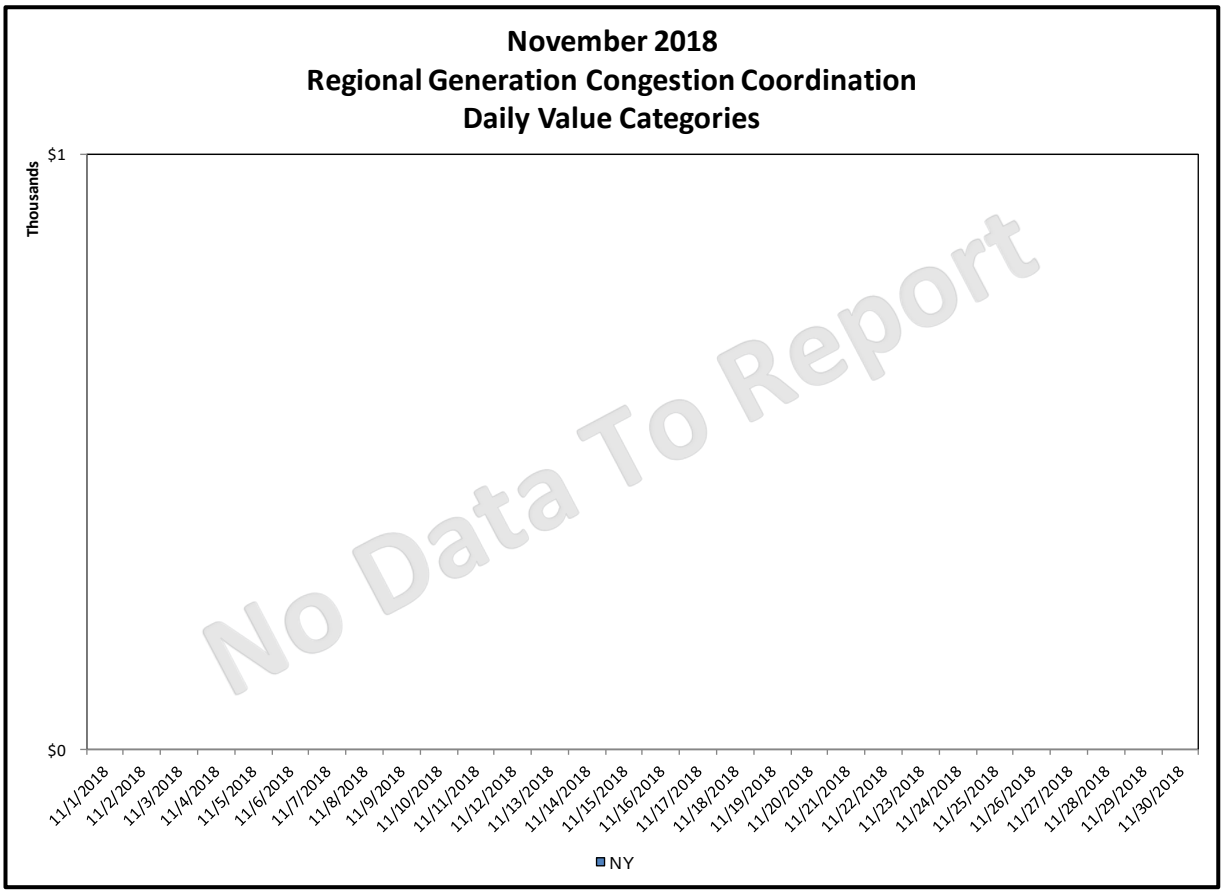




PAR Interconnection Congestion Coordination

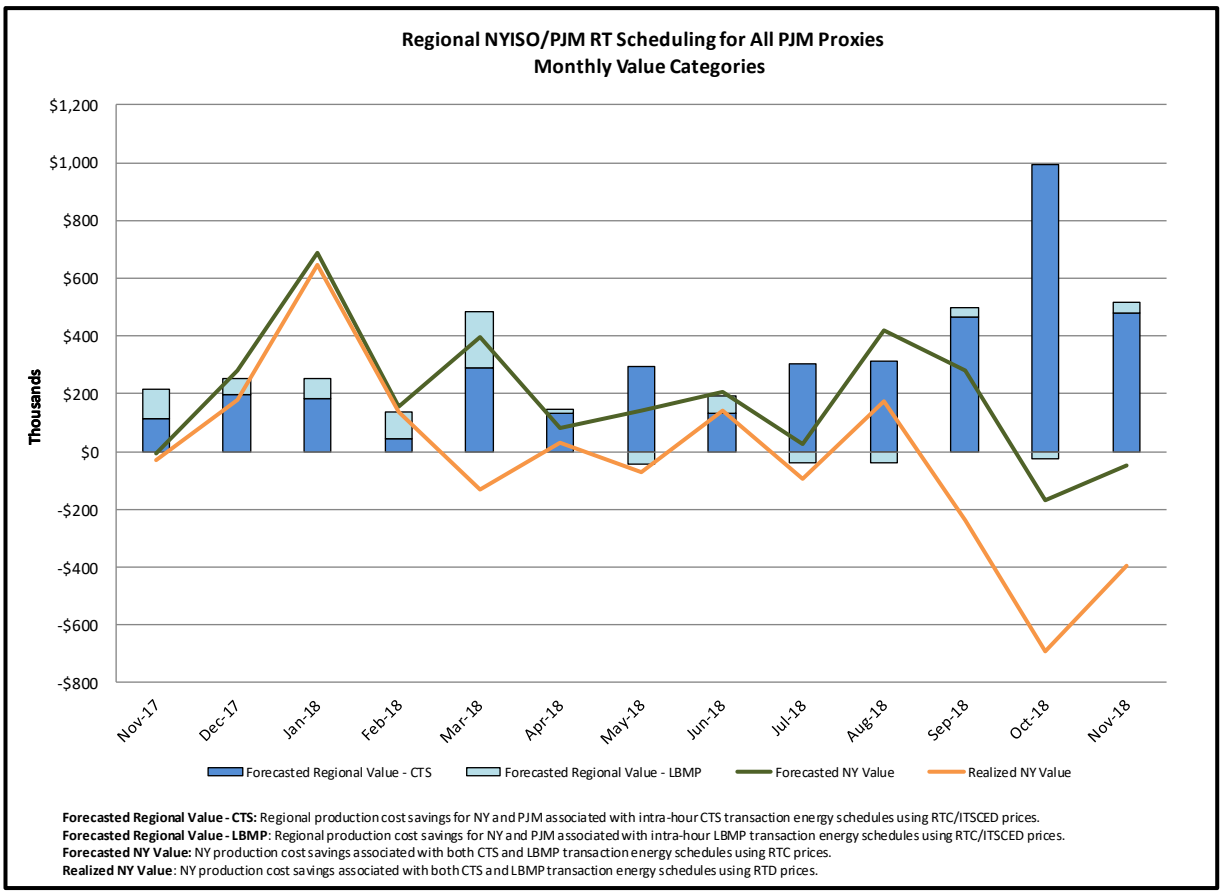
Category	Description
NY	Represents the value NY realizes from Market-to-Market PAR Coordination when experiencing congestion. This is the estimated savings to NY for additional deliveries into NY
RECO	Represents the value of PJM's obligation to deliver 80% of service to RECO load over Ramapo 5018. This 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 Generation Congestion Coordination
Monthly Value Categories
Thousands
$0
$0
$0
$0
$0
$0
$0
$0
$0
$0
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
NY
No Data To Report

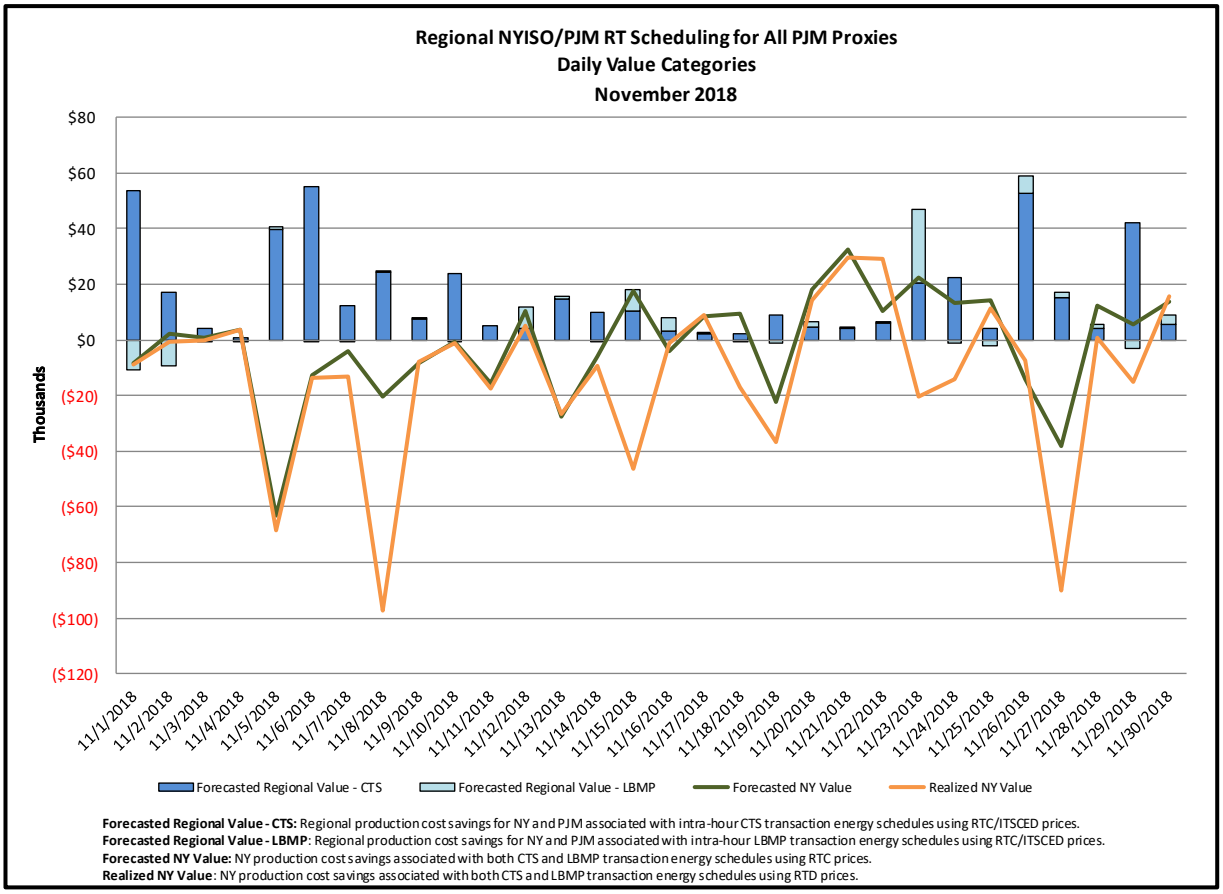

November 2018
Regional Generation Congestion Coordination
Daily Value Categories
Thousands
$1
$0
11/1/2018
11/2/2018
11/3/2018
11/4/2018
11/5/2018
11/6/2018
11/7/2018
11/8/2018
11/9/2018
11/10/2018
11/11/2018
11/12/2018
11/13/2018
11/14/2018
11/15/2018
11/16/2018
11/17/2018
11/18/2018
11/19/2018
11/20/2018
11/21/2018
11/22/2018
11/23/2018
11/24/2018
11/25/2018
11/26/2018
11/27/2018
11/28/2018
11/29/2018
11/30/2018
NY
No Data To Report

