

# 2019 CARIS 1 Base Case Results: Preliminary

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ESPWG

Sep. 6th, 2019, KCC

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# 2019 CARIS 1 Schedule

- **June 25<sup>th</sup> ESPWG**
  - Model Development/Key Base case assumptions
  - Emission Allowance Price Forecast
- **August 6<sup>th</sup> ESPWG**
  - Fuel price forecasts
- **September 6<sup>th</sup> ESPWG**
  - Additional Base case input assumptions
  - Base case preliminary results

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# Base Case Input Assumptions

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# Generation updates

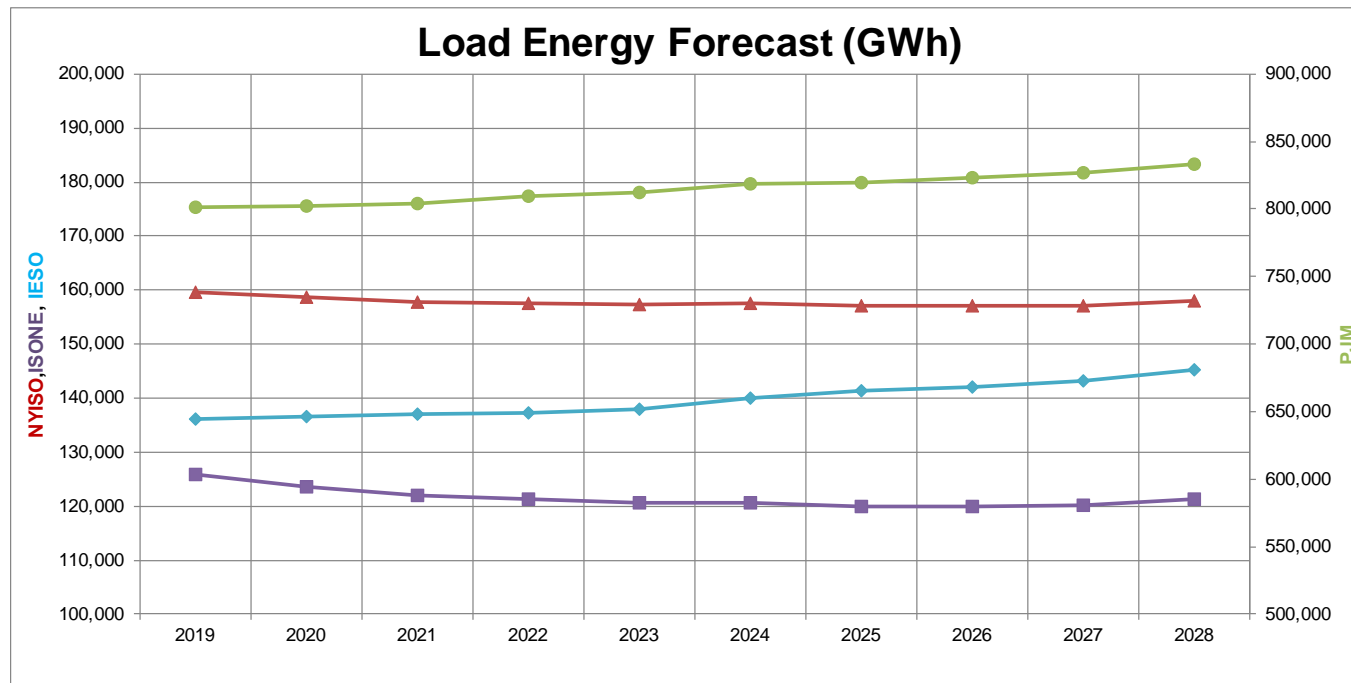
## ■ Retirements/Removals

- Hudson Ave 4 (Zone J, 16.3MW, 4/1/2019)
- Auburn/State St GT (Zone C, 7.4 MW, 5/1/2019)
- Steuben (Zone C, 3.2 MW, 5/1/2019)
- Monroe Livingston (Zone B, 2.4 MW, 6/30/2019)
- Cayuga 1 (Zone C, 155.3MW, 1/1/2020)
- Schuylerville Station (Zone F, 1.2 MW, 6/13/2019)
- Ogdensburg (Zone E, 102.2 MW)

## ■ NYISO received no other regulatory compliance plans prior to Aug. 1st, 2019

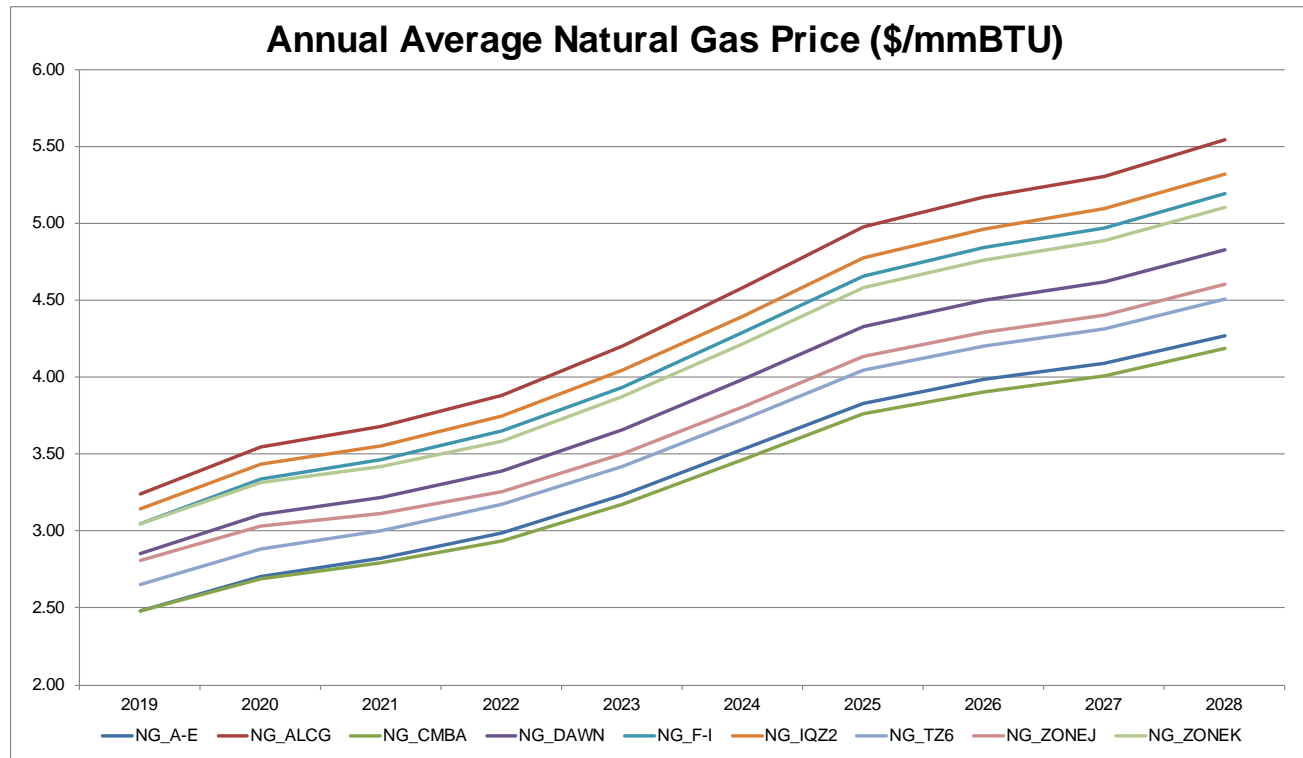
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# Load Energy Forecast



