

Updating and Extending the 2019 CARIS Database for Specific Project Evaluation

Jason L. Frasier & Chen Yang

Economic Planning

Business Issues Committee (BIC)

Wednesday January 13th, 2021

Agenda

- **Background**
- **Timeline**
- **Phase 2 Input Assumptions**
- **Business Issues Committee Discussion and Conceptual Approval**
- **Next Steps**

2020 CARIS Phase 2

- **NYISO must update and extend the CARIS Phase 1 database for Phase 2 studies**
 - Economic Planning Process Manual, Section 3.1
 - 2019 CARIS Phase 1 Base Case (2019-2028)
 - 2020 CARIS Phase 2 updates and extends through 2038 for a total of 20-year (2019-2038) study period
- **CARIS Phase 2 Base Case to be utilized in evaluation of specific Regulated Economic Transmission Projects (RETP)**
 - Also available for use in optional Additional CARIS Studies

Timeline

■ Study Kickoff

- August 20th ESPWG - Kickoff Presentation

■ Database Development

- September 24th ESPWG - Assumptions Review
- October 5th TPAS – Follow up Assumptions Review

■ Review of Results

- October 23rd ESPWG – Manual Change Review
- December 1st TPAS/ESPGW – Preliminary Results
- December 11th ESPWG – Final Results

■ Final CARIS Phase 2 Database

- Discussion and conceptual approval at January BIC
- “Additional CARIS Study” and “Specific Project” studies available using the 2020 CARIS Phase 2 database

2020 CARIS Phase 2 Input Assumptions

2020 CARIS Phase 2 Assumptions

- Base Case assumptions presented at ESPWG on September 24th, 2020 ([link](#))
- Update on Representative System presented at ESPWG on October 23rd, 2020 ([link](#))
- Appendix provides detailed Phase 2 database results

NYCA Generation Key Updates

- Modeled status changes represented in compliance plans submitted under the DEC Peaker Rule

Units	No. of Units	Capacity (MW)	Zone	MAY 2023 - SEP 2023	OCT 2023 - APR 2024	MAY 2024 - SEP 2024	OCT 2024 - APR 2025	MAY 2025 - SEP 2025	OCT 2025 - APR 2026
Coxsackie GT	1	23.7	G	O/S	O/S	O/S	O/S	O/S	O/S
South Cairo	1	23.4	G	O/S	O/S	O/S	O/S	O/S	O/S
Astoria GT1	1	18.9	J	I/S	I/S	I/S	I/S	O/S	I/S
Gowanus 1&4 (1-1 through 1-8, and 4-1 through 4-8)	15	336.3	J	O/S	I/S	O/S	I/S	O/S	I/S
Gowanus 2&3 (2-1 through 2-8 and 3-1 through 3-8)	16	371.8	J	I/S	I/S	I/S	I/S	O/S	I/S
Narrows 1&2 (1-1 through 1-8, and 2-1 through 2-8)	16	382.5	J	I/S	I/S	I/S	I/S	O/S	I/S
Ravenswood GTs (01, 10, 11)	3	54.5	J	O/S	O/S	O/S	O/S	O/S	O/S
Arthur Kill GT1	1	15.1	J	I/S	I/S	I/S	I/S	O/S	O/S
Astoria GTs (2-1 through 2-4, 3-1 through 3-4, 4-1 through 4-4)	12	545.6	J	O/S	O/S	O/S	O/S	O/S	O/S
Con Ed 59th St	1	21.6	J	I/S	I/S	I/S	I/S	O/S	O/S
Con Ed 74th St	2	41.1	J	O/S	O/S	O/S	O/S	O/S	O/S
Con Ed Hudson Ave 3	1	19.5	J	O/S	O/S	O/S	O/S	O/S	O/S
Con Ed Hudson Ave 5	1	19	J	O/S	O/S	O/S	O/S	O/S	O/S
Glenwood GT1	1	13.5	K	O/S	O/S	O/S	O/S	O/S	O/S
Northport GT	1	11.8	K	O/S	O/S	O/S	O/S	O/S	O/S
Port Jefferson GT1	1	15.2	K	O/S	O/S	O/S	O/S	O/S	O/S