Regional Generation Congestion Coordination

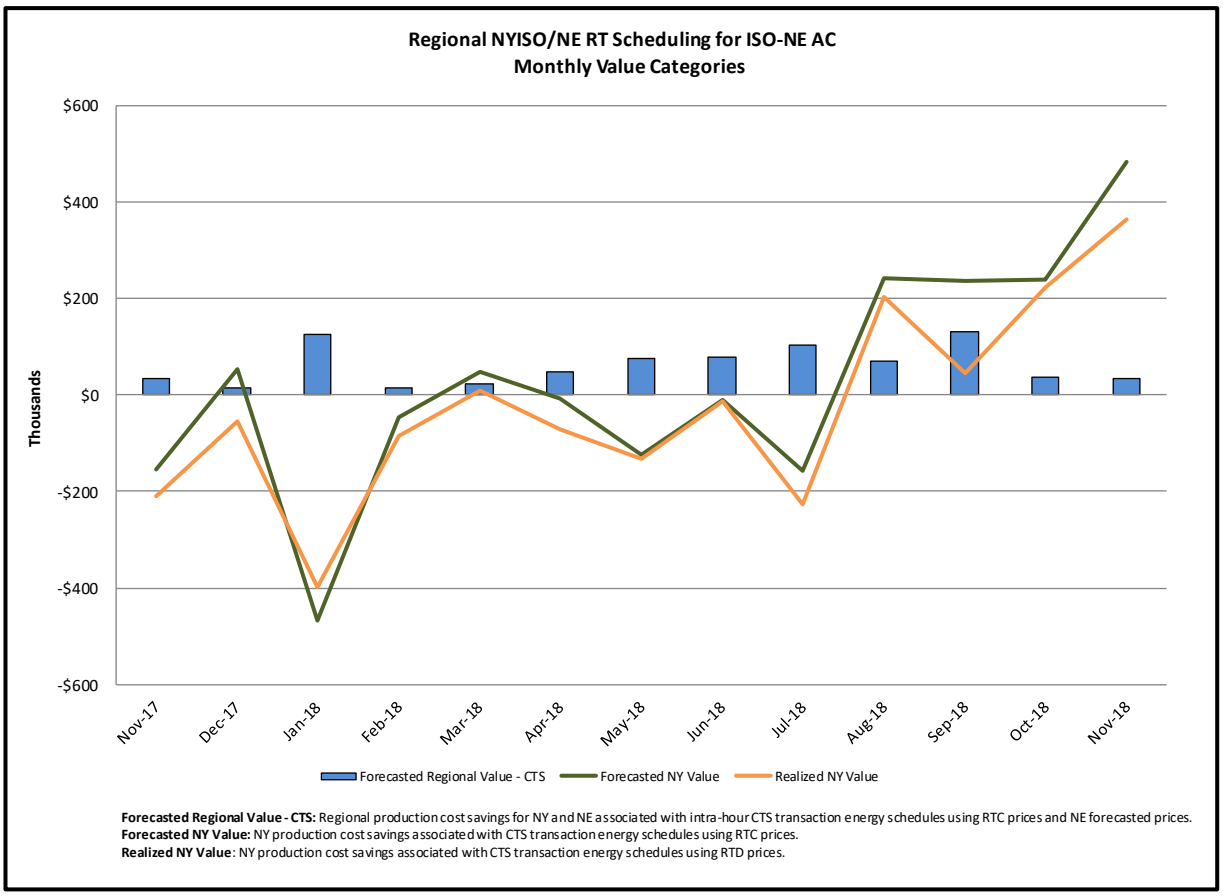
Category	***Description***
NY	NYISO savings that result from PJM payments to NYISO when PJM's transmission use (PJM's market flow) is greater than PJM's entitlement of the NY transmission system and NYISO is incurring Western or Central NY congestion. Additionally, NYISO savings may result from the more efficient regional utilization of PJM's generation resources to directly address Western or Central NY transmission congestion.



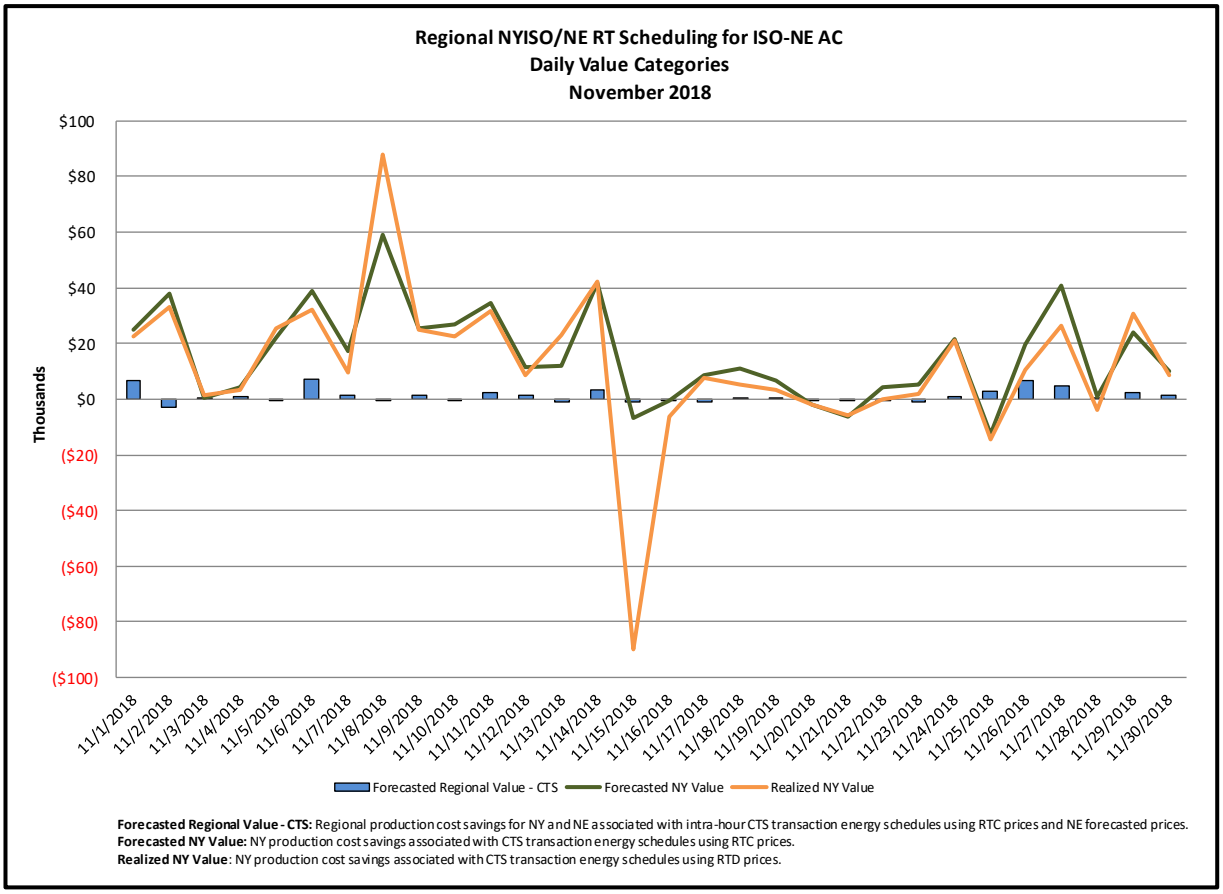
Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCED prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules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



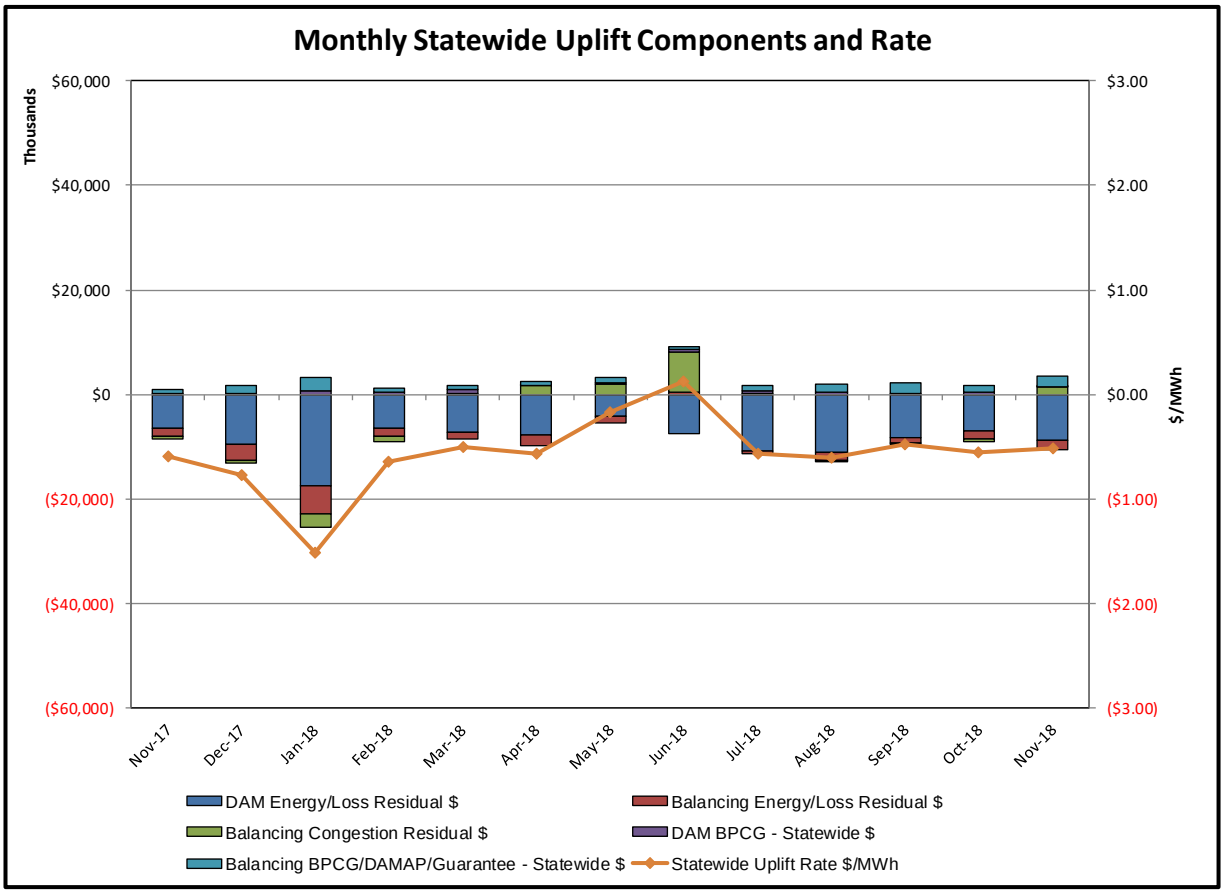
Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCED prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules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