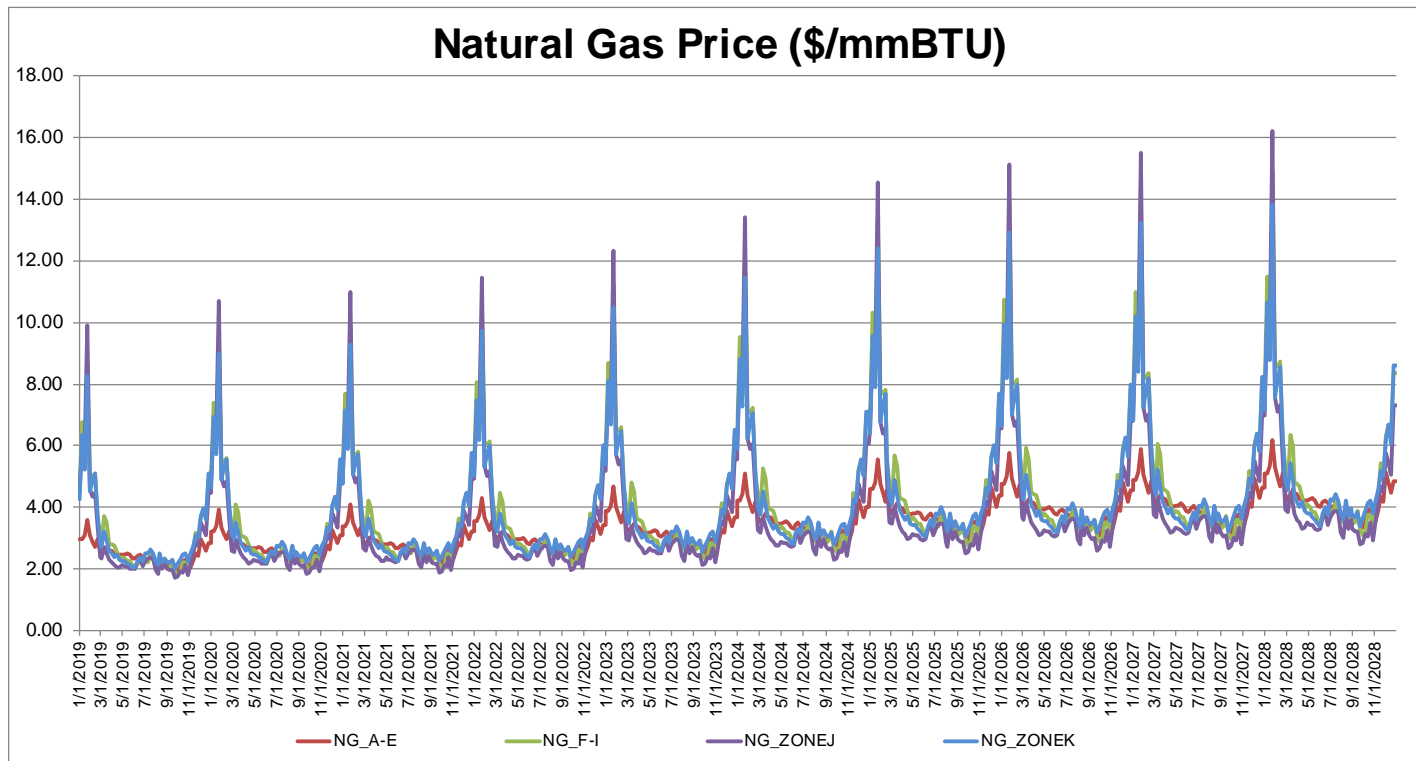
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# Natural Gas Price Forecasts



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# Natural Gas Price Forecasts



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# Base Case Preliminary Results

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# 5 Year Historic Demand Congestion(\$M)

Constraint Group (Nominal \$M)	2014	2015	2016	2017	2018	5Y Total
CENTRAL EAST	1,136	915	641	598	540	3,829
DUNWOODIE TO LONG ISLAND	155	138	164	88	133	677
LEEDS PLEASANT VALLEY	42	111	63	101	9	327
EDIC MARCY	7	0	32	125	107	271
PACKARD HUNTLEY	7	41	54	30	41	172
GREENWOOD	13	19	31	18	62	143
DUNWOODIE MOTTHAVEN	40	2	2	30	65	139
NIAGARA PACKARD	18	22	44	12	9	104
EGRDNCTY 138 VALLYSTR 138 1	20	18	8	17	20	82
NEW SCOTLAND LEEDS	9	32	13	18	5	76

