

2018 CARIS Phase 2 Base Case Assumptions and Preliminary Results

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August 8, 2018, KCC

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Agenda

- Background/Schedule
- Phase 2 Input Assumption Updates
- Phase 2 Preliminary Results – Base Case
- Next Steps

2018 CARIS Phase 2 Background & Schedule

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2018 CARIS Phase 2

- **NYISO must update and extend the CARIS Phase 1 database for Phase 2 studies**
 - Economic Planning Process Manual, Section 3.1
 - CARIS Phase 1 Base Case (2017-2026)
 - CARIS Phase 2 updates and extends through 2036 for a total of 20-year study period
- **CARIS Phase 2 Base Case to be utilized in evaluation of specific Regulated Economic Transmission projects**
 - Also available for use in optional Additional CARIS Studies

2018 CARIS Phase 2 Schedule

- **August 8th ESPWG**
 - Base Case Assumptions and Preliminary results
- **August 22th ESPWG**
 - Preliminary Base Case comments follow-up
 - Final Base Case results
- **September BIC**
 - Review and comment of Final Base Case

2018 CARIS Phase 2 Base Case Input Assumption Updates

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NYCA Generation Updates

■ Added for CARIS Phase 2

- Arthur Kill Cogen, Zone J, 11.1MW (04/01/2018)

■ Modified In service date for CARIS Phase 2

- Ogdensburg, Zone E, 79.0MW (05/01/2018, was 05/01/2017)
- Arkwright Summit, Zone A, 78.4MW (10/01/2018, was 10/01/2017)
- Cricket Valley Energy Center II, Zone G, 1020.0MW (01/01/2020, was 08/01/2019)
- Taylor Biomass, Zone G, 19.0MW (04/01/2021, was 04/01/2018)

NYCA Generation Updates

■ Removed for CARIS Phase 2

Unit name	Zone	SUM. Capacity(MW)	Removal Date
Binghamton	C	43.7	1/9/2018
Indian Point 2	H	1018.5	4/30/2020
Indian Point 3	H	1037.8	4/30/2021
Selkirk 1&2	F	360.2	5/15/2018
Lyonsdale(Burrows)	E	20.1	4/1/2018
Ravenswood 09	J	16.3	11/1/2017
Ravenswood GT 2-1, 2-2, 2-3, 2-4, 3-1, 3-2&3-4	J	213.4	4/1/2018
Cayuga 2	C	150.2	7/1/2018
Eight Point Wind Energy Center	B	101.2	N/A

■ Retained for CARIS Phase 2

- Pilgrim GT1, GT2(reliability need identified, solution under solicitation)

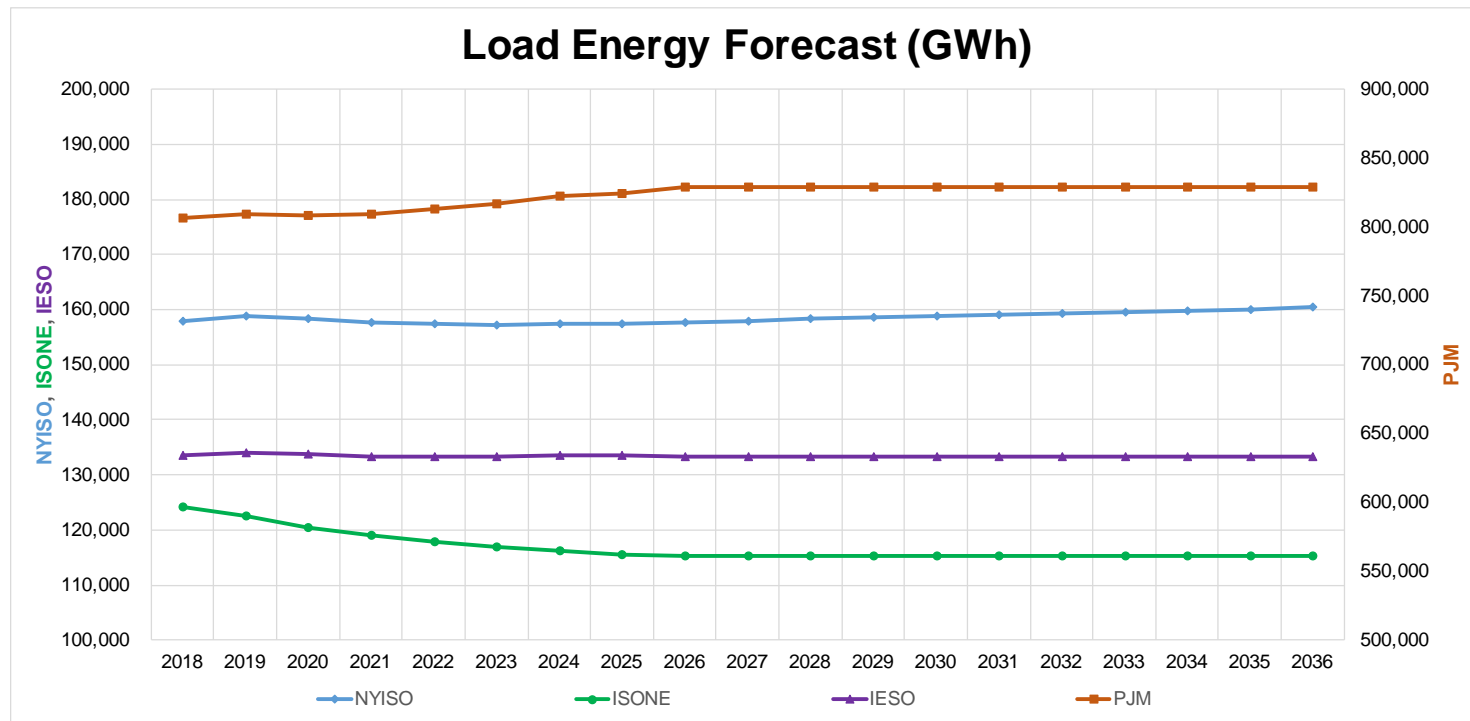
NYCA Transmission Updates

- Zero OBF effective date change(2019)
- Erie – South Ripley series reactor(2019)
- Leeds Hurley SDU(2020)
- UPNY-ConEd limit increase to 6250MW(May 2021)
- Empire State Line Project/Western PP Selected project(2022)
- Representative AC PP Transmission project(2023)