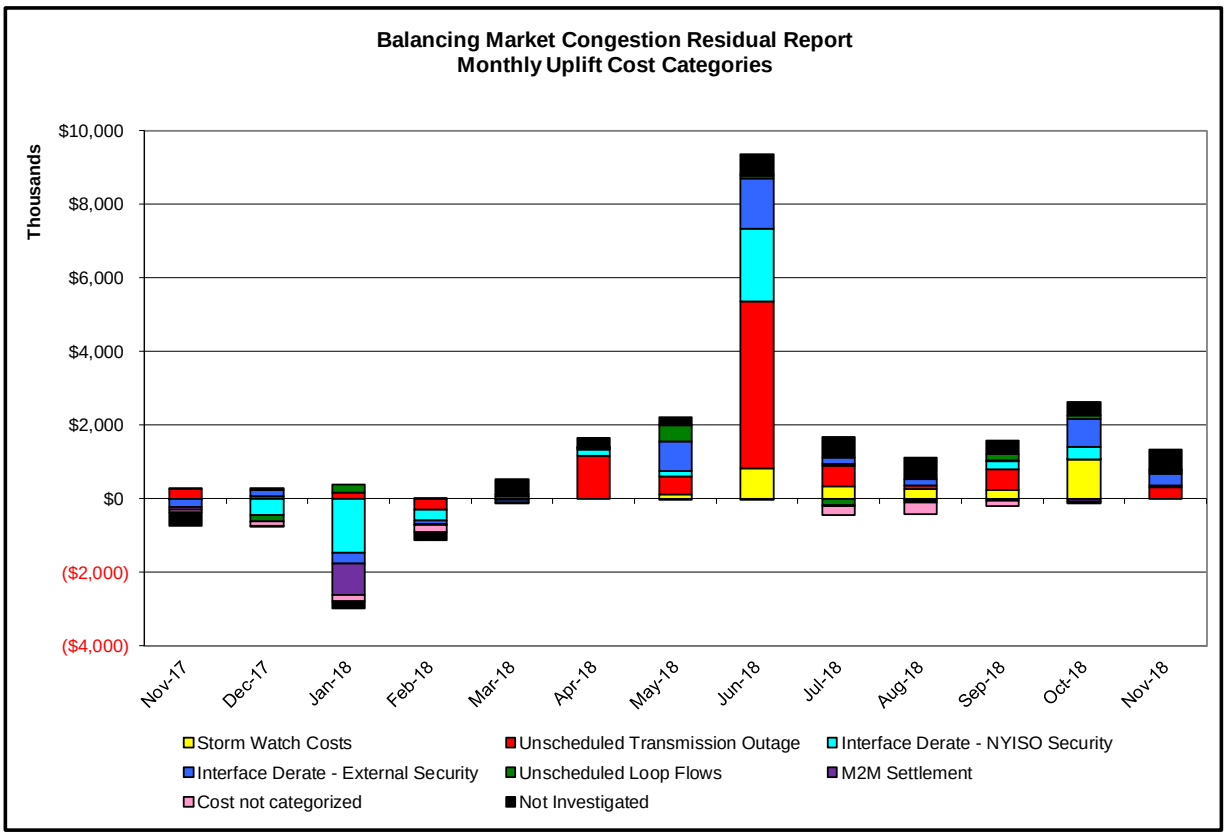


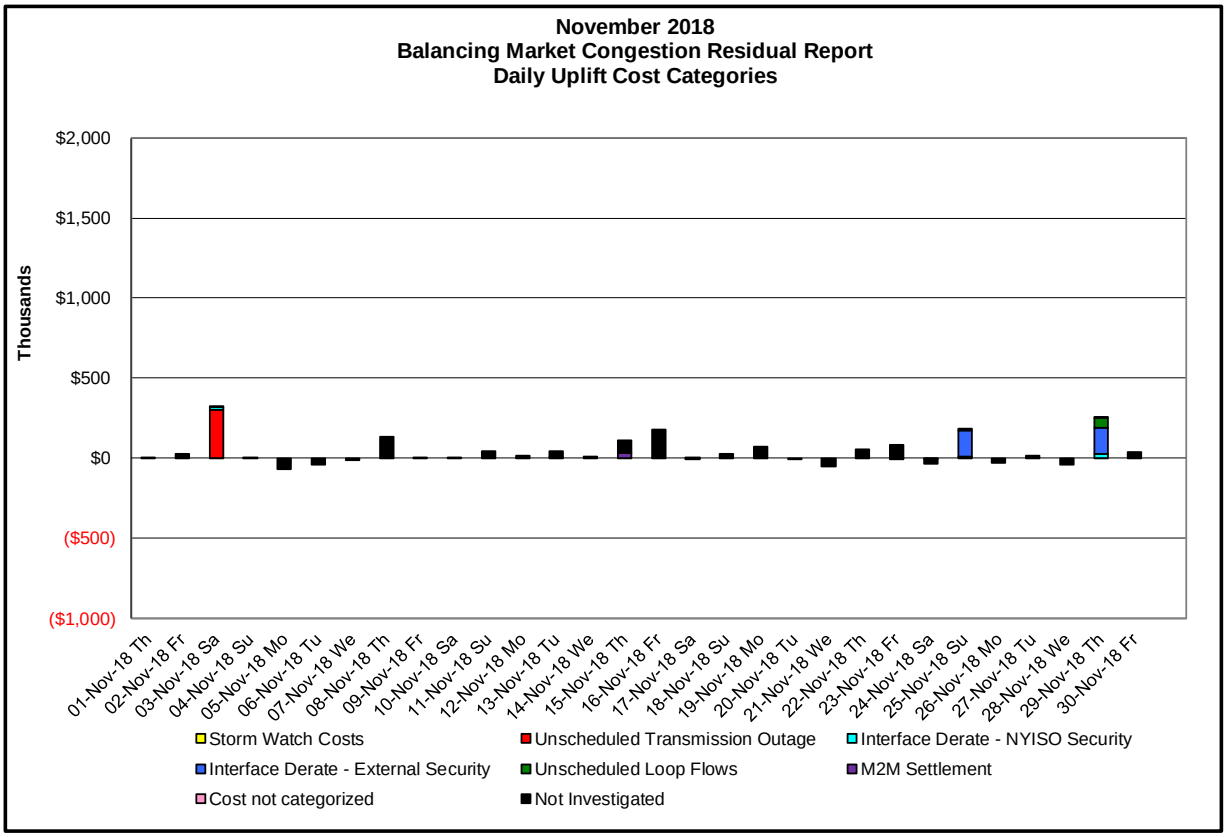
Forecasted Regional Value - CTS: Regional production cost savings for NY and NE associated with intra-hour CTS transaction energy schedules using RTC prices and NE forecasted prices.
Forecasted NY Value: NY production cost savings associated with CTS transaction energy schedules using RTC prices.
Realized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



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.


Monthly Statewide Uplift Components and Rate
Thousands
$60,000
$40,000
$20,000
$0
($20,000)
($40,000)
($60,000)
$3.00
$2.00
$1.00
$0.00
($1.00)
($2.00)
($3.00)
$/MWh
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
DAM Energy/Loss Residual $
Balancing Energy/Loss Residual $
Balancing Congestion Residual $
DAM BPCG - Statewide $
Balancing BPCG/DAMAP/Guarantee - Statewide $
Statewide Uplift Rate $/MWh


Balancing Market Congestion Residual Report
Monthly Uplift Cost Categories
Thousands
$10,000
$8,000
$6,000
$4,000
$2,000
$0
($2,000)
($4,000)
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Storm Watch Costs
Unscheduled Transmission Outage
Interface Derate - NYISO Security
Interface Derate - External Security
Unscheduled Loop Flows
M2M Settlement
Cost not categorized
Not Investigated


November 2018
Balancing Market Congestion Residual Report
Daily Uplift Cost Categories
Thousands
$2,000
$1,500
$1,000
$500
$0
($500)
($1,000)
01-Nov-18 Th
02-Nov-18 Fr
03-Nov-18 Sa
04-Nov-18 Su
05-Nov-18 Mo
06-Nov-18 Tu
07-Nov-18 We
08-Nov-18 Th
09-Nov-18 Fr
10-Nov-18 Sa
11-Nov-18 Su
12-Nov-18 Mo
13-Nov-18 Tu
14-Nov-18 We
15-Nov-18 Th
16-Nov-18 Fr
17-Nov-18 Sa
18-Nov-18 Su
19-Nov-18 Mo
20-Nov-18 Tu
21-Nov-18 We
22-Nov-18 Th
23-Nov-18 Fr
24-Nov-18 Sa
25-Nov-18 Su
26-Nov-18 Mo
27-Nov-18 Tu
28-Nov-18 We
29-Nov-18 Th
30-Nov-18 Fr
Storm Watch Costs
Unscheduled Transmission Outage
Interface Derate - NYISO Security
Interface Derate - External Security
Unscheduled Loop Flows
M2M Settlement
Cost not categorized
Not Investigated

