

NYCA IRM Requirement Study 2023-2024 Preliminary Base Case (PBC) Model Assumptions Matrix

Draft V 1.1

NYSRC

Installed Capacity Subcommittee Meeting #261

June 1, 2022

Load Forecast

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
1	Peak Load Forecast (Preliminary Base Case – Parametric & Sensitivities)	2021 Gold Book NYCA: 32,308 MW ² NYC: 11,286 MW LI: 5,192 MW G-J: 15,453 MW (Attachment A1)	2022 Gold Book NYCA: 32,018 MW ¹ NYC: 11,001 MW LI: 5,031 MW G-J: 15,223 MW (Attachment A1)			
2	Peak Load Forecast (Final Base Case)	October 2021 Fcst. NYCA: 32,139 MW ² NYC: 10,944 MW LI: 5,159 MW G-J: 15,171 MW				
3	Load Shape (Multiple Load Shape)	Bin 1: 2006 Bin 2: 2002 Bins 3-7: 2007	Bin 1: 2006 Bin 2: 2002 Bins 3-7: 2007			
4	Load Forecast Uncertainty (LFU)-	Zonal Model to reflect current data with input from Con Ed and LIPA. (Attachment A2)	Zonal Model to reflect current data with input from Con Ed and LIPA. (Attachment A2)			
5	LFU Winter	Attachment A3	Attachment A3			

1 The loads associated with the BTM-NG program need to be added to these values

2 BTM-NG loads have been incorporated into these numbers.

Generation Parameters

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
6	Existing Generating Unit Capacities	2021 Gold Book Values. Use min. (DMNC vs. CRIS) capacity value	2022 Gold Book Values. Use min. (DMNC vs. CRIS) capacity value			
7	Proposed New Units (Thermal) and re-ratings	111.2 MW of new Thermal resources	0 MW of new Thermal resources, (Attachment B1)			
8	Deactivations and Removals ³	19.1 MW of unit deactivations	1,266.5 MW unit deactivations (Attachment B2)			
9	Forced and Partial Outage Rates	Five-year (2016-2020) GADS data for each unit represented. Those units with less than five years – use representative data. (Attachment C)	Five-year (2017-2021) GADS data for each unit represented. Those units with less than five years – use representative data. (Attachment C)			
10	Planned Outages	Based on schedules received by the NYISO and adjusted for history	Based on schedules received by the NYISO and adjusted for history			

Generation Parameters

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
11	Summer Maintenance	Nominal 50 MWs – divided equally between Zones J and K				
12	Combustion Turbine Derates	Derate based on temperature correction curves provided	Derate based on temperature correction curves provided			
13	Existing and Proposed New Wind Units ⁴	158.1 MW of Wind Capacity additions totaling 2017.5 MW of qualifying wind	317.5 MW of Wind Capacity additions totaling 2335.0 MW of qualifying wind (Attachment B3)			
14	Wind Shape	Actual hourly plant output over the period 2016-2020. New units will use zonal hourly averages or nearby units.	Actual hourly plant output over the period 2017-2021. New units will use zonal hourly averages or nearby units			
15	Existing and Proposed New Solar Resources ⁴	182.9 MW of Solar Capacity additions totaling 214.4 MW of qualifying Solar Capacity.	0 MW of Solar Capacity additions totaling 214.4 MW of qualifying Solar Capacity. (Attachment B3)			
16	Solar Shape	Actual hourly plant output over the period 2016-2020. New units will use zonal hourly averages or nearby units.	Actual hourly plant output over the period 2017-2021. New units will use zonal hourly averages or nearby units.			