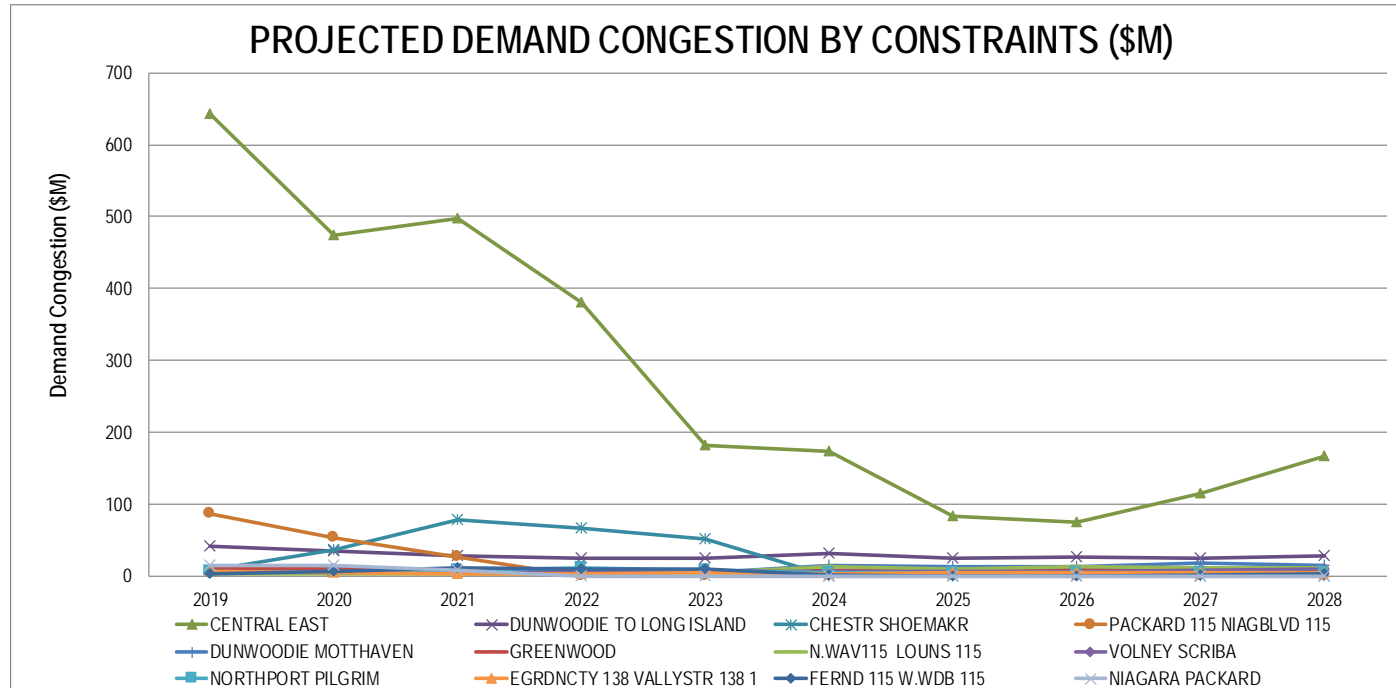
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# Projected Demand Congestion by Constraints (\$M)

Demand Congestion (\$M)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
CENTRAL EAST	642	474	497	380	181	174	84	75	115	166
DUNWOODIE TO LONG ISLAND	40	35	28	25	25	31	25	26	24	27
CHESTR SHOEMAKR	8	36	78	66	52	0	0	0	0	0
PACKARD 115 NIAGBLVD 115	86	53	27	0	0	0	0	0	0	0
DUNWOODIE MOTTHAVEN	7	9	10	7	5	15	13	13	18	15
GREENWOOD	12	10	6	6	6	8	8	10	10	10
N.WAV115 LOUNS 115	2	2	2	4	4	13	10	12	12	11
VOLNEY SCRIBA	5	7	6	7	7	6	5	7	9	9
NORTHPORT PILGRIM	6	4	8	10	8	5	4	5	4	5
EGRDNCTY 138 VALLYSTR 138 1	6	5	3	2	5	4	5	4	5	4
FERND 115 W.WDB 115	2	6	11	9	9	1	0	0	1	2
NIAGARA PACKARD	14	14	8	0	0	0	0	0	0	0

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# Projected Demand Congestion by Constraints (\$M)



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# Projected Demand Congestion Key Drivers

- **2020**
  - Cricket Valley Energy Center Addition(Zone G, +1177.2MW)
  - Indian Point 2 Retirement(Zone H, -1299MW)
- **2021**
  - Indian Point 3 Retirement(Zone H, -1012MW)
- **2022**
  - Empire State Line Project/Western PP Selected project in service
- **2023**
  - Ontario nuclear generation decreases ~19TWh compared with 2022 due to retirements of two Pickering units and refurbishment of Bruce units
- **2024**
  - Selected AC PP Transmission projects(Segments A and B) in service – T27/T19
  - Ontario nuclear generation increases ~14TWh compared with 2023 due to Bruce and Darlington units returning from refurbishments
- **2025**
  - Ontario nuclear generation decreases ~19TWh compared with 2024 due to retirements of four Pickering units and refurbishment of Bruce units

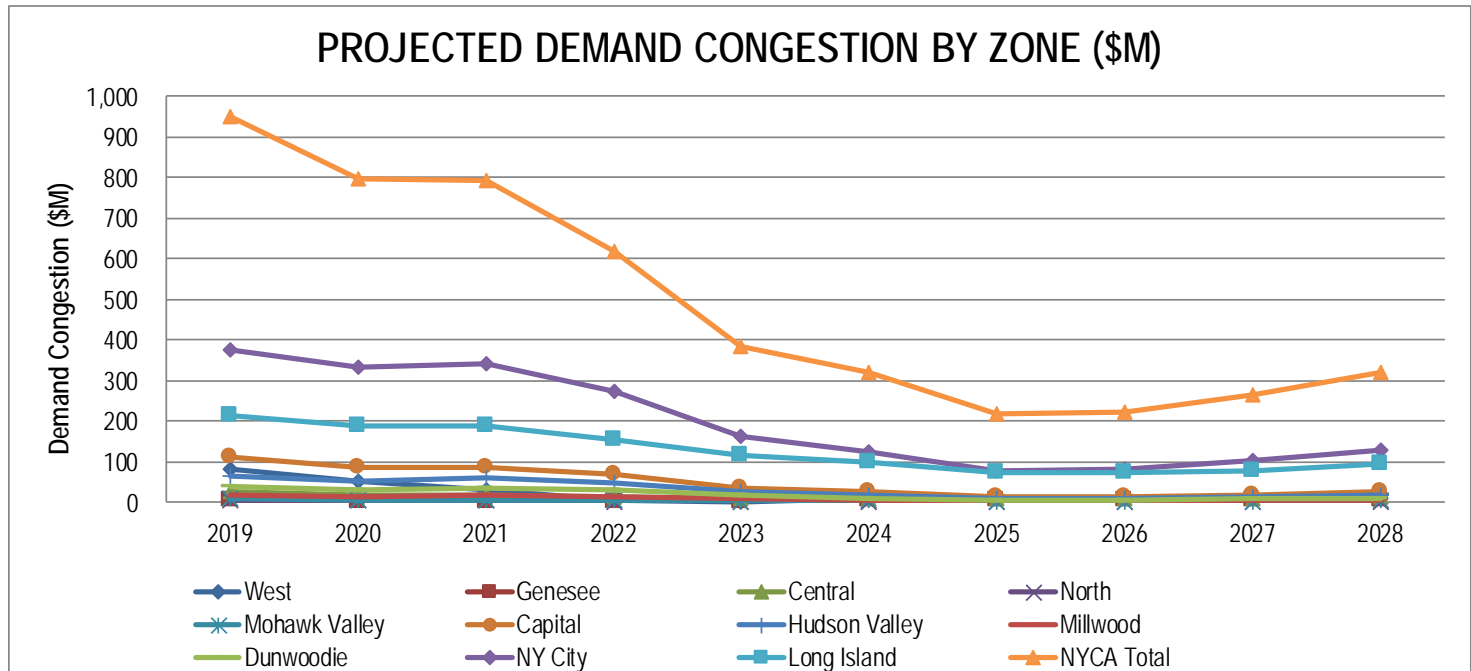
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# Projected Demand Congestion by Zone (\$M)