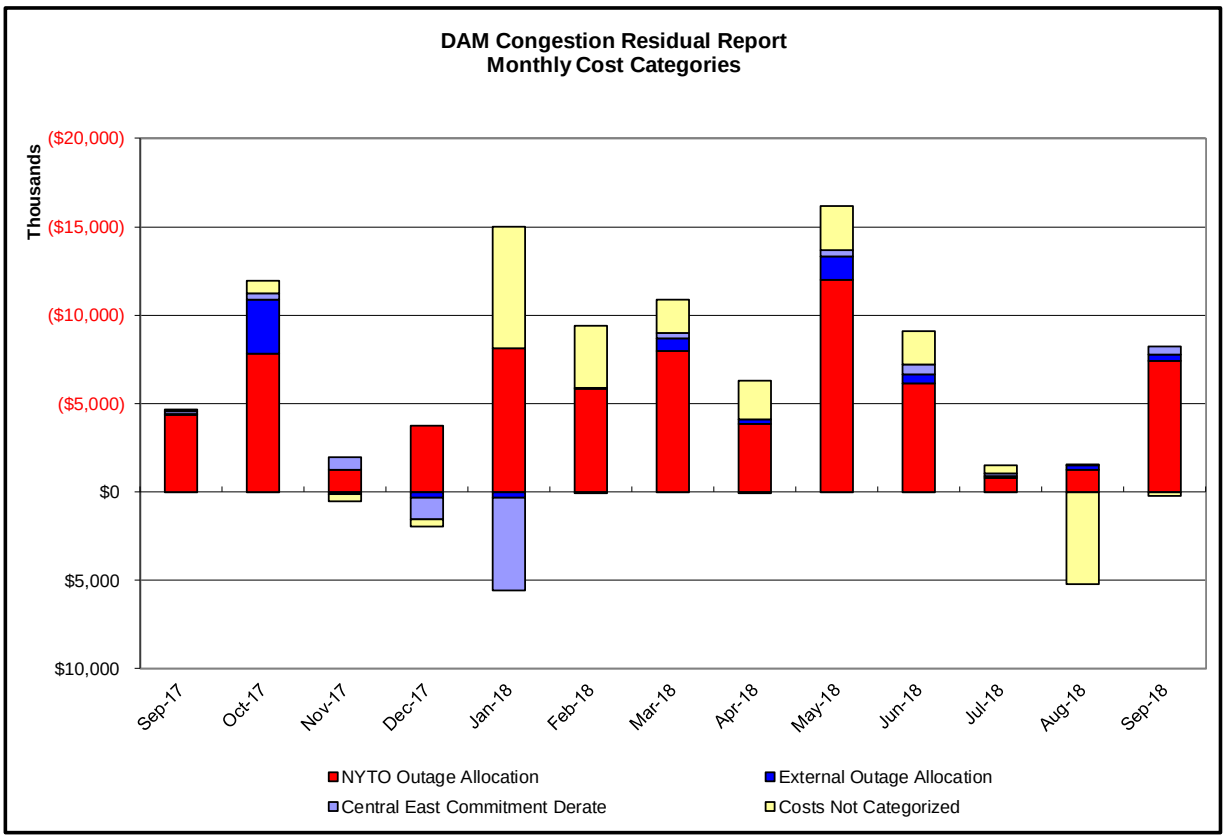
Day's investigated in November:3,25,29			
Event	Date (yyyymmdd)	Hours	Description
	11/3/2018	6-17	Forced outage Scriba-Volney 345kV (#21)
	11/3/2018	3-9	Extended outage Sprainbrook-East Garden City 345kV (#Y49)
	11/3/2018	12,13	Derate Dunwoodie-Shore Road 345kV (#Y50) for l/o SCB:SPBK(RNS2):Y49&M29&Y49_ST
	11/25/2018	23	NYCA DNI Ramp Limit
	11/25/2018	23	Derate Dunwoodie-Shore Road 345kV (#Y50) for l/o SPRNBRK_-EGRDNCTR_345_Y49
	11/25/2018	4	IESO_AC-NY Scheduling Limit
	11/25/2018	23	NE_AC DNI Ramp Limit
	11/29/2018	17	NYCA DNI Ramp Limit
	11/29/2018	4	IESO_AC-NY Scheduling Limit
	11/29/2018	7	NE_AC-NY Scheduling Limit
	11/29/2018	8	PJM_AC DNI Ramp Limit
	11/29/2018	6,17	Lake Erie Circulation, DAM-RTM exceeds +/-125MW; Niagara-Packard

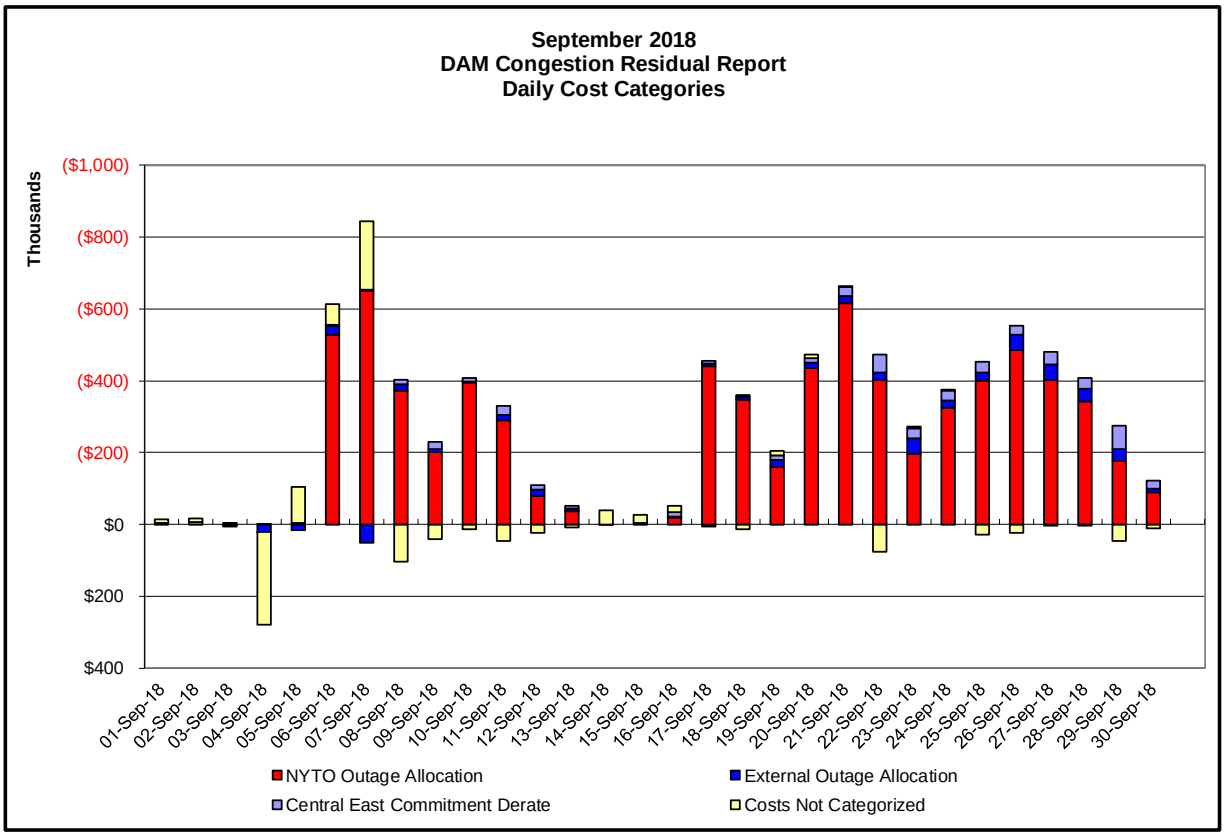
Real-Time Balancing Market Congestion Residual (Uplift Cost) Categories

Category	*Cost Assignment*	*Events Types*	*Event Examples*
Storm Watch	**Zone J**	**Thunderstorm Alert (TSA)**	**TSA Activations**
Unscheduled Transmission Outage	**Market-wide**	**Reduction in DAM to RTM transfers related to unscheduled transmission outage**	**Forced Line Outage, Unit AVR Outages**
Interface Derate - NYISO Security	**Market-wide**	**Reduction in DAM to RTM transfers not related to transmission outage**	**Interface Derates due to RTM voltages**
Interface Derate - External Security	**Market-wide**	**Reduction 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

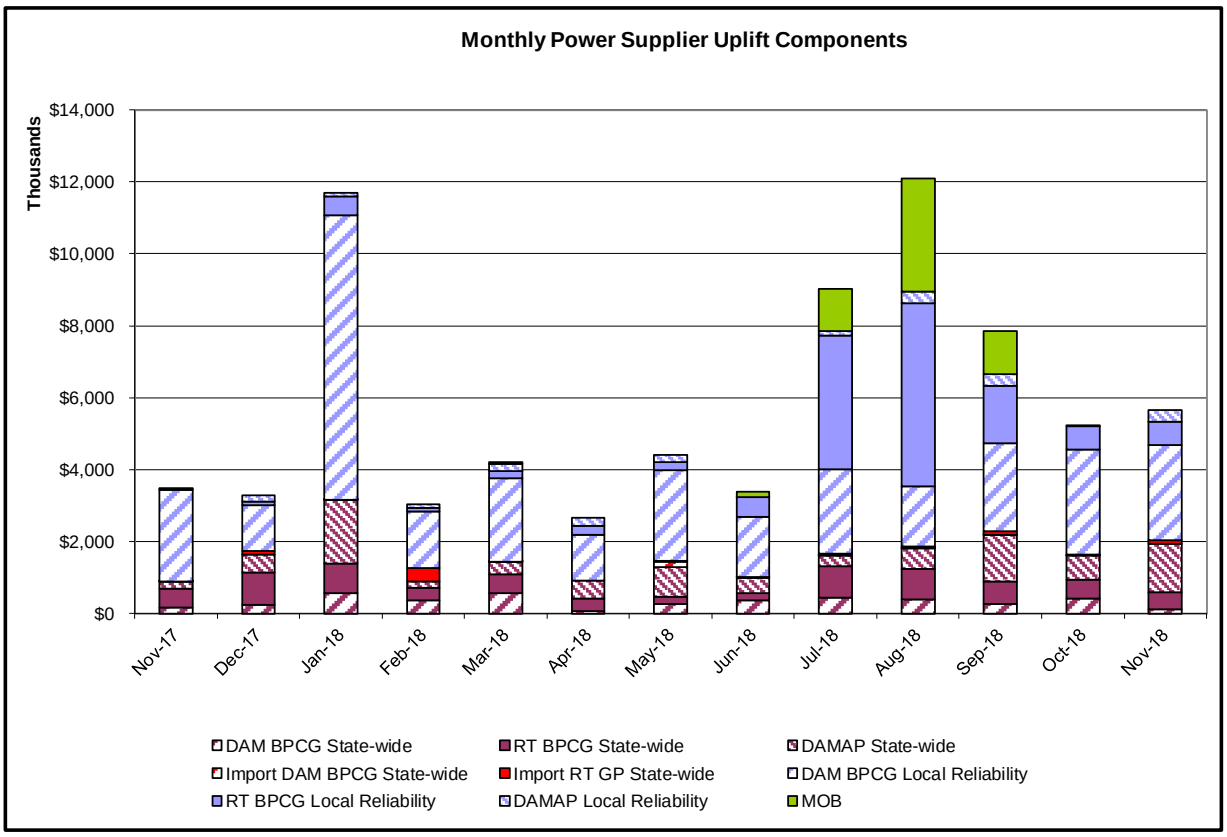
1) Storm Watch Costs are identified as daily total uplift costs
2) Days with a value of BMCR less M2M Settlement of $100K/HR, shortfall of $200K/Day or more, or surplus of $100K/Day or more are investigated.
3) Uplift costs associated with multiple event types are apportioned equally by hour