20-Year Representative System

- No need to add generic capacity to maintain NYCA Target Reserve Proxy
- Model assumptions consistent with 2018 RNA(with load forecasts extended out to 2036) except for inclusion of Pilgrim GT and deactivation of Cayuga 2

Load Forecast Updates



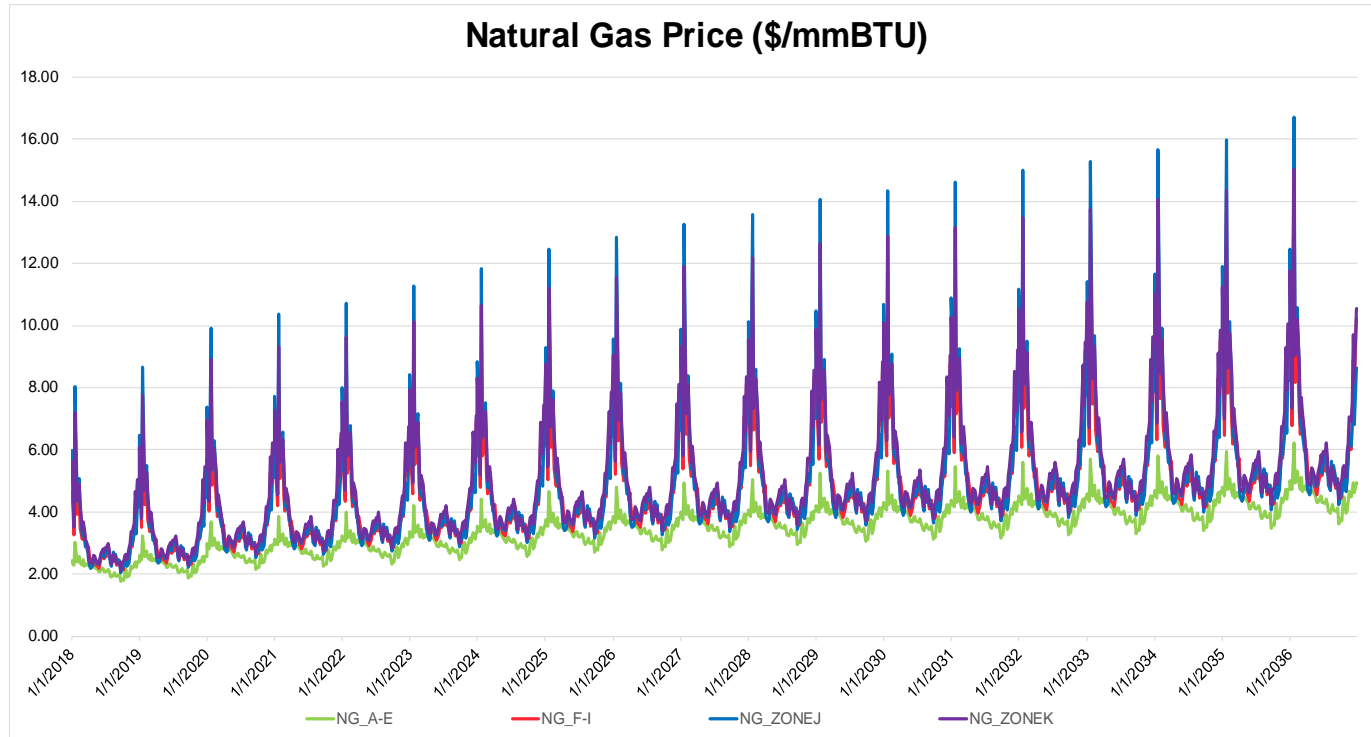
Note: External loads are kept constant starting 2026



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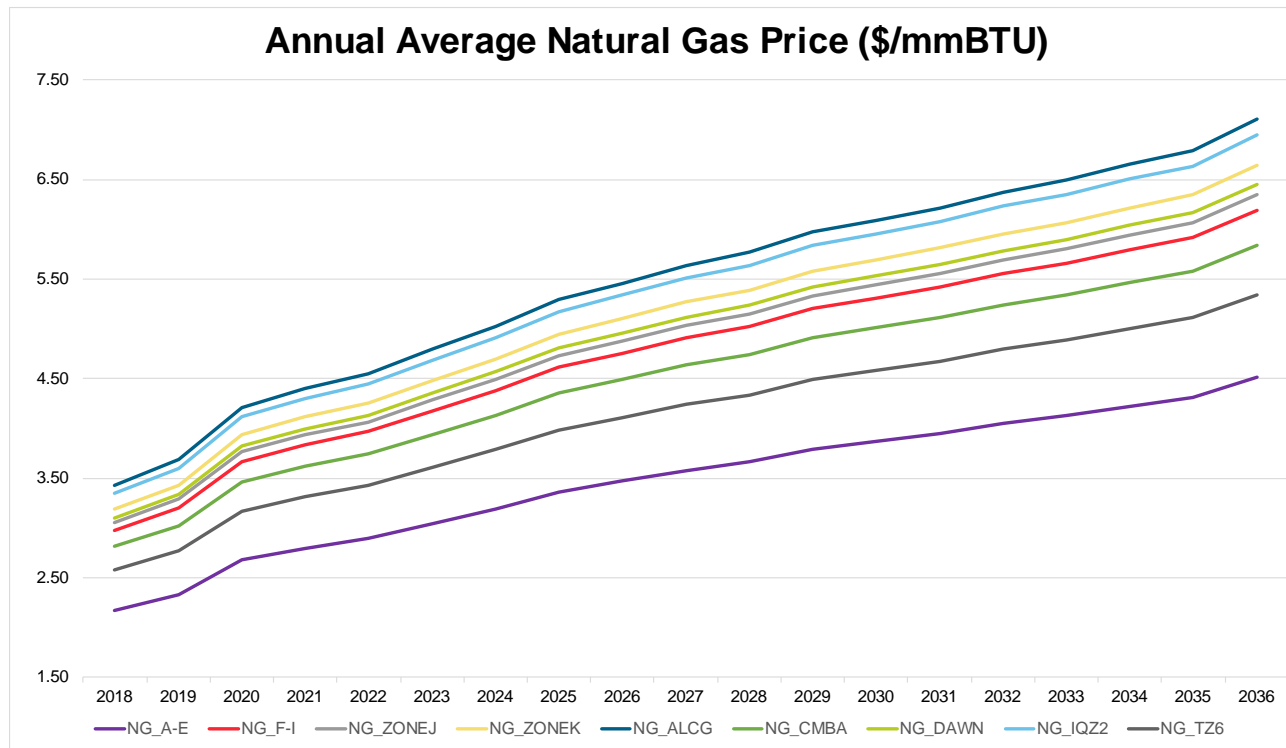
Natural Gas Forecast Updates