Demand Congestion (\$M)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
West	82	52	33	4	1	9	11	12	10	8
Genesee	4	2	1	1	1	5	6	7	6	5
Central	27	21	20	13	9	11	10	10	12	13
North	6	7	5	4	3	4	3	3	3	3
Mohawk Valley	9	7	7	5	3	4	3	3	4	4
Capital	112	85	88	68	34	29	14	14	19	27
Hudson Valley	64	53	59	48	28	19	10	11	14	19
Millwood	19	16	17	14	8	6	3	3	4	6
Dunwoodie	38	33	36	29	17	11	6	6	8	11
NY City	378	332	342	275	164	125	77	81	106	131
Long Island	213	188	187	156	116	102	74	75	80	95
<b>NYCA Total</b>	<b>952</b>	<b>797</b>	<b>795</b>	<b>619</b>	<b>386</b>	<b>322</b>	<b>217</b>	<b>224</b>	<b>266</b>	<b>321</b>

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# Projected Demand Congestion by Zone (\$M)



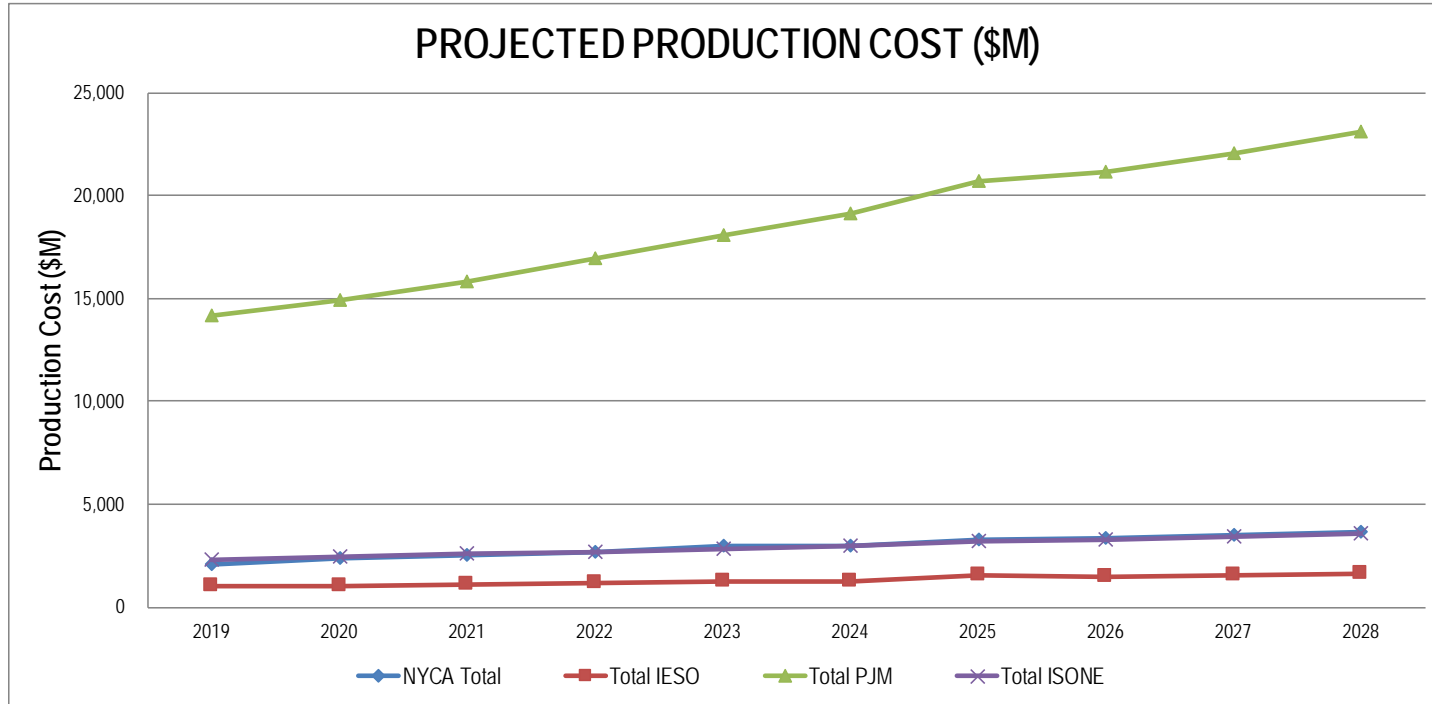
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# Projected Production Costs(\$M)