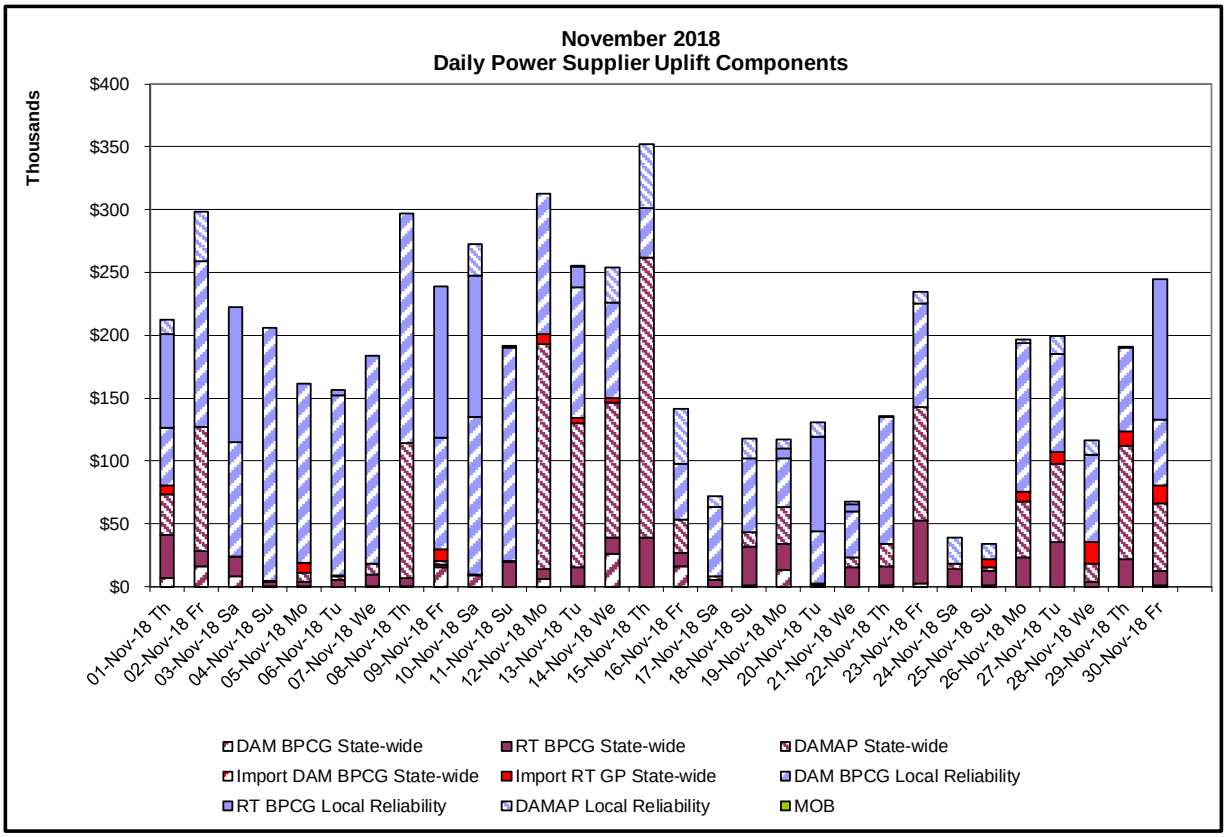

DAM Congestion Residual Report
Monthly Cost Categories
Thousands
($20,000)
($15,000)
($10,000)
($5,000)
$0
$5,000
$10,000
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
NYTO Outage Allocation
External Outage Allocation
Central East Commitment Derate
Costs Not Categorized

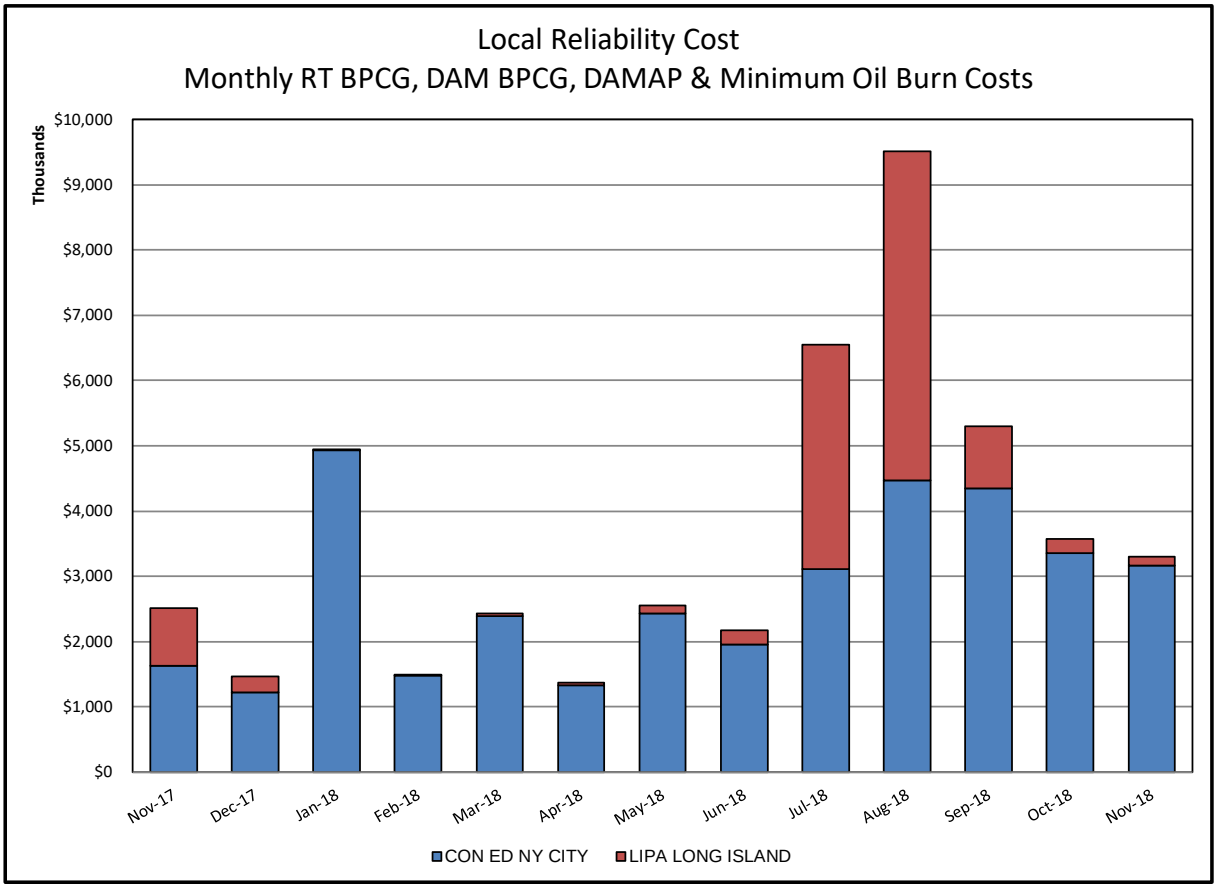

September 2018
DAM Congestion Residual Report
Daily Cost Categories
Thousands
($1,000)
($800)
($600)
($400)
($200)
$0
$200
$400
01-Sep-18
02-Sep-18
03-Sep-18
04-Sep-18
05-Sep-18
06-Sep-18
07-Sep-18
08-Sep-18
09-Sep-18
10-Sep-18
11-Sep-18
12-Sep-18
13-Sep-18
14-Sep-18
15-Sep-18
16-Sep-18
17-Sep-18
18-Sep-18
19-Sep-18
20-Sep-18
21-Sep-18
22-Sep-18
23-Sep-18
24-Sep-18
25-Sep-18
26-Sep-18
27-Sep-18
28-Sep-18
29-Sep-18
30-Sep-18
NYTO Outage Allocation
External Outage Allocation
Central East Commitment Derate
Costs Not Categorized