The service pattern in the last two columns repeats in subsequent years of the CARIS Study Period

NYCA Network Model Assumption

- Leeds Hurley SDU in-service Summer 2021*
- Cedar Rapids Transmission Upgrade in October 2021
- L33P (Ontario PAR) out of service until January 2022, and then modeled back in-service
- Empire State Line Project/Western New York Public Policy Need selected project modeled in-service January 2022*
- Selected AC Transmission Public Policy Projects modeled in-service January 2024*

*Date adjusted due to software limitation, and does not reflect actual in-service date

2020 RNA Reliability Needs

Study Year	Bulk Facilities			Non-Bulk Facilities	
	Resource Adequacy (Zone J, MW)	Transmission Loading (Zone J, MW)	Dynamic Instability (Zone J, MVA)	ConEdison Astoria East/Corona 138 kV (MW)	ConEdison Greenwood/Fox Hills 138 kV (MW)
2024	below criterion	below criterion	490	115	below criterion
2025	below criterion	700	1,020	110	360
2026	below criterion	760	1,080	115	350
2027	100	820	1,140	120	360
2028	150	900	1,210	125	360
2029	300	990	1,300	170	370
2030	350	1,075	1,390	180	370

Source: 2020 RNA Report

Representative System Buildout

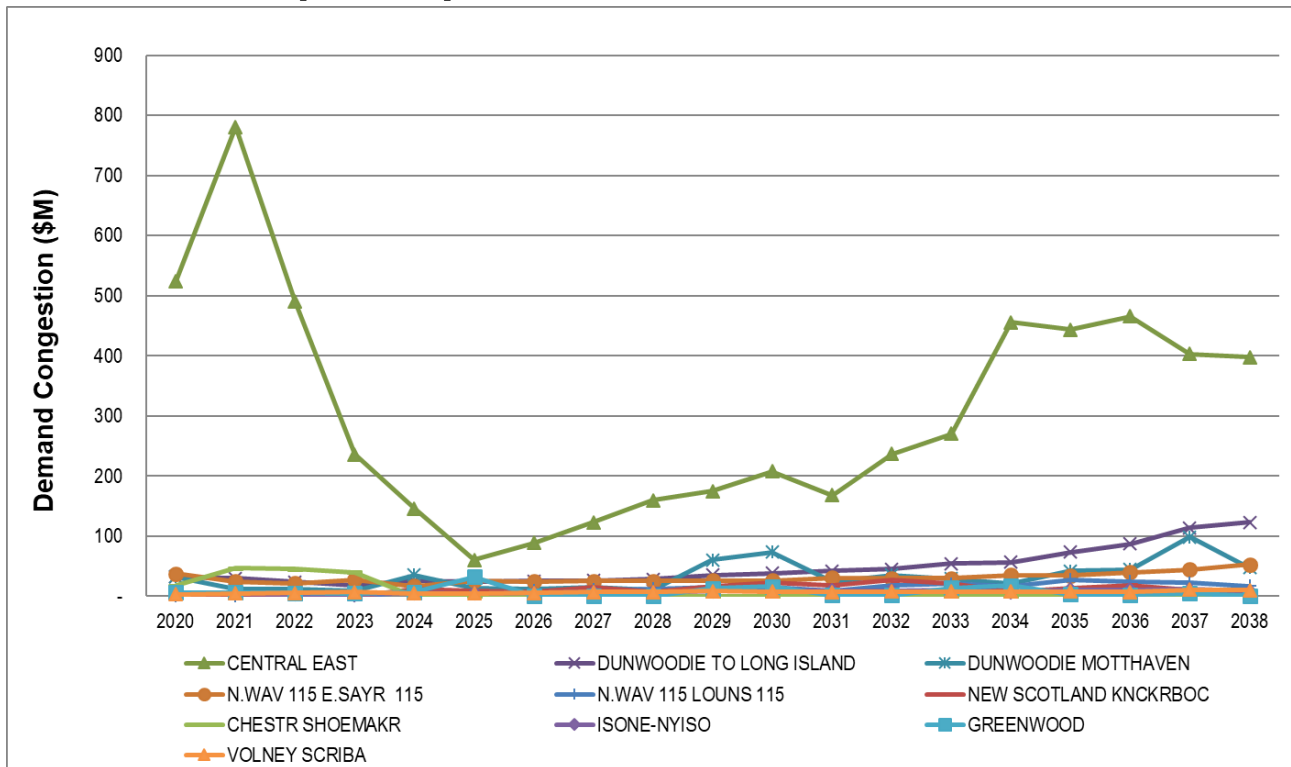
Year	Representative System Buildout (Zone/MW)			
	G	J	K	Total
2020				
2021				
2022				
2023				
2024				
2025		360 @ Astoria 360 @ Gowanus		720
2026		360 @ Gowanus		360
2027				
2028				
2029				
2030				