Generation Parameters

#inimal	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
17	BTM- NG Program	One new BTM NG resource (Attachment B5)	No new BTM NG resources, for 161.6 MW (Attachment B5)			
18	Small Hydro Resources	Actual hourly plant output over the period 2016-2020.	Actual hourly plant output over the period 2017-2021.			
19	Large Hydro	Probabilistic Model based on five years of GADS data (2016-2020)	Probabilistic Model based on five years of GADS data (2017-2021)			
20	Landfill Gas	Actual hourly plant output over the period 2016-2020.	Actual hourly plant output over the period 2017-2021.			
21	New ESR (Energy Storage Resources) ⁴	0 MW of new battery storage scheduled. 0 MW of total battery storage modeled	0 MW of new battery storage scheduled. 0 MW of total battery storage modeled (see attachment B4)			
22	Energy Limited Resources (ELR)	Based upon elections made by August 1 st 2021	Based upon elections made by August 1 st 2022			

Transactions- Imports and Exports

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
23	Capacity Purchases	Existing Rights: PJM - 1,080 MW HQ - 1,190 MW All contracts modeled as equivalent contracts.	Existing Rights: PJM - 1,080 MW HQ - 1,190 MW All contracts modeled as equivalent contracts.			
24	Capacity Sales	Long Term firm sales Summer 265.9 MW	Long Term firm sales Summer __MW			
25	FCM Sales from a Locality ³	No sales modeled within study period				
26	Wheels through NYCA	300 MW HQ to NE equivalent contract	300 MW HQ to NE equivalent contract			
27	New UDRs (Unforced capacity Deliverability Rights)	Projects with expired CRIS will be modeled as Emergency Assistance Only: HTP	Projects with expired CRIS will be modeled as Emergency Assistance ____			
28	New EDRs (External Deliverability Rights)	80 MWs for 2021 Study	__ MWs for 2022 Study			

³ Final FCM sales that will materialize are unknowable at the time of the IRM study. To reflect the impact these sales have on reliability, the NYISO applies a Locality Exchange Factor in the market.

Topology

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
29	Interface Limits	Revisions due to Western NY Public Policy impacts, Central East derate, Cedars upgrade, ConEd-LIPA dynamic limit, Neptune derate (Attachment E-E3)	Central East forward and Group limit updates due to AC Transmission Segment A, Neptune no longer derated unless further delay in return to full service, UPNY-ConED series reactors in service, West Central Reverse uprate External transfer limits update			
30	New Transmission	Cedars External to Rest of State Capacity Deliverability Rights from HQ				
31	AC Cable Forced Outage Rates	All existing Cable EFORds for NYC and LI to reflect most recent five-year history (2016-2020) (Attachment E4)	All existing Cable EFORds for NYC and LI to reflect most recent five-year history (2017-2021) (Attachment E4)			
32	UDR Line Unavailability	Five year history of forced outages (2016-2020)	Five year history of forced outages (2017-2021)			

Emergency Operating Procedures

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
33	Special Case Resources	July 2021 –1164 MW based on registrations and modeled as 812 MW of effective capacity. Monthly variation based on historical experience.				
34	Other EOPs	863.6 MW of non-SCR/non-EDRP resources (Attachment D)	350 MW of 10-min Operating Reserve maintained at Load Shedding, __MW of non-SCR/non-EDRP resources			
35	EOP Structure	10 EOP steps modeled	10 EOP steps modeled			

External Control Areas

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
36	PJM	Load and Capacity data will be provided by ISONE/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 (Attachment E)	Load and Capacity data will be provided by ISONE/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 (Attachment E)			
37	ISONE, Quebec, IESO	Load and Capacity data will be provided by ISONE/NPCC CP-8 Data adjusted per NYSRC Policy 5 (Attachment E)	Load and Capacity data will be provided by ISONE/NPCC CP-8 Data adjusted per NYSRC Policy 5 (Attachment E)			
38	External Adjustments per Policy 5	If needed, add load to externals proportional to existing excess capacity	If needed, add load to externals proportional to existing excess capacity			
39	Reserve Sharing	All NPCC Control Areas indicate that they will initially share reserves equally among all members and then among non-members	All NPCC Control Areas indicate that they will initially share reserves equally among all members and then among non-members			
40	Emergency Assistance	Statewide Limit of 3,500 MW of emergency assistance allowed from neighbors.	Statewide Limit of 3,500 MW of emergency assistance allowed from neighbors.			