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Natural Gas Forecast Updates

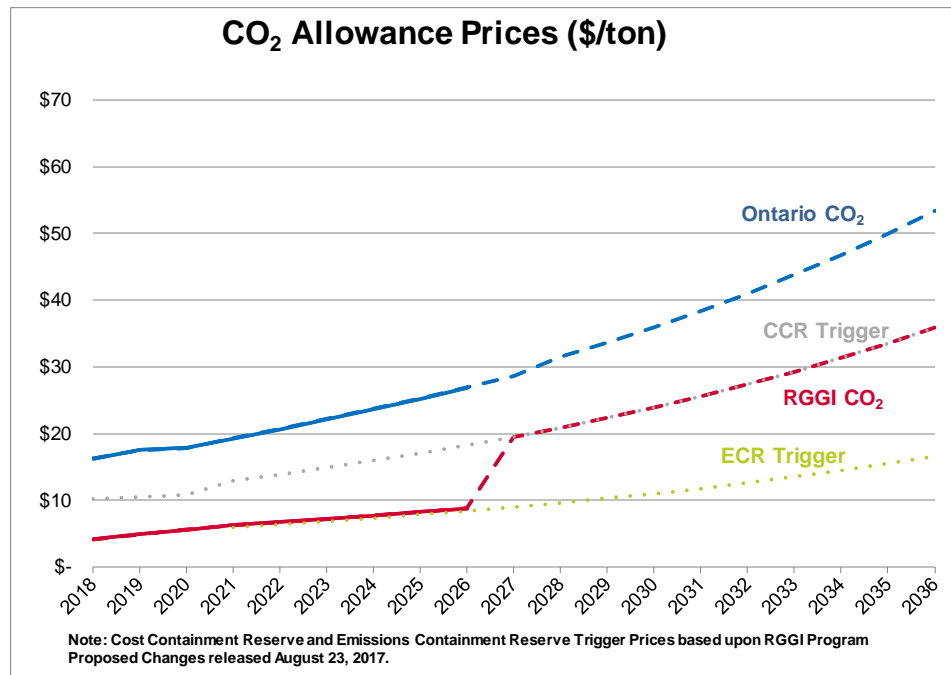


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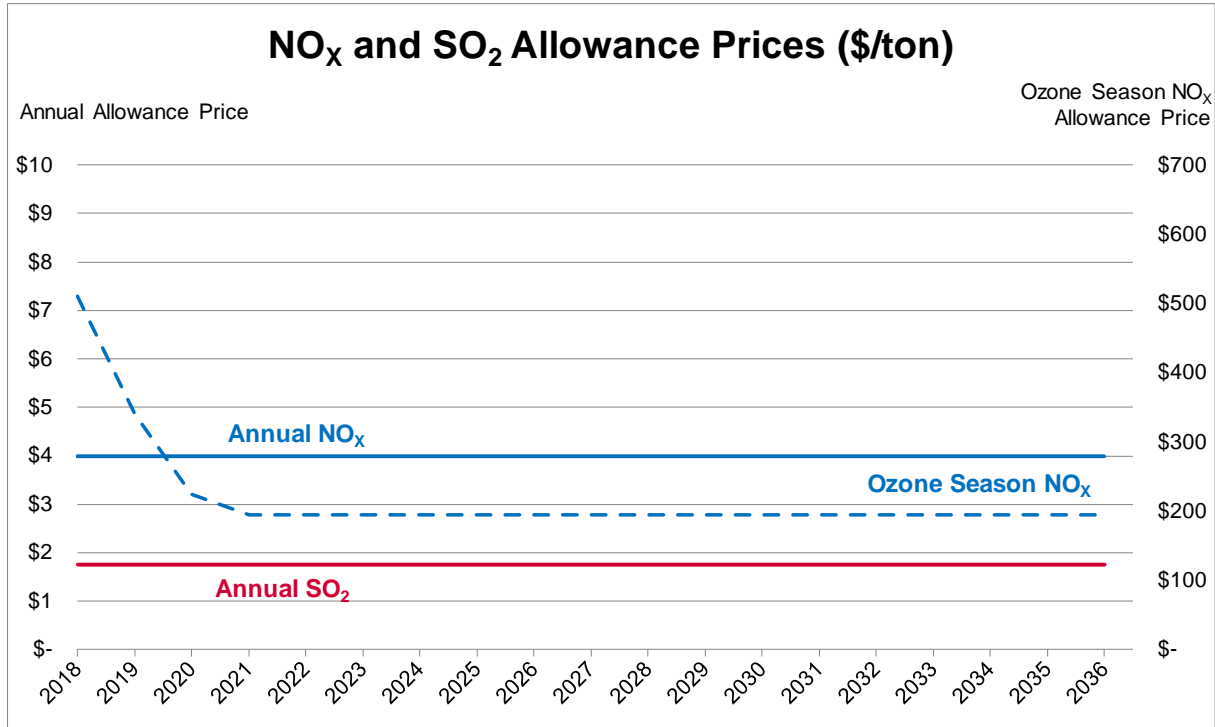
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CO₂ Emission Updates