- Build-out is for transmission security needs
- 1x0 GE 7HA.02 reserve proxy unit from latest NYISO Demand Curve Reset Report
- ICAP (MW) reported

Projected Demand Congestion by Constraint (\$M)

Demand Congestion (\$M)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
CENTRAL EAST	524	781	490	236	146	60	89	123	159	175	208	168	236	270	455	443	466	403	398
DUNWOODIE TO LONG ISLAND	32	30	24	18	25	24	25	26	28	35	38	42	46	54	57	74	87	114	123
DUNWOODIE MOTTHAVEN	32	13	11	9	36	13	12	15	11	61	74	24	35	29	20	42	45	98	47
N.WAV 115 E.SAYR 115	37	25	21	27	17	26	25	25	25	26	26	31	30	30	36	34	40	45	53
N.WAV 115 LOUNS 115	1	1	2	0	7	4	9	11	12	15	15	9	18	20	17	28	25	22	17
NEW SCOTLAND KNCKRBOC	-	-	-	-	13	9	7	15	8	16	22	19	27	21	8	13	19	11	7
CHESTR SHOEMAKR	18	47	45	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ISONE-NYISO	4	5	3	3	6	5	5	7	6	9	10	9	10	11	7	10	11	12	9
GREENWOOD	6	6	5	5	7	32	1	1	0	13	16	2	2	14	18	4	2	4	1
VOLNEY SCRIBA	3	4	6	7	5	5	5	7	7	9	8	7	8	8	8	8	7	11	10

Projected Demand Congestion by Constraint (\$M)



Next Steps

Next Steps

- **NYISO reviewed with ESPWG CARIS Phase 2 model assumptions and updates from CARIS Phase 1**
 - Comments received and addressed
- **CARIS Manual requires BIC's review and comment on updated and extended CARIS Phase 2 database**
 - Provides potential project beneficiaries timely access to Base Case assumptions and model results
 - Any subsequent updates to CARIS Phase 2 Base Case would be brought back to ESPWG and BIC for further review
- **No governance action is required by BIC**
- **2020 CARIS Phase 2 database available for:**
 - Any Specific Transmission Project proposals
 - Additional CARIS Studies

Questions?