Production Cost (\$M)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
West	14	14	16	16	28	33	77	74	75	85
Genesee	37	39	43	41	43	47	45	46	51	49
Central	262	296	314	333	390	399	447	444	459	479
North	1	1	1	2	2	4	3	3	4	5
Mohawk Valley	1	1	1	1	1	2	2	1	1	2
Capital	447	471	551	593	634	639	698	716	735	774
Hudson Valley	134	267	325	340	371	362	395	387	413	441
Millwood	137	94	24	6	7	7	7	7	7	7
Dunwoodie	0	0	0	0	0	0	0	0	0	0
NY City	771	868	947	1,028	1,112	1,141	1,230	1,296	1,318	1,374
Long Island	294	316	335	348	362	373	391	403	413	432
<b>NYCA Total</b>	<b>2,099</b>	<b>2,369</b>	<b>2,558</b>	<b>2,710</b>	<b>2,949</b>	<b>3,007</b>	<b>3,294</b>	<b>3,376</b>	<b>3,476</b>	<b>3,647</b>
NYCA Imports	551	643	699	799	901	1,012	1,145	1,177	1,197	1,274
NYCA Exports	234	259	220	214	349	285	480	401	459	434
<b>NYCA + Imports - Exports</b>	<b>2,416</b>	<b>2,753</b>	<b>3,037</b>	<b>3,294</b>	<b>3,501</b>	<b>3,734</b>	<b>3,959</b>	<b>4,151</b>	<b>4,215</b>	<b>4,486</b>
Total IESO	1,005	1,059	1,081	1,177	1,234	1,272	1,528	1,445	1,582	1,638
Total PJM	14,151	14,881	15,836	16,921	18,082	19,118	20,711	21,135	22,014	23,094
Total ISONE	2,297	2,467	2,569	2,651	2,805	2,986	3,169	3,269	3,405	3,565
<b>Total System</b>	<b>19,551</b>	<b>20,775</b>	<b>22,044</b>	<b>23,458</b>	<b>25,070</b>	<b>26,383</b>	<b>28,701</b>	<b>29,224</b>	<b>30,477</b>	<b>31,942</b>

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# Projected Production Costs(\$M)



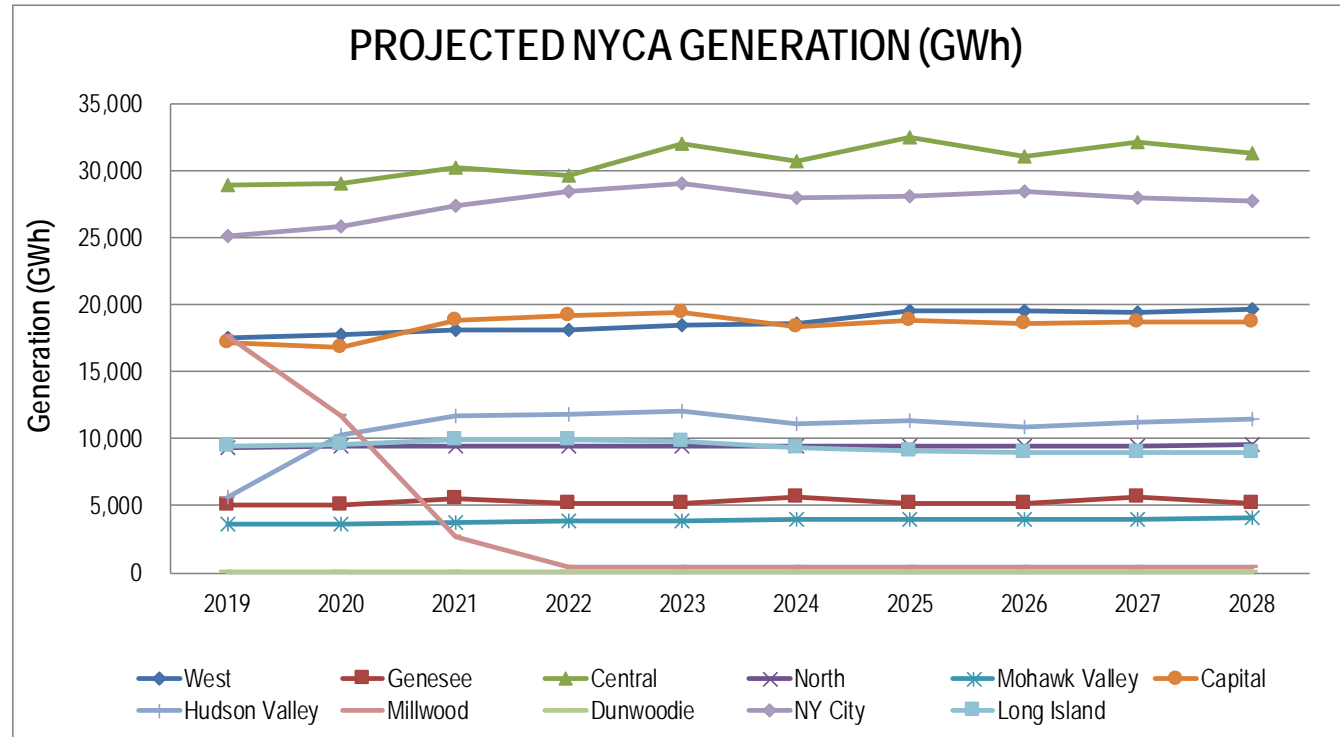
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# Projected NYCA Generation(GWh)

Generation (GWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
West	17,467	17,764	18,101	18,151	18,496	18,621	19,540	19,501	19,476	19,610
Genesee	5,049	5,093	5,533	5,120	5,153	5,604	5,163	5,183	5,619	5,213
Central	28,967	29,068	30,248	29,644	31,974	30,708	32,436	31,027	32,108	31,254
North	9,334	9,397	9,389	9,419	9,440	9,497	9,485	9,466	9,491	9,510
Mohawk Valley	3,626	3,678	3,742	3,810	3,871	3,946	3,977	4,020	4,043	4,077
Capital	17,138	16,780	18,850	19,157	19,465	18,353	18,855	18,572	18,693	18,754
Hudson Valley	5,627	10,233	11,743	11,796	12,117	11,162	11,398	10,918	11,260	11,423
Millwood	17,645	11,724	2,631	438	440	443	443	444	445	447
Dunwoodie	55	63	69	75	79	81	83	85	86	88
NY City	25,127	25,875	27,365	28,410	29,047	27,950	28,088	28,458	27,939	27,782
Long Island	9,466	9,523	9,913	9,894	9,750	9,329	9,072	8,938	8,929	9,006
<b>NYCA Total</b>	<b>139,500</b>	<b>139,200</b>	<b>137,582</b>	<b>135,913</b>	<b>139,831</b>	<b>135,693</b>	<b>138,541</b>	<b>136,612</b>	<b>138,090</b>	<b>137,165</b>
Total IESO	154,370	152,540	147,382	146,785	131,779	142,623	130,589	135,672	134,441	138,911
Total PJM	790,503	793,309	799,174	805,768	819,778	822,096	833,423	834,453	838,758	844,656
Total ISONE	107,980	105,518	105,289	105,906	105,694	104,949	104,828	104,434	105,081	105,849
Total HQ *	25,985	25,999	26,093	26,054	26,020	26,068	25,959	26,134	26,093	26,096
<b>Total System</b>	<b>1,218,338</b>	<b>1,216,567</b>	<b>1,215,521</b>	<b>1,220,427</b>	<b>1,223,102</b>	<b>1,231,429</b>	<b>1,233,340</b>	<b>1,237,306</b>	<b>1,242,463</b>	<b>1,252,678</b>