- 2017 CARIS1 forecast retained through 2026
- No National CO₂ program assumed
- Price increase from soft floor to ceiling due to bank of surplus allowance reduced to zero in 2025, load growth, and decline in the allowance cap



NO_x and SO₂ Price Forecast



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Emission Forecast Updates

	2018 CARIS 2 Emission Price Forecast (\$/ton)				
	SO ₂	ANO _x ^[1]	OS NO _x ^[2]	ONT CO ₂	RGGI CO ₂
2018	\$ 1.75	\$ 4.00	\$ 510.00	\$ 16.25	\$ 4.20
2019	\$ 1.75	\$ 4.00	\$ 340.00	\$ 17.55	\$ 4.90
2020	\$ 1.75	\$ 4.00	\$ 225.00	\$ 17.90	\$ 5.60
2021	\$ 1.75	\$ 4.00	\$ 195.00	\$ 19.27	\$ 6.30
2022	\$ 1.75	\$ 4.00	\$ 195.00	\$ 20.69	\$ 6.74
2023	\$ 1.75	\$ 4.00	\$ 195.00	\$ 22.16	\$ 7.21
2024	\$ 1.75	\$ 4.00	\$ 195.00	\$ 23.68	\$ 7.72
2025	\$ 1.75	\$ 4.00	\$ 195.00	\$ 25.25	\$ 8.25
2026	\$ 1.75	\$ 4.00	\$ 195.00	\$ 26.87	\$ 8.84
2027	\$ 1.75	\$ 4.00	\$ 195.00	\$ 28.55	\$ 19.51
2028	\$ 1.75	\$ 4.00	\$ 195.00	\$ 31.45	\$ 20.88
2029	\$ 1.75	\$ 4.00	\$ 195.00	\$ 33.60	\$ 22.34
2030	\$ 1.75	\$ 4.00	\$ 195.00	\$ 35.90	\$ 23.90
2031	\$ 1.75	\$ 4.00	\$ 195.00	\$ 38.35	\$ 25.57
2032	\$ 1.75	\$ 4.00	\$ 195.00	\$ 40.97	\$ 27.36
2033	\$ 1.75	\$ 4.00	\$ 195.00	\$ 43.77	\$ 29.28
2034	\$ 1.75	\$ 4.00	\$ 195.00	\$ 46.76	\$ 31.33
2035	\$ 1.75	\$ 4.00	\$ 195.00	\$ 49.95	\$ 33.52
2036	\$ 1.75	\$ 4.00	\$ 195.00	\$ 53.36	\$ 35.87

[1] ANO_x is Annual NO_x price

[2] OS NO_x is Ozone season NO_x price



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Ontario Updates

- **Bruce and Darlington Nuclear Refurbishments schedule updated per IESO 2017 LTEP study**
- **Generic thermal units added to meet capacity requirement based on IESO 2017 LTEP study**
 - ~2.7GW generic CT units added by year 2025
 - Reduced future renewable buildout

<http://www.ieso.ca/sector-participants/planning-and-forecasting/long-term-energy-plan>

Commitment Hurdle Rates

Commitment Hurdle Rate	Export (from NYCA)			Import (into NYCA)		
	Transaction Cost**	2017 CARIS 1	2018 CARIS 2	Transaction Cost**	2017 CARIS 1	2018 CARIS 2
PJM	\$ 8.0	\$ 5.5	\$ 5.5	\$ 5.0	\$ 3.0	\$ 3.0
Linden VFT	\$ 8.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 3.0	\$ 3.0
Neptune	\$ 8.0	\$ 8.0	\$ 8.0	\$ 5.0	\$ 4.0	\$ 4.0
HTP	\$ 8.0	\$ 8.0	\$ 8.0	\$ 5.0	\$ 9.0	\$ 9.0
ISONE	\$ 2.0	\$ 3.5	\$ 3.5	\$ 2.0	\$ 5.0	\$ 5.0
Cross Sound Cable	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.5	\$ 2.5
Northport Norwalk Cable	\$ 2.0	\$ 4.0	\$ 4.0	\$ 2.0	\$ 3.5	\$ 3.5
IMO	\$ 6.0	\$ 6.0	\$ 6.0	\$ 4.0	\$ 4.0	\$ 4.0

** Transaction Costs are annual average costs per CRA report

(Export Transmission Service (ETS) Tariff Study, IESO, Charles River Associates, May 16, 2012)

Same as 2017 CARIS 1

Dispatch Hurdle Rates

Dispatch Hurdle Rate	Export (from NYCA)			Import (into NYCA)		
	Transaction Cost*	2017 CARIS 1	2018 CARIS 2	Transaction Cost*	2017 CARIS 1	2018 CARIS 2
PJM	\$ 6.0	\$ 3.5	\$ 3.5	\$ 3.0	\$ 1.0	\$ 1.0
Linden VFT	\$ 6.0	\$ 3.0	\$ 3.0	\$ 3.0	\$ 1.0	\$ 1.0
Neptune	\$ 6.0	\$ 6.0	\$ 6.0	\$ 3.0	\$ 2.0	\$ 2.0
HTP	\$ 6.0	\$ 6.0	\$ 6.0	\$ 3.0	\$ 7.0	\$ 7.0
ISONE	\$ -	\$ 1.5	\$ 1.5	\$ -	\$ 3.0	\$ 3.0
Cross Sound Cable	\$ -	\$ -	\$ -	\$ -	\$ 0.5	\$ 0.5
Northport Norwalk Cable	\$ -	\$ 2.0	\$ 2.0	\$ -	\$ 1.5	\$ 1.5
IMO	\$ 4.0	\$ 4.0	\$ 4.0	\$ 2.0	\$ 2.0	\$ 2.0