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system



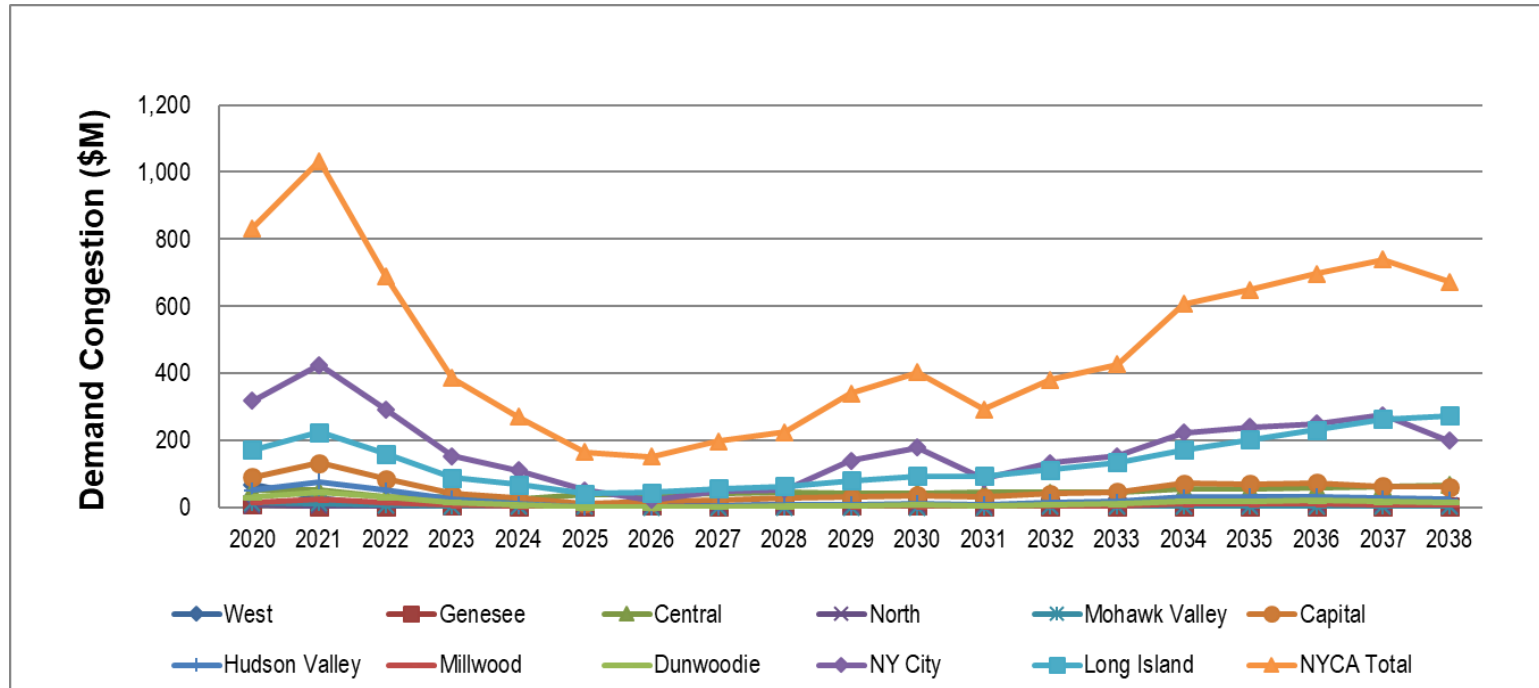
Appendix

2020 CARIS Phase 2 Base Case Final Results

Projected Demand Congestion by Zone (\$M)

Demand Congestion (\$M)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
West	69	27	5	8	2	5	8	5	8	8	7	5	4	0	5	2	0	1	3
Genesee	11	3	2	6	2	5	6	4	6	6	6	5	4	2	5	2	3	2	5
Central	52	52	32	31	27	38	41	41	44	44	44	44	46	44	55	55	58	63	67
North	7	7	5	4	6	6	7	7	7	8	8	8	8	8	8	9	10	9	8
Mohawk Valley	14	13	7	4	2	2	2	1	1	1	1	1	2	2	5	5	5	4	5
Capital	91	134	86	41	29	14	17	23	28	32	37	31	41	47	73	71	74	64	62
Hudson Valley	52	77	52	26	12	1	1	5	7	10	13	9	15	18	31	32	34	28	25
Millwood	16	24	16	8	4	0	1	2	2	4	5	3	5	6	11	11	12	10	9
Dunwoodie	32	46	31	16	7	0	1	3	4	6	9	6	10	11	19	20	21	18	15
NY City	318	424	293	154	111	52	24	49	54	141	179	86	133	153	223	240	251	277	200
Long Island	172	225	160	89	69	42	46	57	63	81	94	94	113	135	172	202	231	263	274
NYCA Total	833	1,034	691	387	270	165	152	198	226	340	404	293	382	427	607	650	698	740	673