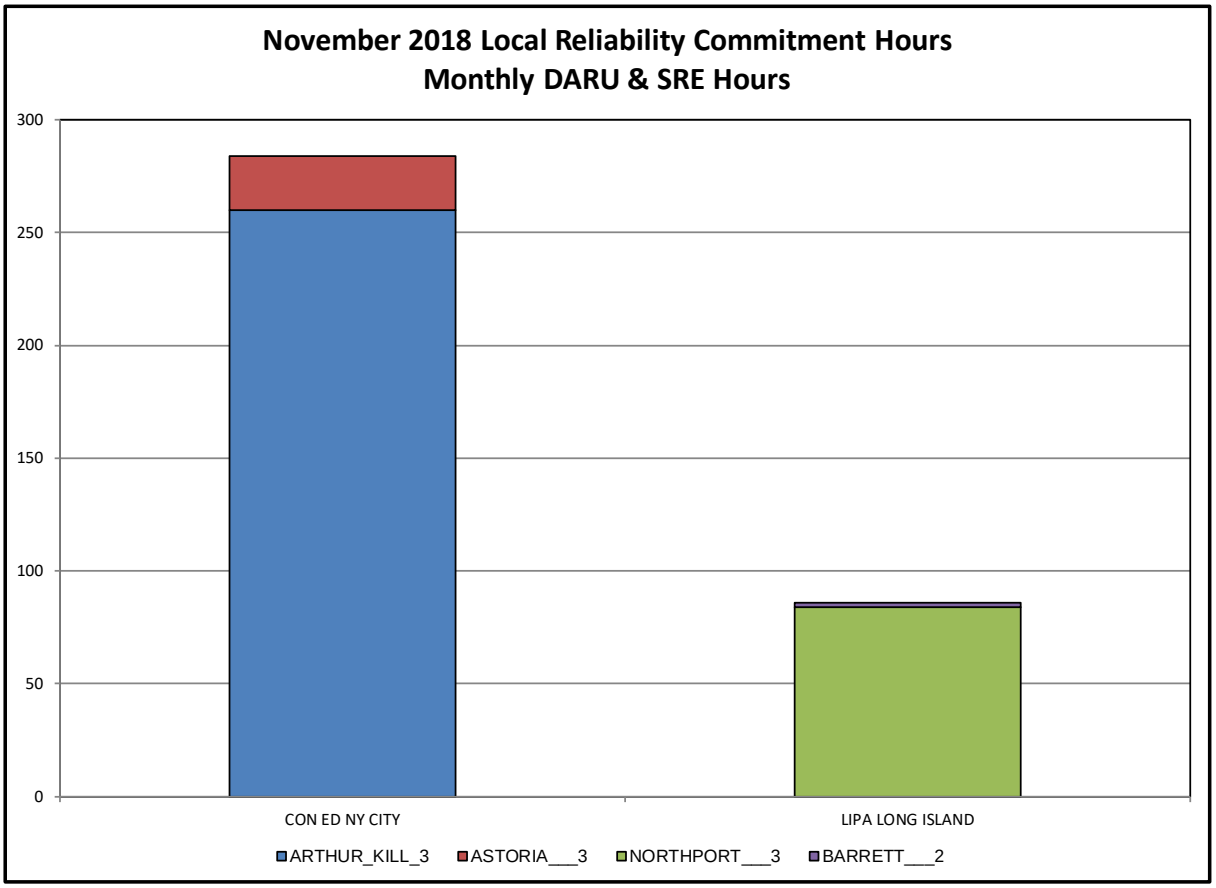
Day-Ahead Market Congestion Residual Categories

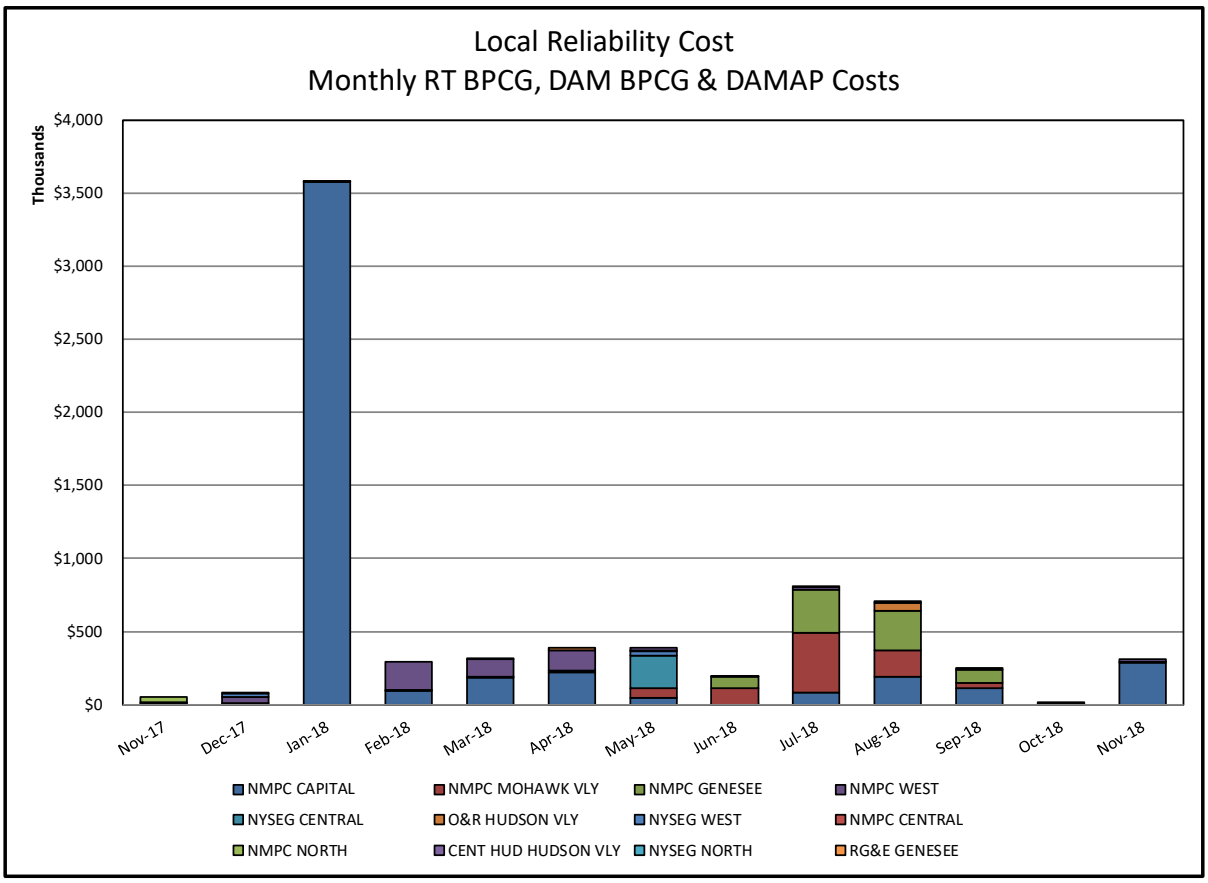
Category	*Cost Assignment*	*Events Types*	*Event Examples*
NYTO Outage Allocation	Responsible TO	Direct allocation to NYTO's responsible for transmission equipment status change.	DAM scheduled outage for equipment modeled in-service for the TCC Auction.
External Outage Allocation	All TO by Monthly Allocation Factor	Direct allocation to transmission equipment status change caused by change in status of external equipment.	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.	

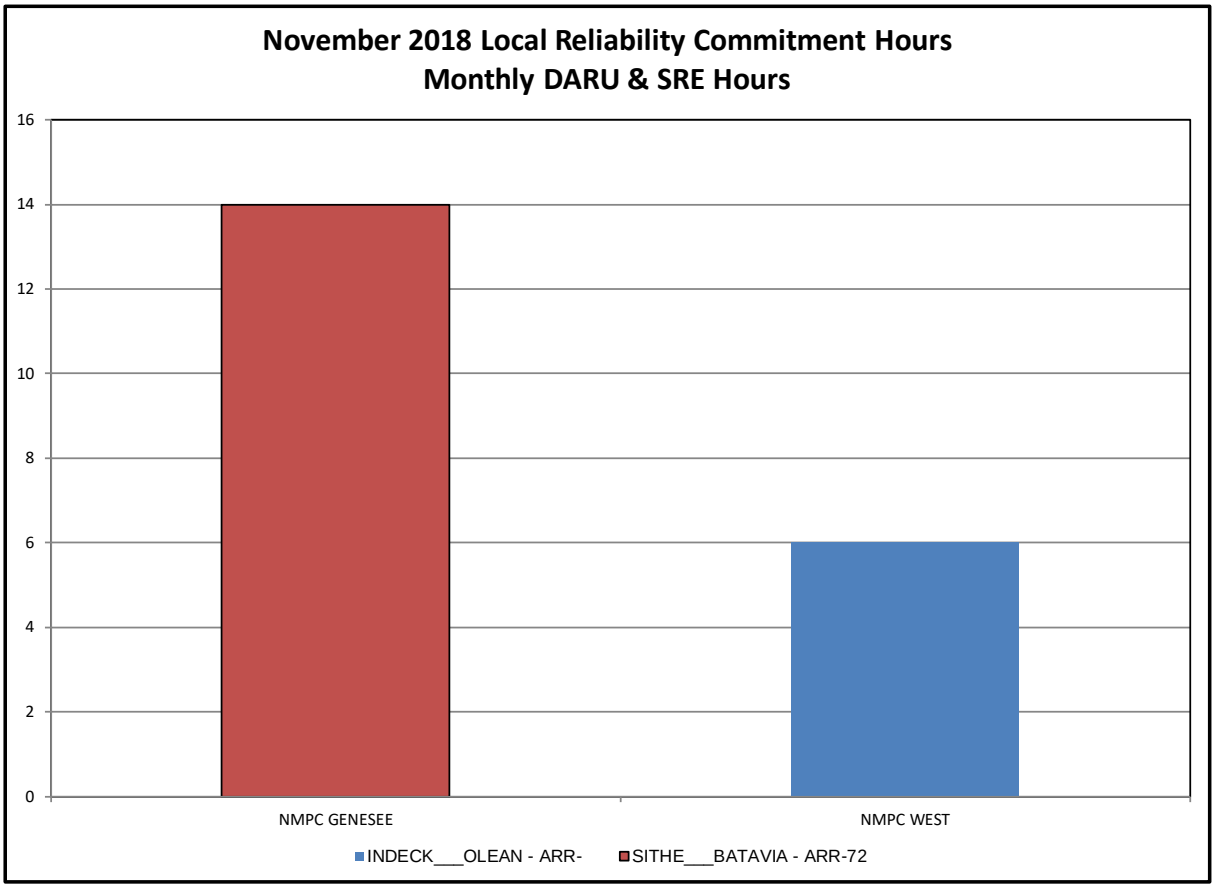

Monthly Power Supplier Uplift Components
Thousands
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$0
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
DAM BPCG State-wide
RT BPCG State-wide
DAMAP State-wide
Import DAM BPCG State-wide
Import RT GP State-wide
DAM BPCG Local Reliability
RT BPCG Local Reliability
DAMAP Local Reliability
MOB