Dispatch Hurdle Rate = Commitment Hurdle Rate - \$2.0
Same as 2017 CARIS 1

2018 CARIS Phase 2 Preliminary Base Case Results

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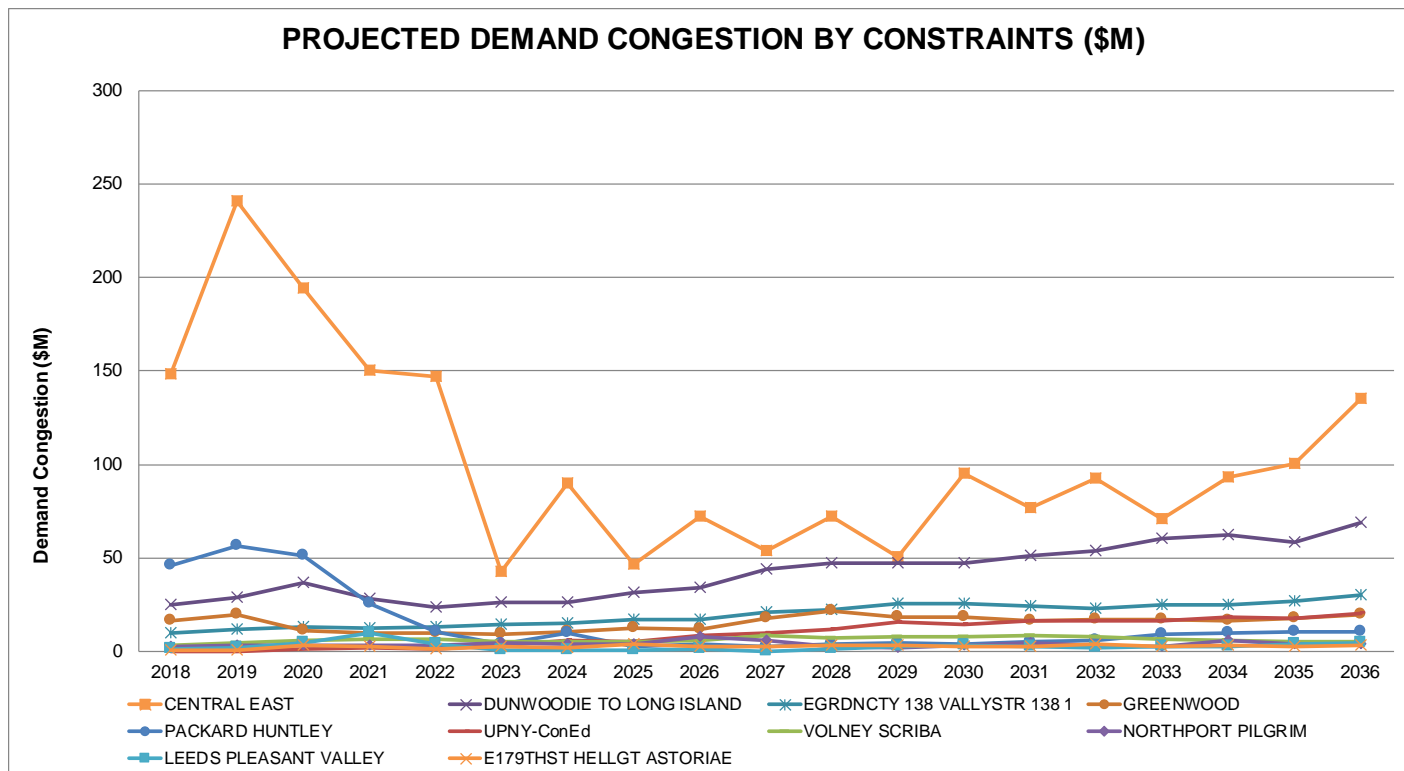
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Projected Demand Congestion by Constraint

Demand Congestion (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
CENTRAL EAST	148	241	194	151	147	43	90	47	72	54	72	51	95	77	92	71	93	100	135
DUNWOODIE TO LONG ISLAND	25	29	37	28	23	26	26	32	34	44	47	47	47	51	54	60	62	58	69
EGRDNCTY 138 VALLYSTR 138 1	10	12	13	12	13	15	15	17	17	21	22	26	26	24	23	25	25	27	30
GREENWOOD	16	20	11	10	10	9	10	12	12	18	22	19	18	16	17	17	16	17	20
PACKARD HUNTLEY	46	56	51	25	11	4	10	2	4	3	4	4	4	5	6	9	10	11	11
UPNY-ConEd	0	0	2	2	1	3	6	5	8	10	12	16	15	16	16	16	19	18	20
VOLNEY SCRIBA	4	5	6	7	6	5	5	5	6	8	7	8	8	8	8	6	6	5	5
NORTHPORT PILGRIM	3	3	3	3	4	4	4	4	8	6	3	2	3	5	3	3	6	4	4
LEEDS PLEASANT VALLEY	1	2	5	10	4	0	1	1	1	0	1	3	3	2	2	2	2	4	5
E179THST HELLGT ASTORIAE	0	1	3	3	2	2	2	4	3	3	3	3	2	2	4	3	3	3	3