# Projected NYCA Generation(GWh)



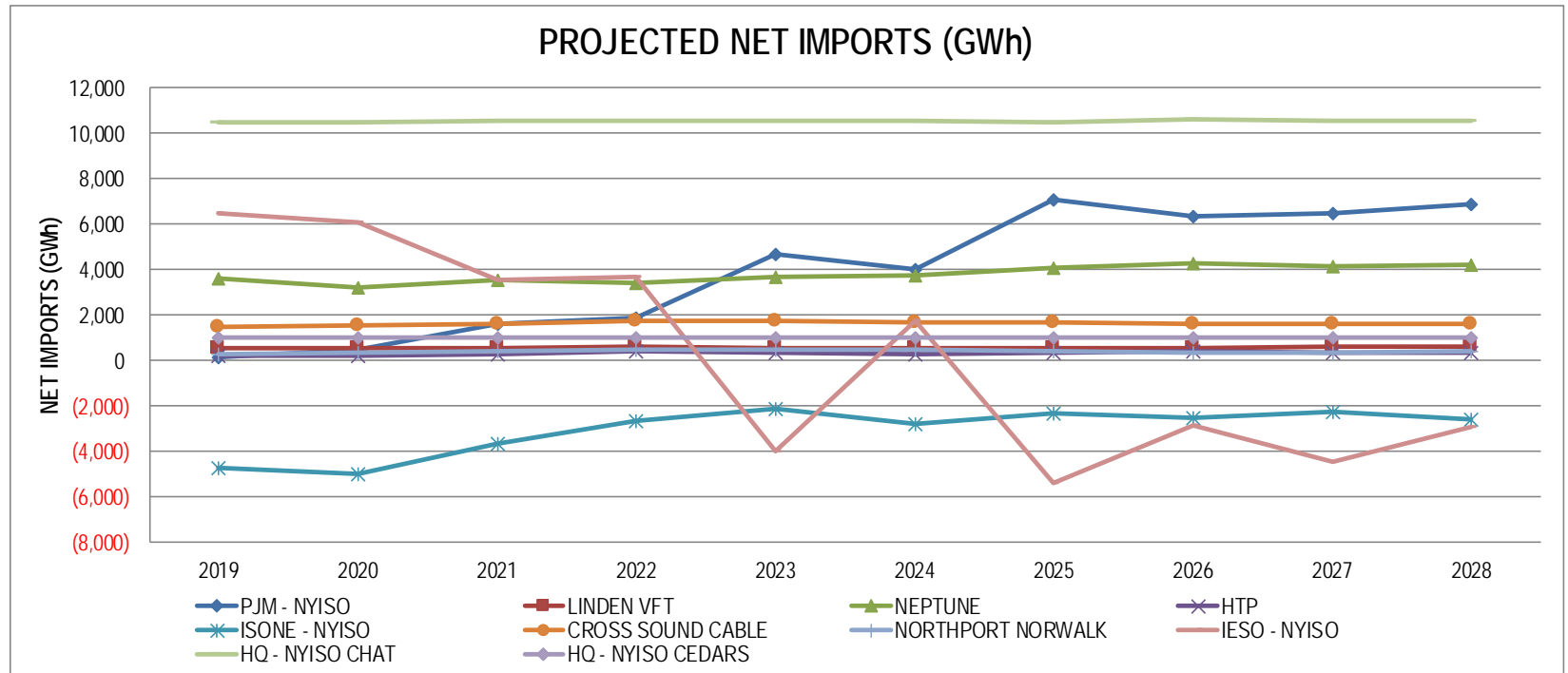
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# Projected NYCA Net Imports(GWh)

NET IMPORTS (GWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
PJM - NYISO	174	509	1,640	1,904	4,714	4,025	7,087	6,355	6,487	6,896
LINDEN VFT	569	527	565	594	542	543	525	575	586	627
NEPTUNE	3,636	3,199	3,529	3,399	3,702	3,722	4,085	4,279	4,130	4,224
HTP	195	218	311	401	341	311	336	386	384	373
ISONE - NYISO	(4,737)	(5,004)	(3,642)	(2,636)	(2,108)	(2,789)	(2,280)	(2,501)	(2,232)	(2,571)
CROSS SOUND CABLE	1,494	1,538	1,606	1,724	1,728	1,687	1,661	1,595	1,636	1,629
NORTHPORT NORWALK	296	350	393	487	481	453	406	365	384	430
IESO - NYISO	6,511	6,112	3,558	3,713	(3,967)	1,784	(5,353)	(2,833)	(4,420)	(2,923)
HQ - NYISO CHAT	10,503	10,497	10,569	10,546	10,520	10,539	10,486	10,598	10,569	10,555
HQ - NYISO CEDARS	1,000	1,002	1,008	1,005	1,004	1,008	1,002	1,014	1,008	1,009
<b>TOTAL</b>	<b>19,642</b>	<b>18,949</b>	<b>19,538</b>	<b>21,137</b>	<b>16,958</b>	<b>21,282</b>	<b>17,955</b>	<b>19,833</b>	<b>18,532</b>	<b>20,247</b>

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# Projected NYCA Net Imports(GWh)