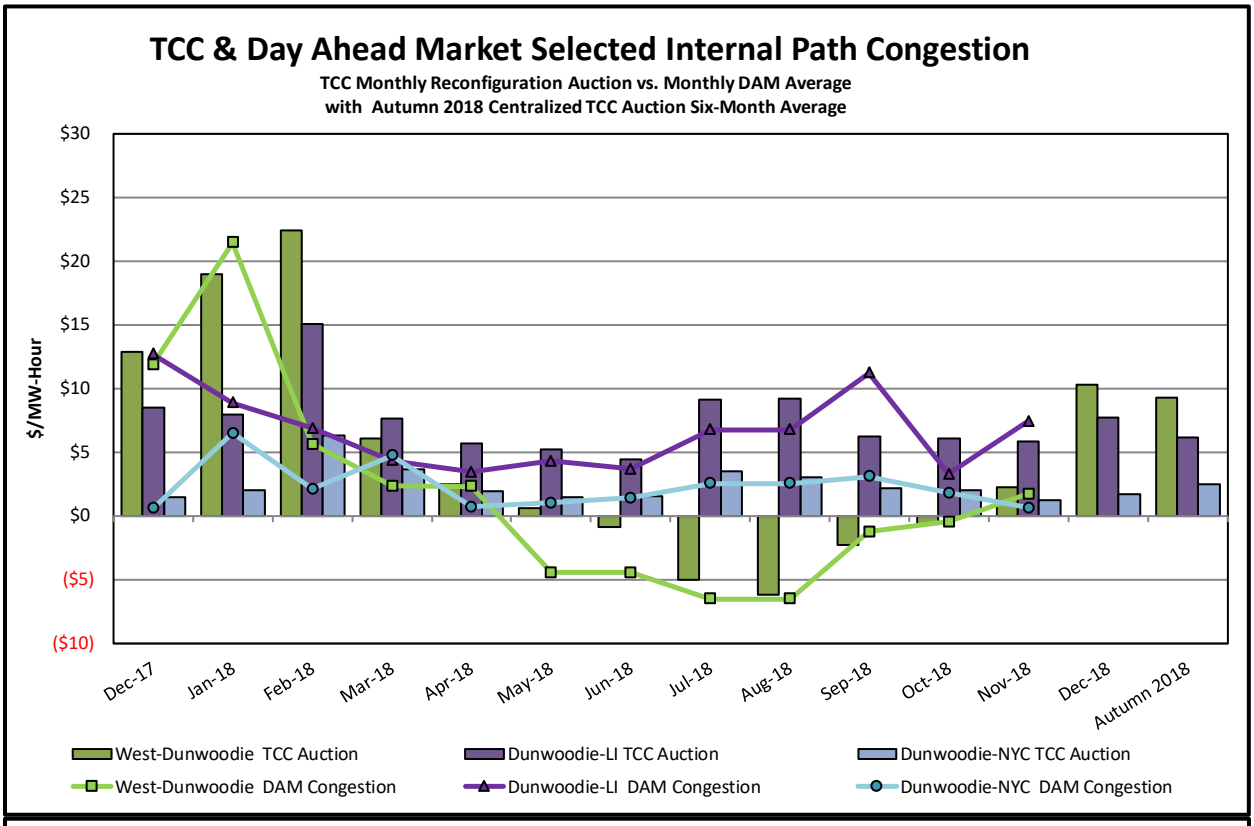

November 2018
Daily Power Supplier Uplift Components
Thousands
$400
$350
$300
$250
$200
$150
$100
$50
$0
01-Nov-18 Th
02-Nov-18 Fr
03-Nov-18 Sa
04-Nov-18 Su
05-Nov-18 Mo
06-Nov-18 Tu
07-Nov-18 We
08-Nov-18 Th
09-Nov-18 Fr
10-Nov-18 Sa
11-Nov-18 Su
12-Nov-18 Mo
13-Nov-18 Tu
14-Nov-18 We
15-Nov-18 Th
16-Nov-18 Fr
17-Nov-18 Sa
18-Nov-18 Su
19-Nov-18 Mo
20-Nov-18 Tu
21-Nov-18 We
22-Nov-18 Th
23-Nov-18 Fr
24-Nov-18 Sa
25-Nov-18 Su
26-Nov-18 Mo
27-Nov-18 Tu
28-Nov-18 We
29-Nov-18 Th
30-Nov-18 Fr
DAM BPCG State-wide
RT BPCG State-wide
DAMAP State-wide
Import DAM BPCG State-wide
Import RT GP State-wide
DAM BPCG Local Reliability
RT BPCG Local Reliability
DAMAP Local Reliability
MOB

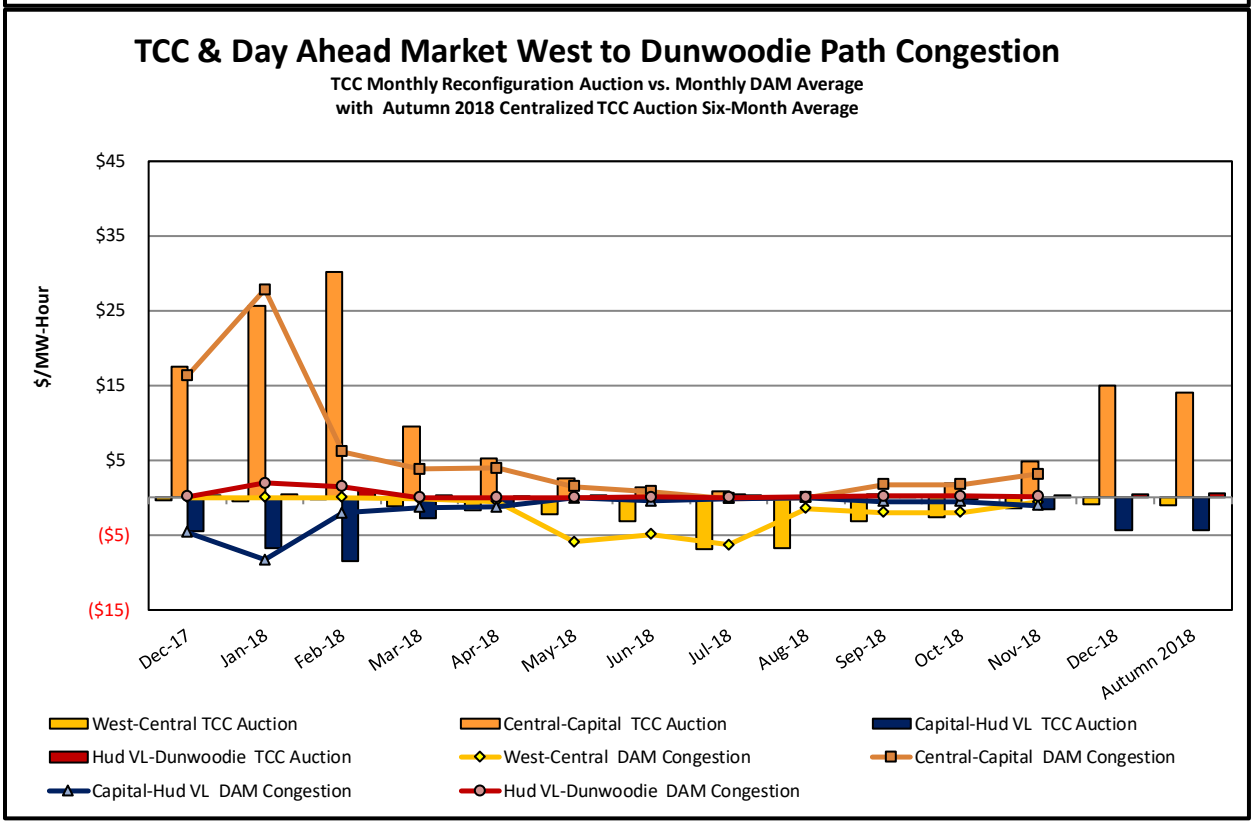

Local Reliability Cost
Monthly RT BPCG, DAM BPCG, DAMAP & Minimum Oil Burn Costs
Thousands
$10,000
$9,000
$8,000
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
CON ED NY CITY
LIPA LONG ISLAND

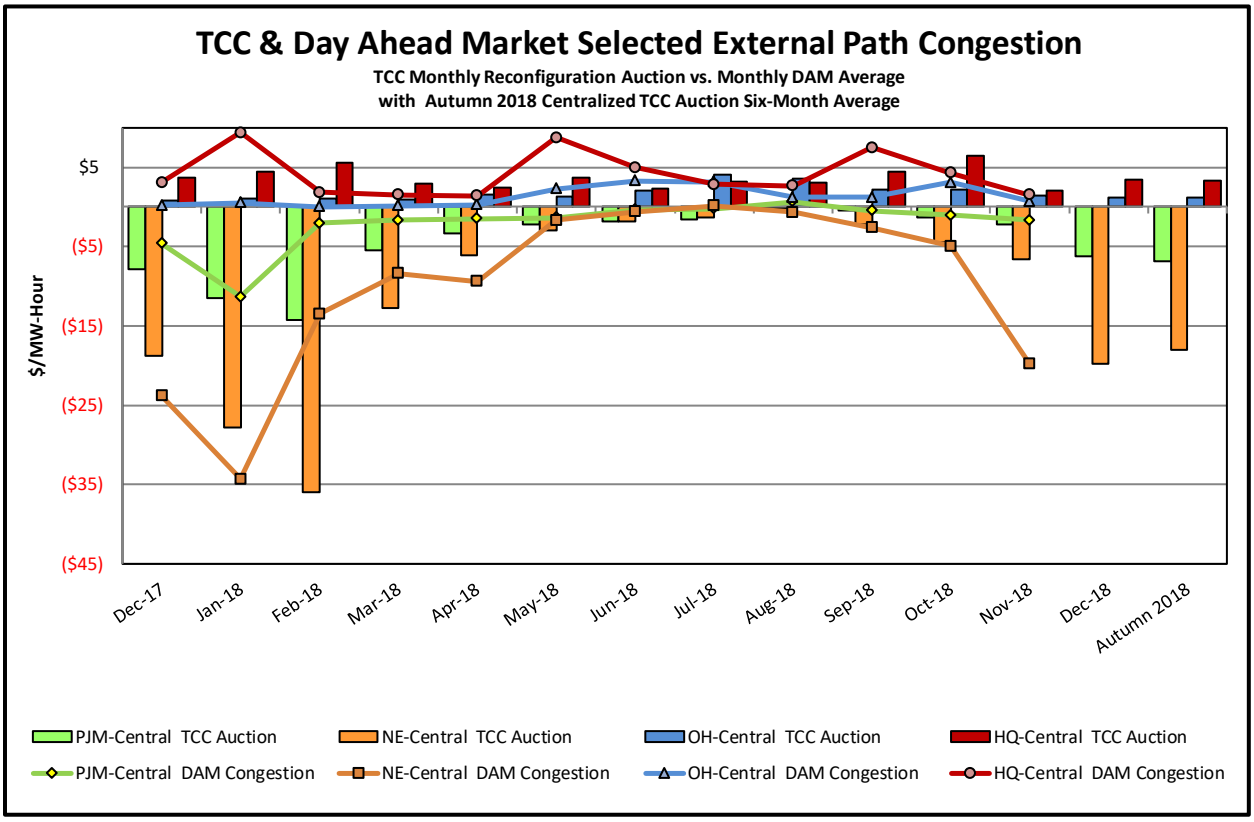

November 2018 Local Reliability Commitment Hours
Monthly DARU & SRE Hours
300
250
200
150
100
50
0
CON ED NY CITY
LIPA LONG ISLAND
ARTHUR_KILL_3
ASTORIA___3
NORTHPORT___3
BARRETT___2