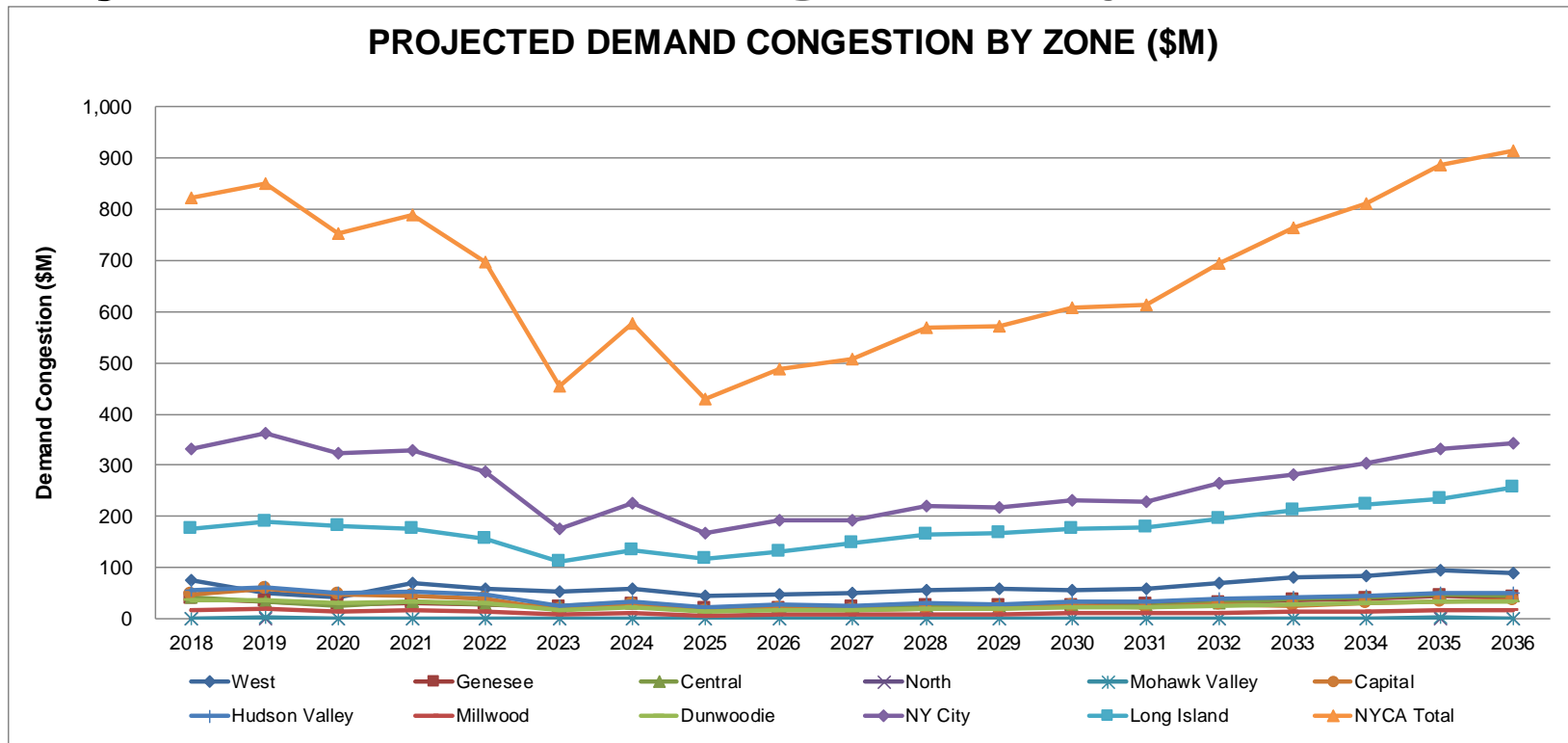
Projected Demand Congestion by Constraint



Projected Demand Congestion by Zone

Demand Congestion (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	76	51	42	70	60	52	60	44	47	51	55	58	57	60	69	81	83	95	88
Genesee	40	34	29	32	28	23	28	19	21	22	24	26	25	27	31	37	38	44	41
Central	41	33	26	34	28	25	30	20	22	22	24	26	25	27	31	40	41	47	44
North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Mohawk Valley	1	2	1	1	1	1	1	1	1	0	0	1	1	1	1	2	1	2	1
Capital	48	60	49	44	40	16	27	15	20	17	21	18	25	23	27	26	30	33	37
Hudson Valley	57	61	51	53	48	25	35	23	27	26	30	29	33	33	38	41	45	50	52
Millwood	17	19	15	16	14	8	11	7	8	8	9	9	11	11	12	13	14	16	17
Dunwoodie	36	38	32	34	30	17	23	15	18	18	20	20	23	23	26	28	30	34	35
NY City	332	362	324	329	289	176	227	168	192	194	221	217	233	230	265	281	303	331	342
Long Island	175	191	183	175	157	112	135	117	132	149	164	167	176	180	194	213	225	234	256
NYCA Total	823	851	752	788	696	455	577	429	489	508	570	572	607	613	694	763	811	885	914

Projected Demand Congestion by Zone



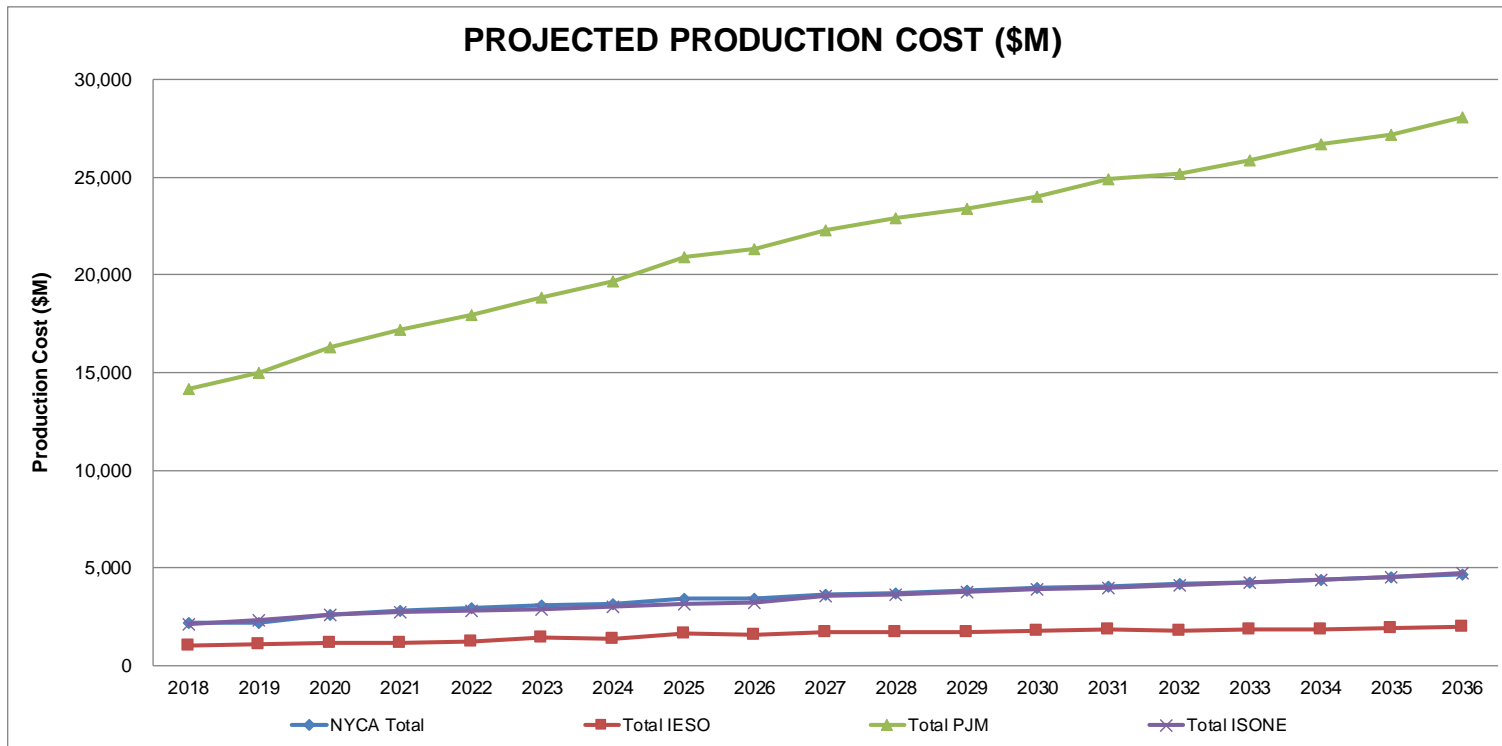
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Projected Production Cost (\$M)