Miscellaneous

#	Parameter	2022 Model Assumptions	2023 Model Assumptions	Basis for Recommendation	Model Change	Est. IRM Impact
41	MARS Model Version	4.2.1765	4.7.1889			
42	Environmental Initiatives	No new rules for 2022 Capability Year				

Attachment A1

NYCA Summer Load Forecast Coincident and Non-Coincident Peak:
2022 PBC and FBC

2022 FBC													
Area	A	B	C	D	E	F	G	H	I	J	K	NYCA	G_J
NCP - Forecast	2918	2112.1	2881.2	668.1	1425.1	2419.8	2256.2	634.4	1408.9	10943.7	5158.5		
CP - Forecast	2764.2	2047.2	2814.8	655.7	1366.1	2381.7	2219.3	625.9	1390	10796.9	5076.8	32138.6	
G-J Peak - Forecast							2243.1	632.6	1404.9	10890.5			15171.1

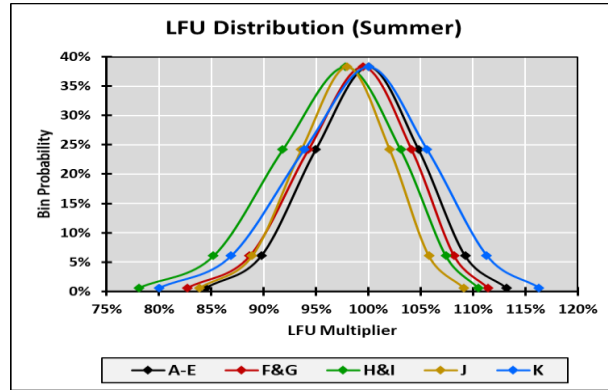
2023 PBC													
Area	A	B	C	D	E	F	G	H	I	J	K	NYCA	G_J

Delta													
Area	A	B	C	D	E	F	G	H	I	J	K	NYCA	G_J
NCP - Forecast													
CP - Forecast													
G-J Peak - Forecast													

Attachment A2

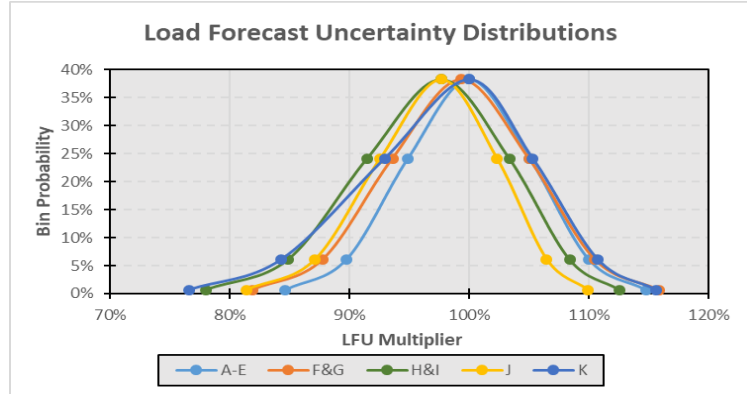
NYCA Summer Load Forecast Uncertainty Model: 2023 and 2022

Load Forecast 2023



Bin	Bin z	Bin Probability	A-E	F&G	H&I	J	K
Bin 1	2.74	0.62%	113.18%	111.42%	110.50%	109.10%	116.30%
Bin 2	1.79	6.06%	109.25%	108.20%	107.41%	105.78%	111.32%
Bin 3	0.89	24.17%	104.80%	104.14%	103.08%	102.05%	105.60%
Bin 4	0.00	38.29%	100.00%	99.46%	97.82%	97.98%	100.00%
Bin 5	-0.89	24.17%	94.96%	94.28%	91.83%	93.60%	93.87%
Bin 6	-1.79	6.06%	89.75%	88.67%	85.21%	88.90%	86.89%
Bin 7	-2.74	0.62%	84.49%	82.72%	78.09%	83.89%	80.04%