Projected Demand Congestion by Zone (\$M)

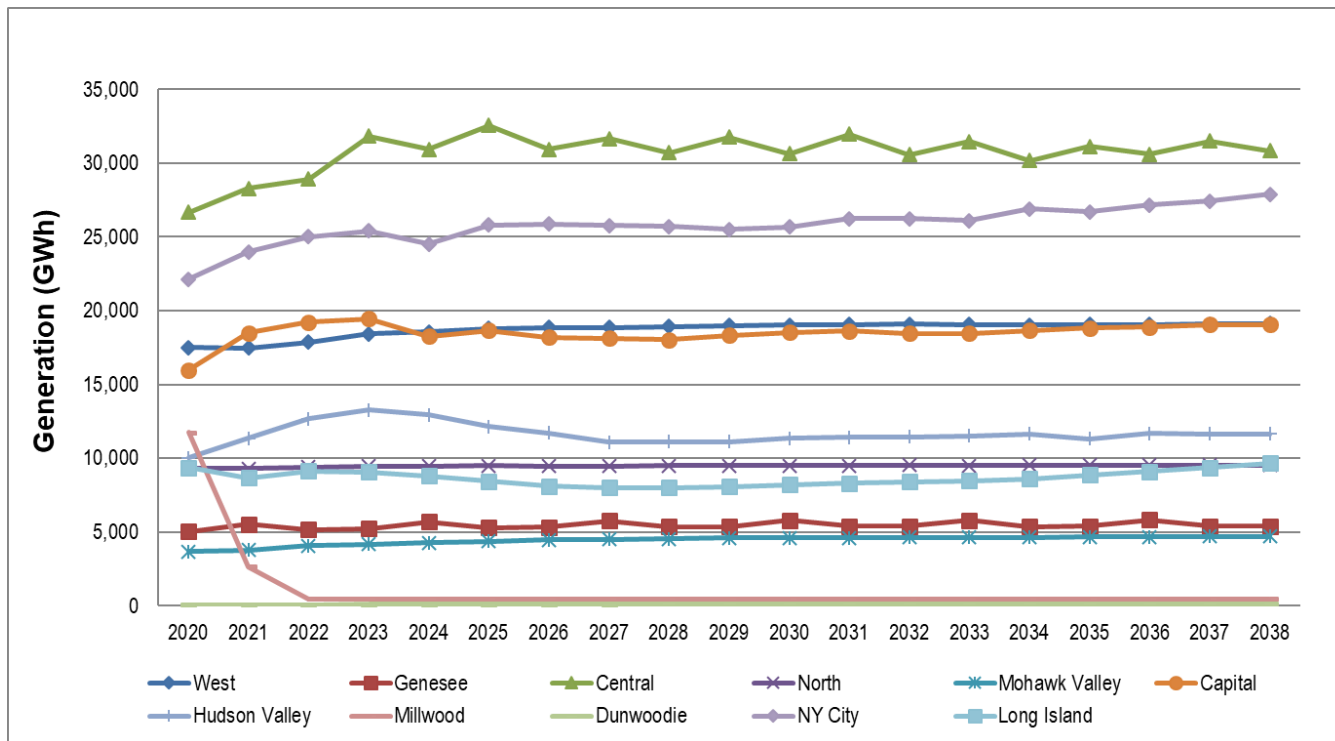


Projected Generation (GWh)