Production Cost (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	12	17	24	25	32	57	47	83	77	46	43	46	46	46	43	35	39	34	36
Genesee	38	36	38	42	40	43	46	45	46	51	47	48	53	50	52	57	54	55	61
Central	260	281	321	354	379	442	440	490	490	518	509	536	537	564	564	584	586	600	624
North	4	5	7	8	9	16	12	19	17	12	14	13	13	14	14	12	13	11	11
Mohawk Valley	3	3	3	4	4	7	6	8	7	7	6	7	7	7	7	6	8	6	6
Capital	392	396	445	521	572	592	604	648	653	670	690	715	734	750	769	759	787	802	839
Hudson Valley	215	218	398	489	506	501	504	546	557	555	574	582	599	609	621	631	660	668	678
Millwood	128	132	91	23	6	7	7	7	7	7	7	7	7	7	8	8	8	8	8
Dunwoodie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NY City	841	860	952	1,052	1,083	1,113	1,152	1,220	1,243	1,382	1,414	1,481	1,519	1,574	1,636	1,675	1,755	1,815	1,881
Long Island	281	279	301	312	319	328	342	357	366	390	402	419	435	445	458	472	490	505	530
NYCA Total	2,175	2,227	2,582	2,831	2,952	3,105	3,160	3,423	3,464	3,637	3,706	3,854	3,950	4,065	4,170	4,239	4,399	4,504	4,674
NYCA Imports	594	671	819	903	979	1,042	1,138	1,155	1,248	1,521	1,638	1,674	1,746	1,787	1,896	1,934	2,044	2,084	2,246
NYCA Exports	244	240	282	227	201	211	225	238	219	264	249	280	276	289	300	322	318	350	376
NYCA + Imports - Exports	2,525	2,658	3,119	3,507	3,730	3,937	4,073	4,341	4,493	4,895	5,096	5,249	5,420	5,564	5,767	5,852	6,125	6,238	6,544
Total IESO	1,020	1,063	1,140	1,177	1,231	1,442	1,350	1,674	1,583	1,704	1,707	1,745	1,798	1,856	1,794	1,825	1,876	1,920	1,972
Total PJM	14,156	15,029	16,307	17,174	17,963	18,832	19,658	20,943	21,312	22,308	22,908	23,421	24,003	24,906	25,157	25,859	26,691	27,162	28,087
Total ISONE	2,157	2,324	2,584	2,744	2,816	2,915	3,020	3,151	3,220	3,556	3,660	3,773	3,913	4,013	4,118	4,253	4,397	4,502	4,733
Total System	19,508	20,643	22,613	23,927	24,962	26,295	27,188	29,191	29,579	31,205	31,981	32,794	33,664	34,840	35,239	36,176	37,364	38,088	39,466

Projected Production Cost (\$M)



Projected NYCA Generation(GWh)