Load Forecast 2022



Bin	Probability	A-E	F&G	H&I	J	K
B1	0.62%	114.78%	115.85%	112.55%	109.95%	115.63%
B2	6.06%	110.01%	110.53%	108.40%	106.49%	110.73%
B3	24.17%	105.06%	105.01%	103.36%	102.33%	105.30%
B4	38.30%	100.00%	99.36%	97.68%	97.67%	100.00%
B5	24.17%	94.88%	93.61%	91.50%	92.58%	92.96%
B6	6.06%	89.73%	87.77%	84.89%	87.13%	84.32%
B7	0.62%	84.63%	81.88%	77.98%	81.38%	76.60%
Delta		A-E	F&G	H&I	J	K
B1 -B4		14.78%	16.49%	14.87%	12.28%	15.63%
B4 - B7		15.37%	17.48%	19.70%	16.29%	23.40%
Total Range		30.15%	33.97%	34.57%	28.57%	39.03%

Attachment A3

NYCA Winter Load Forecast Uncertainty Model: 2023

Bin	Bin z	Bin Probability	NYCA
Bin 1	2.74	0.62%	110.29%
Bin 2	1.79	6.06%	106.26%
Bin 3	0.89	24.17%	102.65%
Bin 4	0.00	38.29%	99.37%
Bin 5	-0.89	24.17%	96.32%
Bin 6	-1.79	6.06%	93.46%
Bin 7	-2.74	0.62%	90.74%

Attachment B1

New Thermal Units and Unit Re-Ratings

New Thermal Units and Unit Re-ratings (summer ratings)					
Project or Generator Name	Zone	2022 Gold Book (MW) CRIS	2022 Gold Book (MW) DMNC	New or Incremental (MW)	2023 MARS Model (MW)
New Units					
Total New Units and Upgrades (MW)					

Attachment B2

Deactivations and Removals

Unit Removal since 2022-2023 IRM Study				
Generator Name	Type	Zone		SUMMER CRIS (MW)
Ravenswood 01	GT	J		8.8
Ravenswood 11	GT	J		20.2
Allegheny Cogen	CC	B		62.9
Nassua Energy Corp.	CC	K		51.6
Sithe Sterling	CC	B		57.4
Gowanus 1-1	GT	J		19.1
Gowanus 1-2	GT	J		17.1
Gowanus 1-3	GT	J		17.2
Gowanus 1-4	GT	J		17.1
Gowanus 1-5	GT	J		16.5
Gowanus 1-6	GT	J		18
Gowanus 1-7	GT	J		17.6
Gowanus 4-1	GT	J		16.8
Gowanus 4-2	GT	J		17.3
Gowanus 4-3	GT	J		17.6
Gowanus 4-4	GT	J		17.1
Gowanus 4-5	GT	J		17.1
Gowanus 4-6	GT	J		18.6
Gowanus 4-7	GT	J		16.6
Gowanus 4-8	GT	J		19

Continued on next slide

Attachment B2 continued

Astoria GT 2-1	GT	J	41.2
Astoria GT 2-2	GT	J	42.4
Astoria GT 2-3	GT	J	41.2
Astoria GT 2-4	GT	J	41
Astoria GT 3-1	GT	J	41.2
Astoria GT 3-2	GT	J	43.5
Astoria GT 3-3	GT	J	43
Astoria GT 3-4	GT	J	43
Astoria GT 4-1	GT	J	42.6
Astoria GT 4-2	GT	J	41.4
Astoria GT 4-3	GT	J	41.1
Astoria GT 4-4	GT	J	42.8
Coxsackie GT	GT	G	21.6
South Cairo	GT	G	19.8
74 St. GT 1 & 2	GT	J	39.1
Astoria GT 01	GT	J	15.7
Hudson Ave 3	GT	J	16
Hudson Ave 5	GT	J	15.1
Ravenswood 01	GT	J	21.2
NorthPort GT	GT	K	13.8
Port Jefferson GT 01	GT	K	14.1
Shoreham 1	GT	K	48.9
Shoreham 2	GT	K	18.5
Glenwood GT 03	GT	K	54.7
Total Removals			1,266.5