Generation (GWh)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
West	17,485	17,451	17,878	18,443	18,574	18,803	18,868	18,850	18,907	18,998	19,010	19,065	19,075	19,044	19,021	19,065	19,051	19,078	19,116
Genesee	5,020	5,513	5,144	5,217	5,695	5,297	5,314	5,766	5,370	5,354	5,798	5,375	5,404	5,804	5,371	5,378	5,828	5,390	5,404
Central	26,653	28,282	28,917	31,832	30,946	32,564	30,928	31,671	30,701	31,757	30,634	31,969	30,580	31,449	30,180	31,143	30,603	31,488	30,828
North	9,313	9,289	9,398	9,445	9,472	9,488	9,471	9,473	9,487	9,492	9,508	9,509	9,521	9,510	9,512	9,519	9,529	9,526	9,527
Mohawk Valley	3,663	3,765	4,052	4,168	4,282	4,367	4,456	4,501	4,546	4,584	4,606	4,610	4,632	4,633	4,645	4,656	4,670	4,686	4,684
Capital	15,978	18,480	19,223	19,462	18,267	18,643	18,209	18,134	18,027	18,317	18,532	18,627	18,444	18,452	18,645	18,809	18,885	19,057	19,052
Hudson Valley	10,037	11,351	12,669	13,263	12,950	12,144	11,723	11,085	11,106	11,104	11,340	11,429	11,460	11,505	11,632	11,325	11,684	11,651	11,629
Millwood	11,728	2,642	456	460	466	468	469	469	472	471	471	471	475	474	474	474	475	476	476
Dunwoodie	64	71	78	86	93	99	105	110	115	119	120	121	122	123	122	124	125	126	127
NY City	22,137	23,986	25,000	25,404	24,512	25,806	25,854	25,755	25,694	25,518	25,679	26,220	26,237	26,086	26,907	26,702	27,171	27,434	27,885
Long Island	9,347	8,656	9,116	9,072	8,805	8,435	8,112	7,989	8,011	8,079	8,198	8,298	8,391	8,452	8,594	8,876	9,097	9,372	9,674
NYCA Total	131,427	129,486	131,929	136,851	134,060	136,114	133,509	133,802	132,436	133,793	133,897	135,694	134,341	135,531	135,104	136,072	137,119	138,283	138,401
Total IESO	151,690	150,083	145,539	130,481	137,817	125,760	129,205	131,689	136,986	134,852	137,024	135,365	139,840	140,256	142,210	142,246	142,593	143,002	143,311
Total PJM	771,211	787,217	799,592	815,149	823,837	837,260	842,214	846,812	852,850	854,977	853,227	853,880	852,714	852,523	852,240	853,913	854,685	855,039	856,749
Total ISONE	106,348	106,147	107,834	108,077	107,630	108,032	108,109	108,748	110,365	110,176	110,519	110,835	110,440	110,806	111,436	111,414	111,944	112,452	112,800
Total HQ *	25,992	26,180	26,463	26,425	26,473	26,359	26,536	26,492	26,496	26,406	26,384	26,355	26,573	26,451	26,418	26,409	26,439	26,538	26,496
Total System	1,186,667	1,199,113	1,211,358	1,216,984	1,229,817	1,233,524	1,239,574	1,247,544	1,259,134	1,260,203	1,261,050	1,262,130	1,263,908	1,265,568	1,267,408	1,270,054	1,272,781	1,275,313	1,277,757