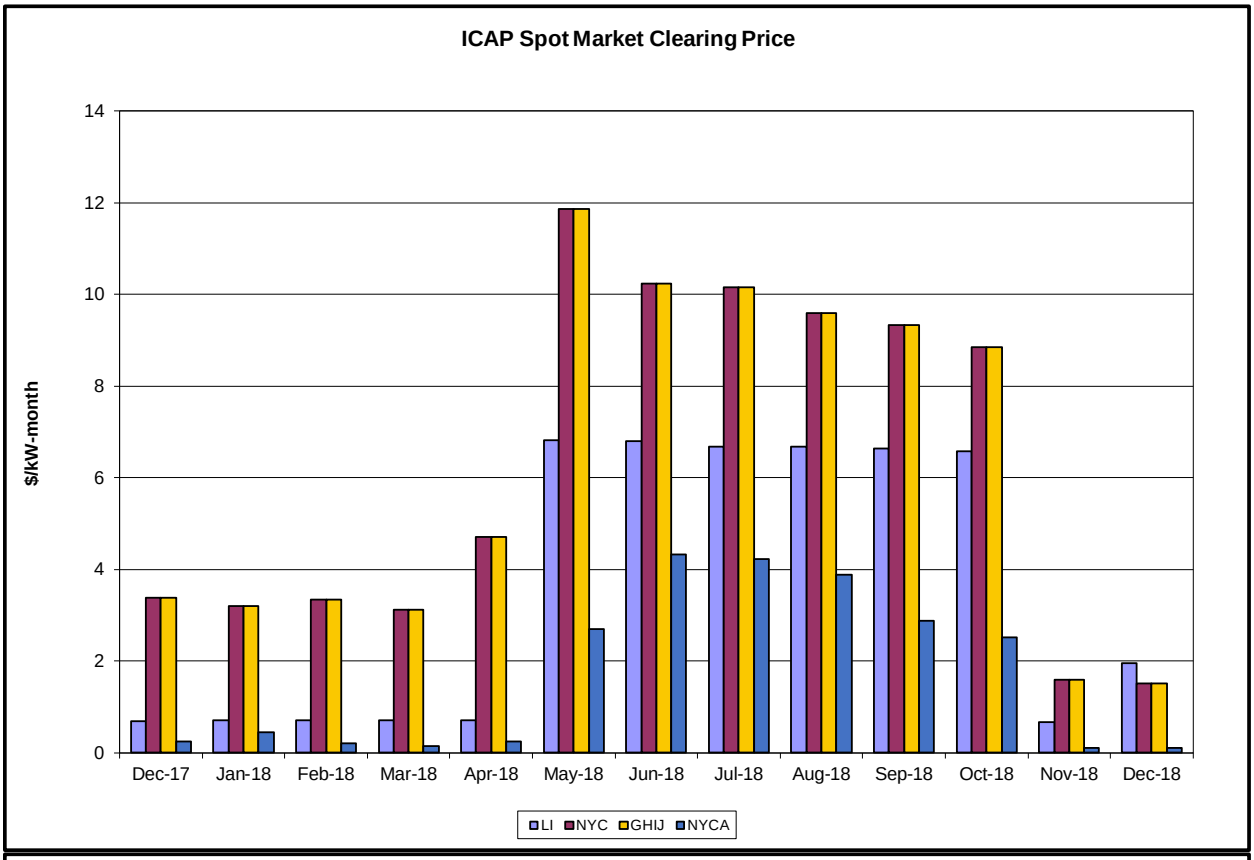

Local Reliability Cost
Monthly RT BPCG, DAM BPCG & DAMAP Costs
Thousands
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
NMPC CAPITAL
NMPC MOHAWK VLY
NMPC GENESEE
NMPC WEST
NYSEG CENTRAL
O&R HUDSON VLY
NYSEG WEST
NMPC CENTRAL
NMPC NORTH
CENT HUD HUDSON VLY
NYSEG NORTH
RG&E GENESEE

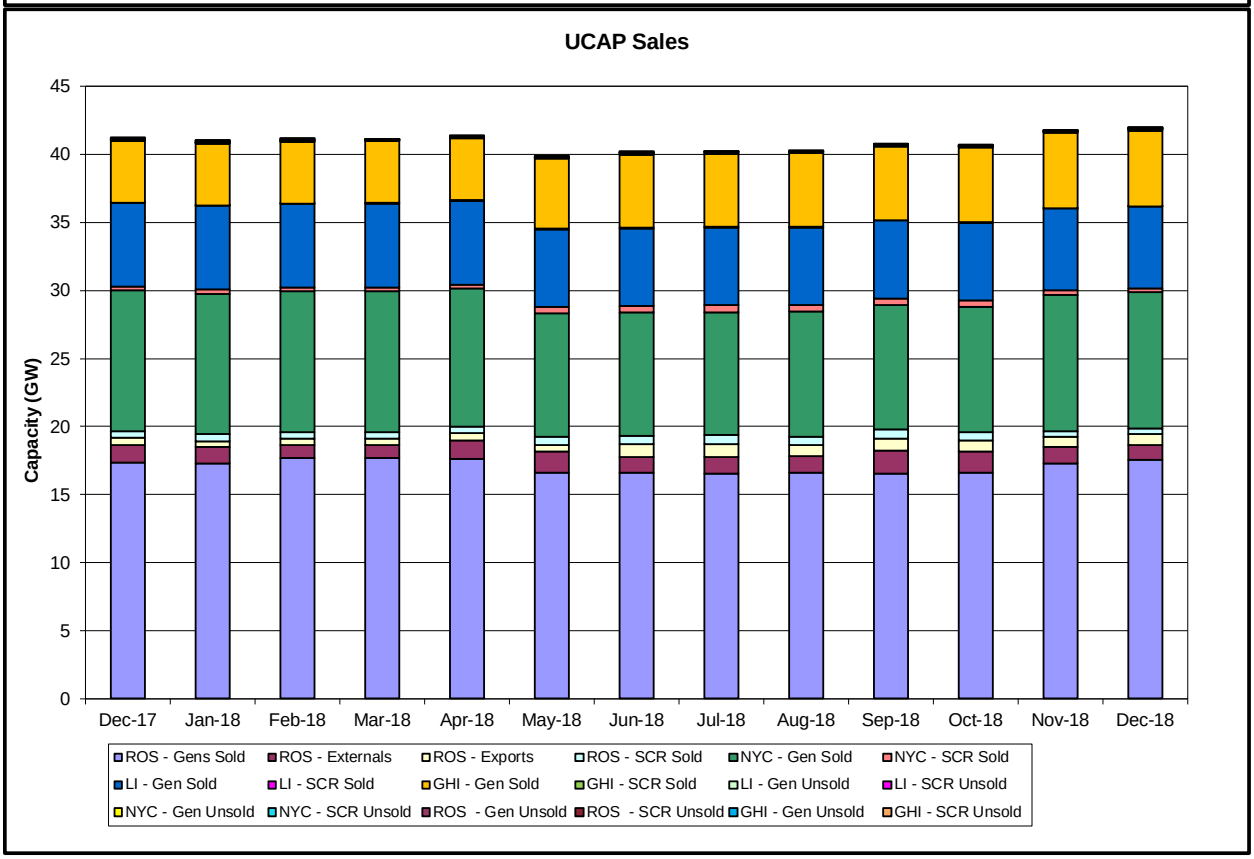

November 2018 Local Reliability Commitment Hours
Monthly DARU & SRE Hours
16
14
12
10
8
6
4
2
0
NMPC GENESEE
NMPC WEST
INDECK___OLEAN - ARR-
SITHE___BATAVIA - ARR-72


TCC & Day Ahead Market Selected Internal Path Congestion
TCC Monthly Reconfiguration Auction vs. Monthly DAM Average
with Autumn 2018 Centralized TCC Auction Six-Month Average
$/MW-Hour
$30
$25
$20
$15
$10
$5
$0
($5)
($10)
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Autumn 2018
West-Dunwoodie TCC Auction
Dunwoodie-LI TCC Auction
Dunwoodie-NYC TCC Auction
West-Dunwoodie DAM Congestion
Dunwoodie-LI DAM Congestion
Dunwoodie-NYC DAM Congestion


TCC & Day Ahead Market West to Dunwoodie Path Congestion
TCC Monthly Reconfiguration Auction vs. Monthly DAM Average
with Autumn 2018 Centralized TCC Auction Six-Month Average
$/MW-Hour
$45
$35
$25
$15
$5
($5)
($15)
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Autumn 2018
West-Central TCC Auction
Central-Capital TCC Auction
Capital-Hud VL TCC Auction
Hud VL-Dunwoodie TCC Auction
West-Central DAM Congestion
Central-Capital DAM Congestion
Capital-Hud VL DAM Congestion
Hud VL-Dunwoodie DAM Congestion


TCC & Day Ahead Market Selected External Path Congestion
TCC Monthly Reconfiguration Auction vs. Monthly DAM Average
with Autumn 2018 Centralized TCC Auction Six-Month Average
$/MW-Hour
$5
($5)
($15)
($25)
($35)
($45)
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Autumn 2018
PJM-Central TCC Auction
NE-Central TCC Auction
OH-Central TCC Auction
HQ-Central TCC Auction
PJM-Central DAM Congestion
NE-Central DAM Congestion
OH-Central DAM Congestion
HQ-Central DAM Congestion


ICAP Spot Market Clearing Price
$/kW-month
14
12
10
8
6
4
2
0
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
LI
NYC
GHIJ
NYCA


UCAP Sales
Capacity (GW)
45
40
35
30
25
20
15
10
5
0
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
ROS - Gens Sold
ROS - Externals
ROS - Exports
ROS - SCR Sold
NYC - Gen Sold
NYC - SCR Sold
LI - Gen Sold
LI - SCR Sold
GHI - Gen Sold
GHI - SCR Sold
LI - Gen Unsold
LI - SCR Unsold
NYC - Gen Unsold
NYC - SCR Unsold
ROS - Gen Unsold
ROS - SCR Unsold
GHI - Gen Unsold
GHI - SCR Unsold