Attachment B3

New Intermittent Resources

New Intermittent Units				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	MARS Modeled Capacity
Wind				
Eight Point Wind Energy Center	C	101.8	101.8	101.8
Number 3 Wind Energy Center	E	103.9	103.9	103.9
Bluestone Wind	E	111.8	111.8	111.8
Total Wind				317.5
Solar				
Total Solar				

Attachment B4

New Energy Storage Resources

Energy Storage				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	Lesser of Summer Capability VS CRIS
New Battery Units				
Total New Energy Storage				

Attachment B5

Resources in the Behind the Meter Net Generation Program (BTM-NG)

Attachment B5 -Units in the Behind the Meter Net Generation Program*			
Generator Name	Zone	Resource Value (MW) ⁴	Peak Load Adjustment (MW) ⁵
Existing:			
Stony Brook	K	42.3	41.1
Greenidge 4	C	101.8	41.5
Lyons Falls Hydro	E	0.0	2.0
(CONFIDENTIAL)***	J		23.6
Red Rochester	B	78.6	53.4
Total BTM-NG			161.6

*The IRM study independently models the generation and load components of BTM:NG Resources.

⁴ Based on adjusted Dependable Maximum Gross Capability (DMGC) value.

⁵ Based on Average Coincident Host Load (ACHL).