*Only interchange flow is modeled

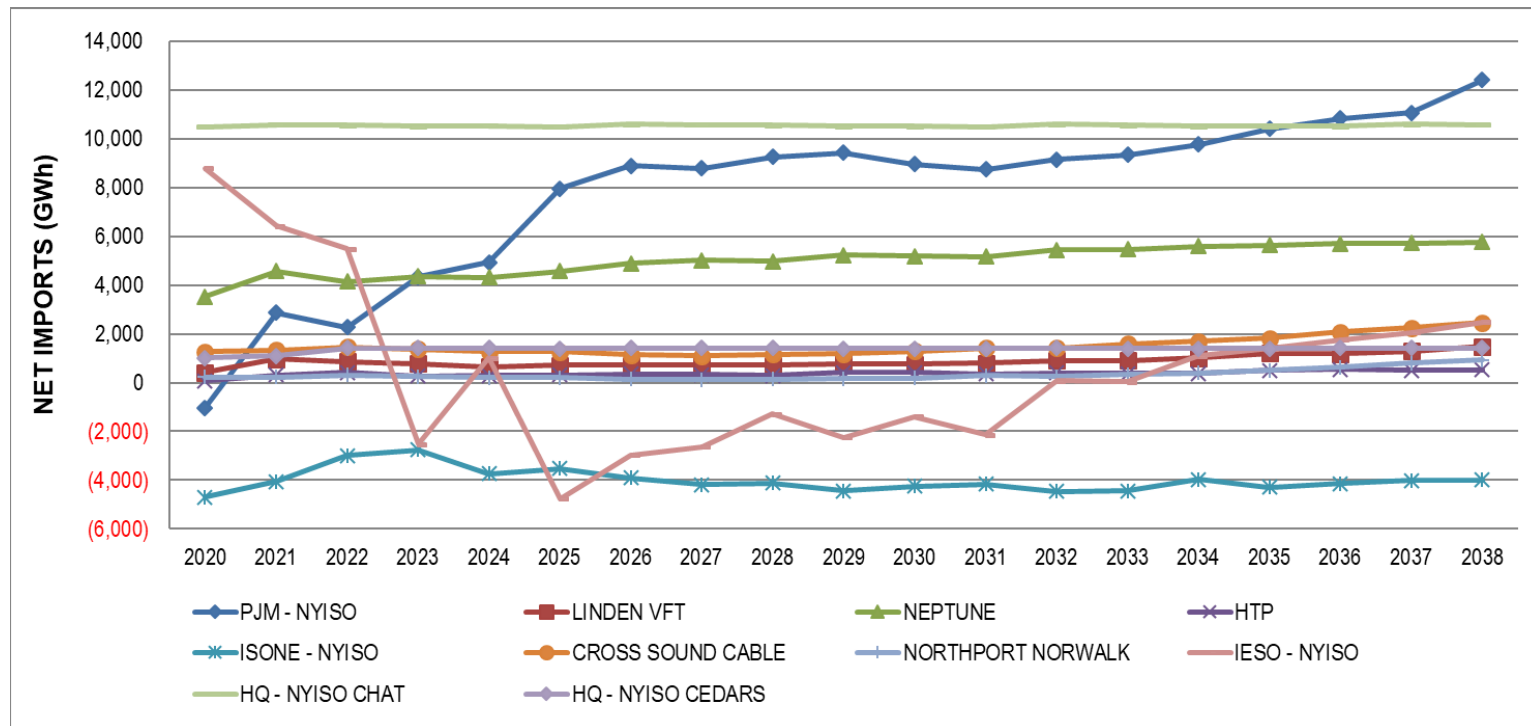
Projected NYCA Generation (GWh)



Projected NYCA Net Imports (GWh)