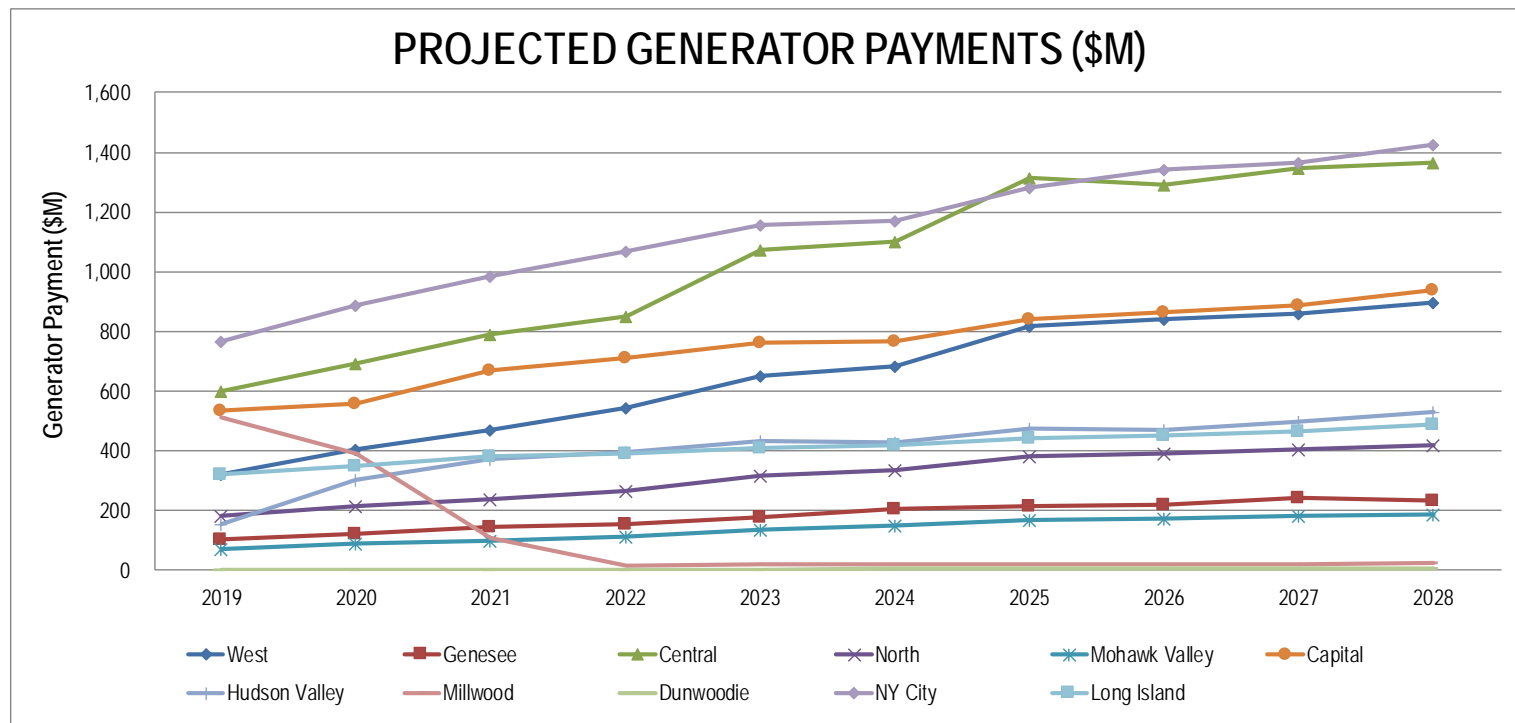
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# Projected NYCA Generator Payments(\$M)

Generator Payment (\$M)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
West	322	407	472	543	651	683	818	841	860	898
Genesee	103	123	147	152	179	203	213	220	244	235
Central	599	694	789	849	1,072	1,101	1,315	1,293	1,345	1,364
North	180	214	236	264	314	337	384	393	405	421
Mohawk Valley	73	88	97	112	134	147	167	174	180	189
Capital	537	560	667	712	763	764	843	863	888	938
Hudson Valley	153	303	374	395	435	429	473	467	496	531
Millwood	512	389	109	16	18	19	20	21	21	23
Dunwoodie	2	2	3	3	3	4	4	4	4	5
NY City	767	885	986	1,067	1,158	1,172	1,280	1,342	1,365	1,426
Long Island	320	348	380	392	409	418	442	453	467	490
<b>NYCA Total</b>	<b>3,567</b>	<b>4,013</b>	<b>4,259</b>	<b>4,504</b>	<b>5,136</b>	<b>5,277</b>	<b>5,960</b>	<b>6,072</b>	<b>6,275</b>	<b>6,519</b>

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# Projected NYCA Generator Payments(\$M)



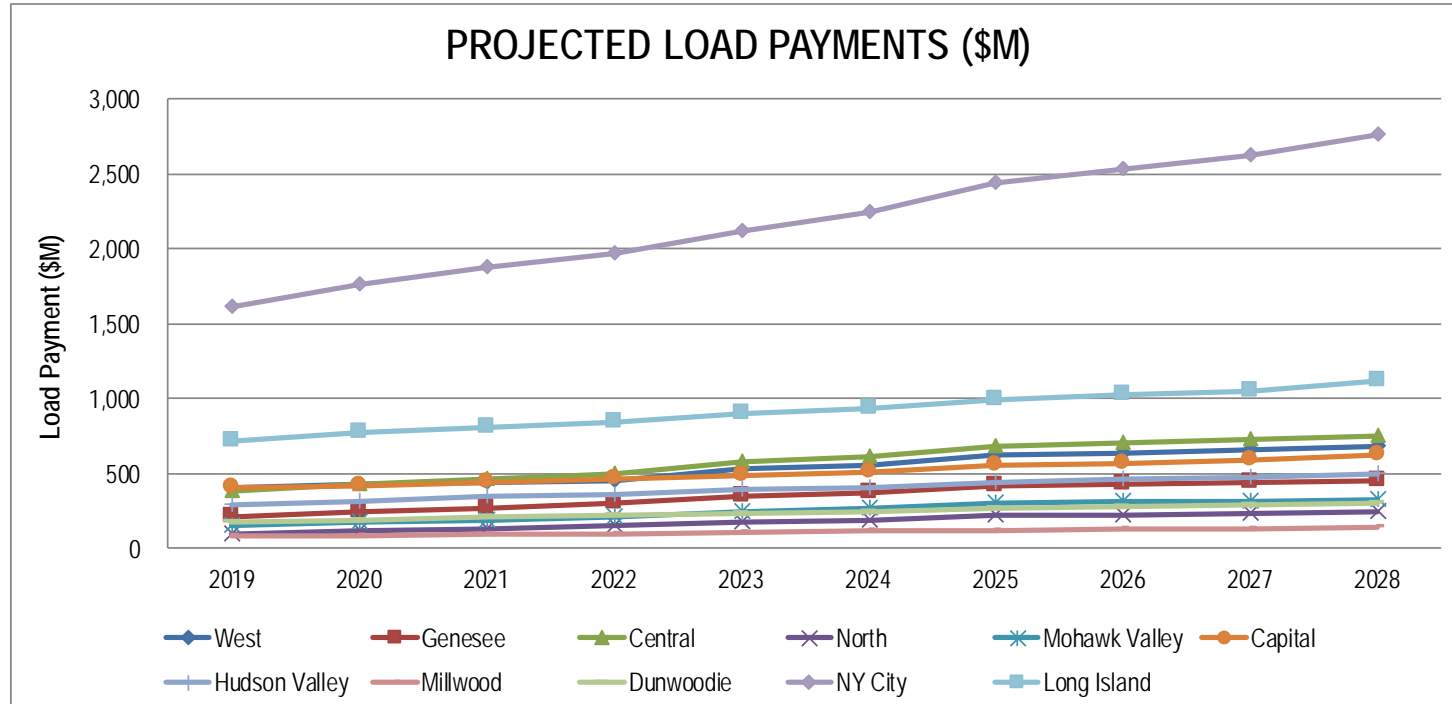
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# Projected NYCA Load Payments(\$M)