*** One existing resource in Zone J is expected to begin participating in the BTM:NG program in Summer 2022

Attachment C

NYCA Five Year Derating Factors

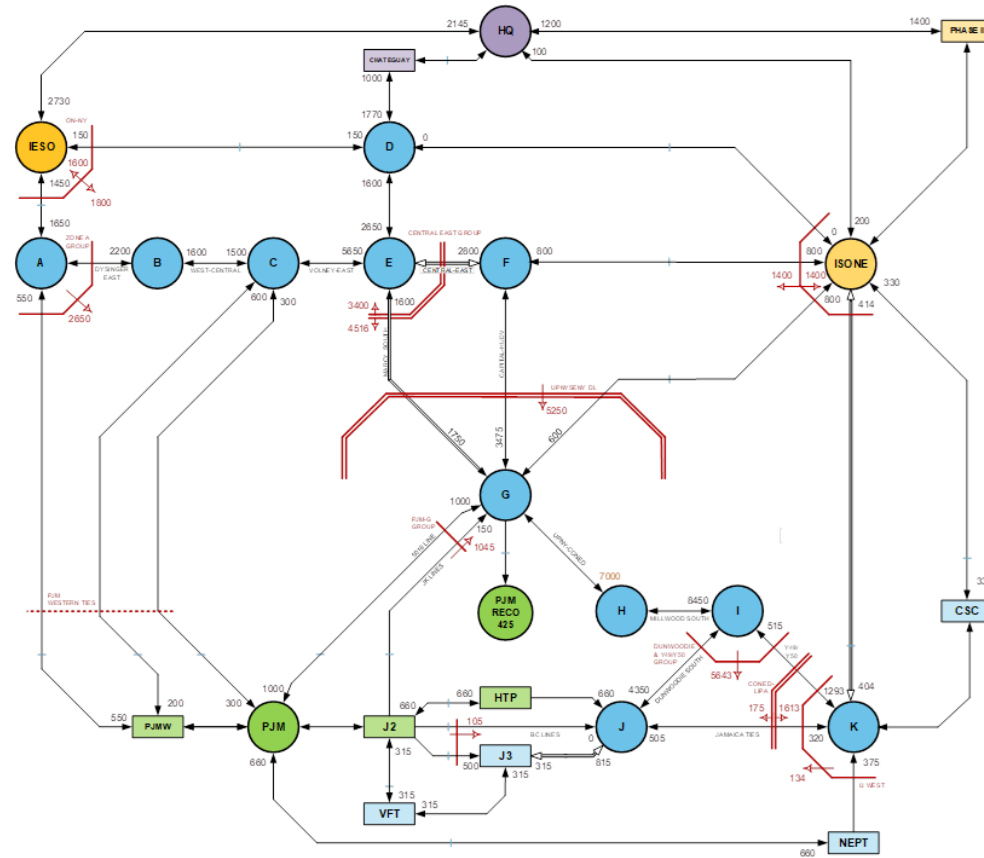
Attachment D

Emergency Operating Procedures

Step	Procedure	2022 IRM MW Value	2023 IRM MW Value
1	Special Case Resources –Load, Gen	1,164 MW Enrolled/ 812 MW modeled	
2	5% manual voltage Reduction	60.43 MW	
3	Thirty-minute reserve to zero	655 MW	
4	5% remote voltage reduction	483.09 MW	
5	Voluntary industrial curtailment	240.05 MW	
6	General Public Appeals	80 MW	
7	Emergency Purchases	Varies	
8	Ten-minute reserves to zero	1,310 MW	960 MW (350 MW maintained at load shedding)
9	Customer disconnections	As needed	
10	Adjustment used if IRM is lower than technical study margin	As needed	

Attachment E1

IRM Topology



Notes

1. PJM to NY emergency assistance (EA) assumption for calculating the PJM-NY Western ties, PJM-G Group, and ABC Line Group flow distribution limit: 1,500 MW
2. NYCA EA simultaneous import limit: 3,500 MW
3. External areas representation based upon information received from the NPCC CP-8 WG

Legend

- ↔ Interface
 - Unidirectional Interface
 - ↔ Interface w/ Dynamic Ratings
 - Interface Group
 - Interface Group w/ Dynamic Ratings
 - Monitoring Interface Group
 - NYCA EA Interface Group Marker
 - xx "Dummy Bubble" i.e. no load
- NOTE: An interface is considered to not have a MW limitation if no number is specified

Attachment E2

ISO-NE 14 Bubble Model

Attachment E3

PJM Bubble Model

85

Attachment E4

5 Year Average Cable Outage Rate	
2017-21	2016-20
	6.42%

The facilities included in these averages are VFT, HTP, Dunwoodie-South, Y49/Y50, CSC, Neptune, Norwalk-Northport and A-Line.

Attachment F

SCR Determinations 2022 and 2023 IRM Studies

SCR Performance for 2022 IRM Study						
Super Zones	Enrollments (July 2021)	Forecast (2022) ⁶	Performance Factor ⁷	UCAP (2022)	Adjustment Factor ⁸	Model Value
A-F	636.0	636.0	0.866	550.9	0.949	522.4
G-I	84.9	84.9	0.772	65.5	0.846	55.5
J	406.5	406.5	0.701	284.9	0.746	212.4
K	36.8	36.8	0.735	27.0	0.822	22.2
Totals	1164.2	1164.2		928.4		812.5
					Overall Performance = 69.8%	

6. These values represent no growth from July 2020 ICAP based enrollments.

7. Performance Factor based on ACL methodology.

8. The SCR Adjustment factor captures two different performance derates; 1) Calculated Translation Factor (TF) between ACL and CBL values, and the Fatigue Factor (FF=1.00).