NET IMPORTS (GWh)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
PJM - NYISO	(1,040)	2,856	2,266	4,345	4,942	7,966	8,893	8,790	9,264	9,417	8,965	8,749	9,146	9,342	9,774	10,408	10,840	11,068	12,399
LINDEN VFT	407	961	873	769	651	713	716	708	714	779	754	800	898	909	1,022	1,195	1,176	1,300	1,473
NEPTUNE	3,518	4,566	4,152	4,347	4,310	4,564	4,890	5,011	4,984	5,226	5,187	5,160	5,445	5,474	5,588	5,637	5,701	5,712	5,754
HTP	76	303	408	277	281	307	344	337	288	411	412	350	402	367	366	507	537	510	527
ISONE - NYISO	(4,688)	(4,059)	(3,004)	(2,752)	(3,745)	(3,533)	(3,899)	(4,179)	(4,116)	(4,451)	(4,248)	(4,167)	(4,473)	(4,443)	(3,979)	(4,287)	(4,151)	(4,013)	(4,003)
CROSS SOUND CABLE	1,274	1,326	1,468	1,377	1,273	1,264	1,134	1,091	1,153	1,187	1,282	1,406	1,408	1,595	1,688	1,824	2,069	2,254	2,471
NORTHPORT NORWALK	218	222	303	252	198	200	142	107	130	157	182	279	238	330	399	496	631	807	921
IESO - NYISO	8,780	6,427	5,485	(2,516)	1,010	(4,756)	(2,979)	(2,639)	(1,297)	(2,242)	(1,387)	(2,136)	82	38	1,099	1,405	1,750	2,046	2,488
HQ - NYISO CHAT	10,490	10,569	10,546	10,520	10,539	10,486	10,598	10,569	10,555	10,514	10,503	10,486	10,605	10,546	10,520	10,514	10,521	10,598	10,569
HQ - NYISO CEDARS	1,002	1,095	1,414	1,409	1,412	1,402	1,415	1,407	1,408	1,400	1,399	1,398	1,415	1,402	1,402	1,403	1,408	1,417	1,411
PJM Total	2,961	8,686	7,698	9,737	10,183	13,550	14,843	14,847	15,250	15,832	15,318	15,060	15,891	16,091	16,750	17,747	18,254	18,590	20,153
ISONE Total	(3,195)	(2,512)	(1,233)	(1,123)	(2,274)	(2,069)	(2,623)	(2,980)	(2,833)	(3,107)	(2,785)	(2,482)	(2,828)	(2,518)	(1,892)	(1,967)	(1,452)	(952)	(611)
IESO Total	8,780	6,427	5,485	(2,516)	1,010	(4,756)	(2,979)	(2,639)	(1,297)	(2,242)	(1,387)	(2,136)	82	38	1,099	1,405	1,750	2,046	2,488
HQ Total	11,492	11,664	11,959	11,929	11,951	11,888	12,013	11,977	11,963	11,914	11,903	11,884	12,020	11,948	11,922	11,917	11,929	12,015	11,981
TOTAL	20,038	24,265	23,909	18,028	20,871	18,613	21,253	21,205	23,083	22,397	23,049	22,326	25,166	25,559	27,880	29,102	30,481	31,699	34,010

Projected NYCA Net Imports (GWh)



Projected LBMP (\$/MWh)

LBMP (\$/MWh)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
West	18.92	23.79	24.40	28.54	30.62	35.83	38.01	39.20	39.95	41.50	41.56	43.06	43.27	44.46	44.64	46.19	47.87	50.14	51.98
Genesee	14.28	21.97	24.58	28.67	31.04	36.24	38.52	39.74	40.57	42.12	42.19	43.74	44.11	45.33	45.56	47.32	49.01	51.43	53.38
Central	18.67	26.01	26.69	30.08	32.87	38.17	40.69	42.19	43.14	44.63	44.86	46.43	47.13	48.53	49.11	51.24	53.15	55.81	57.78
North	13.09	20.09	22.28	26.21	28.81	33.50	35.59	37.03	37.57	39.03	39.17	40.70	41.16	42.62	42.47	44.31	45.91	48.28	50.10
Mohawk Valley	17.41	24.54	25.74	28.87	31.78	36.36	38.72	40.20	40.96	42.56	42.77	44.21	45.06	46.59	46.83	49.07	50.82	53.29	55.09
Capital	24.11	34.63	32.42	32.26	33.97	37.44	40.19	42.21	43.31	45.21	45.80	46.93	48.45	50.46	52.18	54.35	56.30	58.15	59.65
Hudson Valley	22.25	32.41	31.55	32.20	34.07	37.51	40.11	42.21	43.10	45.16	45.73	46.96	48.41	50.42	51.58	54.00	55.94	58.09	59.53
Millwood	22.47	32.72	31.79	32.41	34.39	37.83	40.47	42.61	43.52	45.61	46.20	47.44	48.93	50.98	52.15	54.59	56.56	58.71	60.19
Dunwoodie	22.43	32.65	31.75	32.37	34.33	37.70	40.31	42.45	43.34	45.46	46.09	47.27	48.77	50.82	51.96	54.41	56.37	58.62	60.01
NY City	23.13	33.00	32.04	32.60	34.95	38.43	40.61	42.80	43.61	46.46	47.26	47.84	49.51	51.56	52.58	55.31	57.33	60.12	60.96
Long Island	24.71	35.01	33.61	33.75	36.22	39.60	42.34	44.61	45.66	48.21	49.00	50.66	52.34	55.11	56.42	60.02	62.90	66.81	68.81

Projected LBMP (\$/MWh)