Load Payment (\$M)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
West	408	429	442	458	534	555	626	641	659	684
Genesee	211	246	270	301	350	368	414	427	438	457
Central	379	430	460	500	574	617	685	708	723	752
North	93	124	136	153	182	194	222	228	233	241
Mohawk Valley	159	181	194	212	244	272	301	312	318	331
Capital	401	419	445	461	489	513	554	572	588	619
Hudson Valley	291	318	346	365	393	409	445	463	477	503
Millwood	80	88	96	101	109	114	125	130	135	143
Dunwoodie	175	192	207	218	234	246	268	279	288	303
NY City	1,606	1,760	1,880	1,970	2,116	2,240	2,434	2,534	2,621	2,755
Long Island	718	771	809	838	895	939	997	1,027	1,052	1,117
<b>NYCA Total</b>	<b>4,522</b>	<b>4,959</b>	<b>5,284</b>	<b>5,577</b>	<b>6,122</b>	<b>6,467</b>	<b>7,070</b>	<b>7,322</b>	<b>7,531</b>	<b>7,906</b>

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# Projected NYCA Load Payments(\$M)



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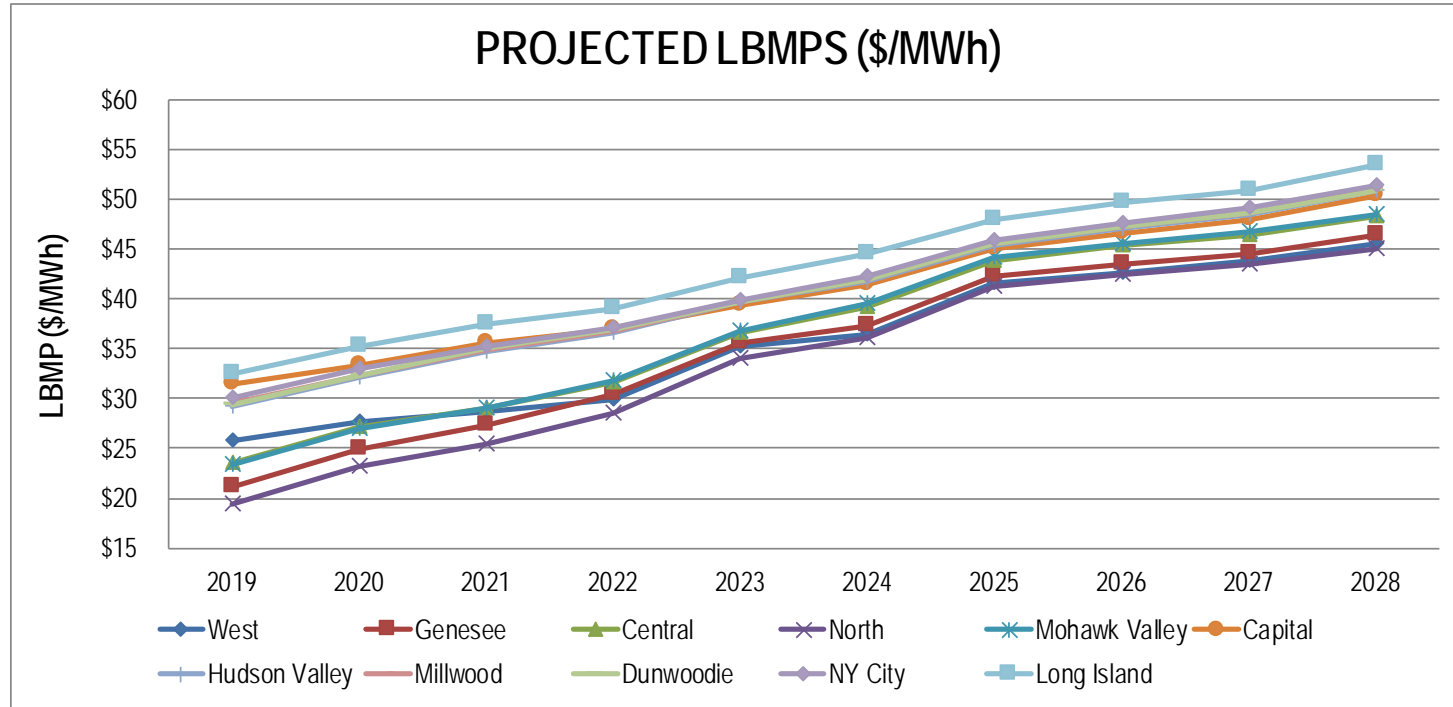


# Projected NYCA LBMPs(\$/MWh)

LBMP (\$/MWh)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
West	25.76	27.57	28.71	29.93	35.19	36.49	41.54	42.59	43.86	45.45
Genesee	21.14	24.93	27.24	30.32	35.58	37.21	42.21	43.46	44.54	46.31
Central	23.60	27.06	28.99	31.61	36.56	39.15	43.79	45.28	46.37	48.18
North	19.41	23.13	25.44	28.49	33.99	36.10	41.20	42.38	43.41	45.02
Mohawk Valley	23.41	27.00	28.95	31.74	36.68	39.44	44.05	45.58	46.63	48.47
Capital	31.40	33.32	35.53	37.00	39.40	41.44	45.04	46.56	47.96	50.33
Hudson Valley	29.27	32.05	34.73	36.63	39.59	41.67	45.41	47.10	48.43	50.76
Millwood	29.45	32.36	34.91	36.81	39.73	41.87	45.59	47.29	48.64	50.96
Dunwoodie	29.44	32.37	34.95	36.85	39.75	41.85	45.56	47.25	48.60	50.91
NY City	30.03	32.95	35.22	37.04	39.90	42.22	45.94	47.64	49.07	51.37
Long Island	32.49	35.26	37.36	38.94	42.10	44.52	47.86	49.58	50.88	53.37

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# Projected NYCA LBMPs(\$/MWh)



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# Feedback/Comments?

- Email additional feedback to: [Cyang@nyiso.com](mailto:Cyang@nyiso.com)

# The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits 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 policy makers, stakeholders and investors in the power system



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