To be updated for 2023

Attachment G

Wind Units Modeled

Wind				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	MARS Modeled Capability**
Bliss Wind Power [WT]	A	100.5	100.5	100.5
Canandaigua Wind Power [WT]	C	125.0	125.0	125.0
High Sheldon Wind Farm [WT]	C	112.5	118.1	112.5
Howard Wind [WT]	C	57.4	55.4	55.4
Orangeville Wind Farm [WT]	C	94.4	93.9	93.9
Wethersfield Wind Power [WT]	C	126.0	126.0	126.0
Altona Wind Power [WT]	D	97.5	97.5	97.5
Chateaugay Wind Power [WT]	D	106.5	106.5	106.5
Clinton Wind Power [WT]	D	100.5	100.5	100.5
Ellenburg Wind Power [WT]	D	81.0	81.0	81.0
Jericho Rise Wind Farm [WT]	D	77.7	77.7	77.7
Marble River Wind [WT]	D	215.2	215.2	215.2
Hardscrabble Wind [WT]	E	74.0	74.0	74.0
Madison Wind Power [WT]	E	11.5	11.6	11.5
Maple Ridge Wind [WT01]	E	231.0	231.0	231.0
Maple Ridge Wind [WT02]	E	90.7	90.8	90.7
Munnsville Wind Power [WT]	E	34.5	34.5	34.5
Cassadaga Wind [WT]	A	126.0	126.5	126.0
Arkwright Summit Wind Farm [WT]*	A	78.4	78.4	78.4
Roaring Brook [WT]	E	79.7	79.7	79.7
Total		2020.0	2023.8	2017.5

**This is an existing resource that became an ICAP supplier.

Draft

To be updated for 2023

Attachment G1

Wind Units Not Currently Participating in ICAP Market

Wind					
Resource	Zone	Nameplate (MW)	CRIS (MW)	Summer Capability (MW)	MARS Modeled Capacity
Erie Wind [WT]	A	15.0	0.0	0.0	0.0
Steel Wind [WT]	A	20.0	0.0	0.0	0.0
Western NY Wind Power [WT]	B	6.6	0.0	0.0	0.0
Marsh Hill Wind Farm [WT]	C	16.2	0.0	0.0	0.0
Copenhagen Wind [WT]	E	79.9	79.9	0.0	0.0
Fenner Wind [WT]	C	30.0	0.0	0.0	0.0
Total		167.7	79.9	0.0	0.0

Attachment G2

Solar Units Modeled

Solar				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	Lesser of Summer Capability vs. CRIS
Long Island Solar Farm [PV]	K	31.5	31.5	31.5
Calverton Solar Energy Center [PV]	K	22.9	22.9	22.9
Total		54.4	54.4	54.4

Attachment G3

Solar Units Not Modeled

Solar				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	Lesser of Summer Capability vs. CRIS
Shoreham Solar [PV]*	K	24.9	0.0	0.0
Total		24.9	0.0	0.0

*Unit provides power at the distribution rather than at the transmission level.

To be updated for 2023

Attachment G4

LFG Units Modeled

LFG				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	Lesser of Summer Capability VS CRIS
CHAFEE [IC]	A	6.4	6.4	6.4
Model City Energy LFGE [IC]	A	5.6	5.6	5.6
Modern LFGE [IC]	A	6.4	6.4	6.4
Hyland LFGE [IC]	B	4.8	4.8	4.8
Mill Seat [IC]	B	6.4	6.4	6.4
Broome 2 [IC]	C	2.0	2.0	2.0
Broome LFGE [IC]	C	2.1	2.1	2.1
High Acres Group [IC] (23767)	C	9.6	9.6	9.6
Ontario LFGE [IC]	C	11.2	11.2	11.2
Seneca Energy Group [IC] (23797)	C	17.6	17.6	17.6
Clinton LFGE [IC]	D	6.4	6.4	6.4
DANC LFGE [IC]	E	6.4	6.4	6.4
Madison County LFGE [IC]	E	1.6	1.6	1.6
Oneida-Herkimer LFGE [IC]	E	3.2	3.2	3.2
Colonie LFGTE [IC]	F	6.4	6.4	6.4
Fulton County Landfill [IC]	F	3.2	3.2	3.2
Totals		99.3	99.3	99.3

Attachment G5

LFG Units Not Modeled

LFG				
Resource	Zone	CRIS (MW)	Summer Capability (MW)	Lesser of Summer Capability VS CRIS
Albany LFGE	F	4.5	5.6	4.5
Total		4.5	5.6	4.5

Assumption Matrix History

Date	Ver	Preliminary Base Case	Date	Ver	Final Base Case
2/2/22	V0.0	Preliminary assumptions without attachments.			
5/4/22	V1.0	Preliminary assumptions without attachments.			