Generation (GWh)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	14,579	14,919	15,430	15,418	15,649	16,252	15,925	16,747	16,556	15,748	15,701	15,763	15,741	15,712	15,666	15,501	15,555	15,490	15,524
Genesee	5,260	4,888	4,965	5,390	4,996	5,046	5,463	5,068	5,079	5,483	5,074	5,058	5,484	5,079	5,103	5,507	5,099	5,086	5,526
Central	28,172	29,547	29,553	31,185	30,789	33,283	31,714	33,695	32,334	32,830	31,338	32,523	31,223	32,454	31,198	32,190	30,884	31,840	30,903
North	8,749	8,770	8,820	8,832	8,849	9,009	8,934	9,057	9,011	8,839	8,866	8,867	8,858	8,852	8,855	8,804	8,816	8,816	8,796
Mohawk Valley	2,923	3,081	3,123	3,151	3,180	3,240	3,261	3,293	3,288	3,275	3,275	3,308	3,312	3,305	3,312	3,305	3,323	3,323	3,325
Capital	16,189	15,489	15,487	17,131	17,931	17,895	17,518	17,825	17,407	15,879	15,776	15,729	15,758	15,634	15,399	14,842	14,822	14,736	14,660
Hudson Valley	7,461	7,100	12,200	13,986	14,109	13,562	13,267	13,509	13,456	11,901	11,934	11,779	11,854	11,623	11,495	11,280	11,268	11,232	10,959
Millwood	17,123	17,121	11,370	2,558	435	438	443	443	445	446	449	450	451	454	455	456	458	459	462
Dunwoodie	47	58	68	74	81	85	89	93	96	99	102	105	108	111	113	114	116	118	121
NY City	26,592	25,421	24,798	26,215	26,131	25,495	25,145	25,318	25,073	25,082	24,887	25,062	25,008	25,238	25,329	25,292	25,664	25,846	25,532
Long Island	9,018	8,563	8,277	8,346	8,285	8,119	8,002	8,077	8,041	7,622	7,625	7,559	7,650	7,616	7,640	7,704	7,727	7,656	7,731
NYCA Total	136,112	134,956	134,091	132,286	130,436	132,424	129,761	133,125	130,787	127,205	125,027	126,204	125,449	126,077	124,567	124,994	123,730	124,603	123,538
Total IESO	154,675	155,890	154,142	149,274	148,845	138,777	146,631	134,436	139,345	136,959	140,403	138,152	139,831	138,343	141,337	141,864	142,915	142,730	142,853
Total PJM	799,662	803,688	805,443	808,961	813,701	825,006	826,437	835,402	837,903	845,332	844,046	845,933	845,130	846,217	845,368	844,859	844,703	845,198	845,980
Total ISONE	108,520	106,827	104,027	104,845	104,457	103,587	102,510	102,501	101,942	100,931	101,239	100,875	101,046	101,063	100,840	100,738	101,144	100,666	100,648
Total HQ *	22,390	22,397	22,481	22,430	22,423	22,421	22,460	22,411	22,432	22,430	22,487	22,390	22,397	22,411	22,494	22,423	22,421	22,390	22,473
Total System	1,221,358	1,223,759	1,220,183	1,217,795	1,219,862	1,222,215	1,227,799	1,227,874	1,232,409	1,232,856	1,233,203	1,233,554	1,233,854	1,234,111	1,234,606	1,234,878	1,234,913	1,235,586	1,235,493

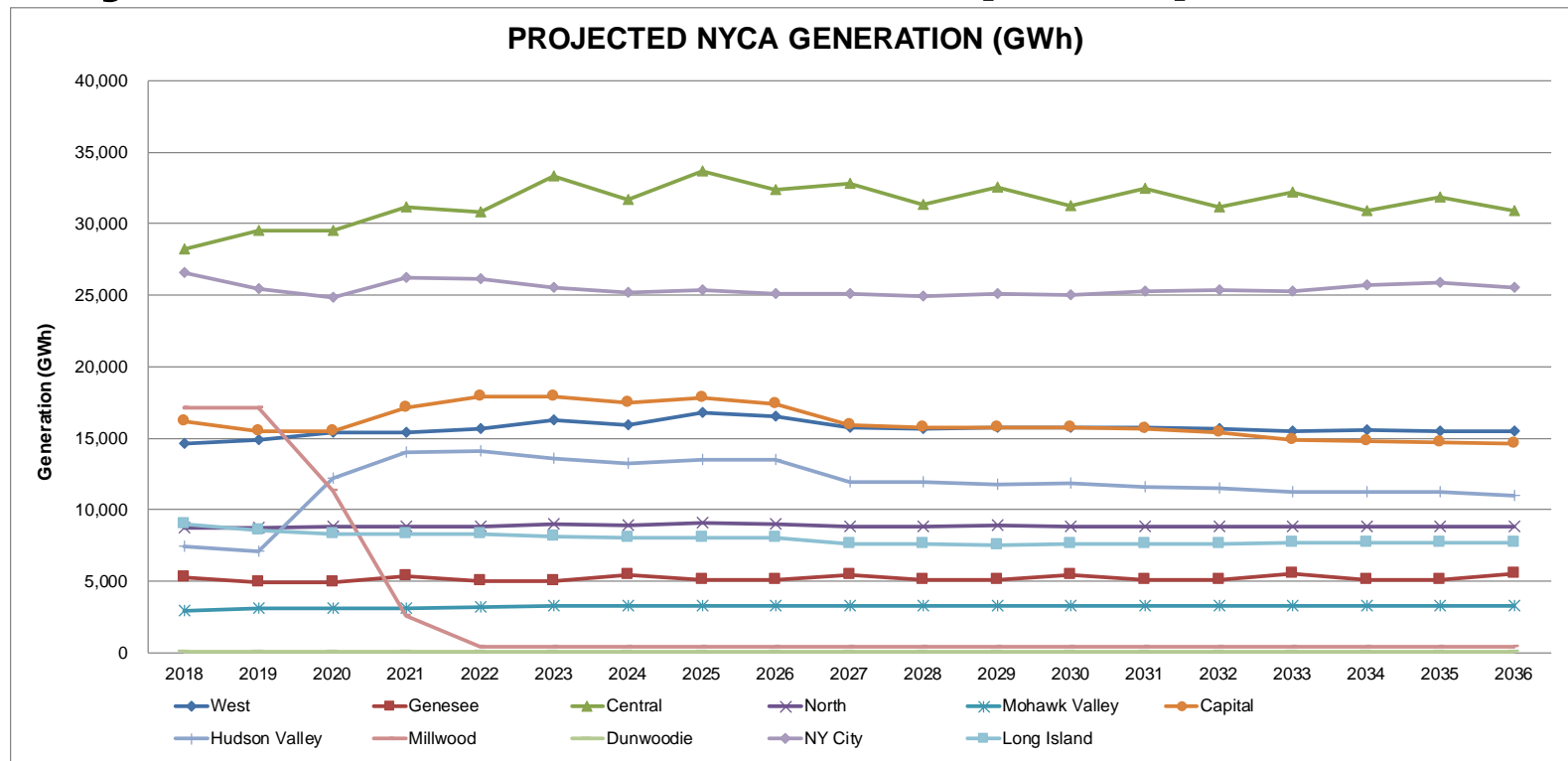
*Only interchange flow is modeled



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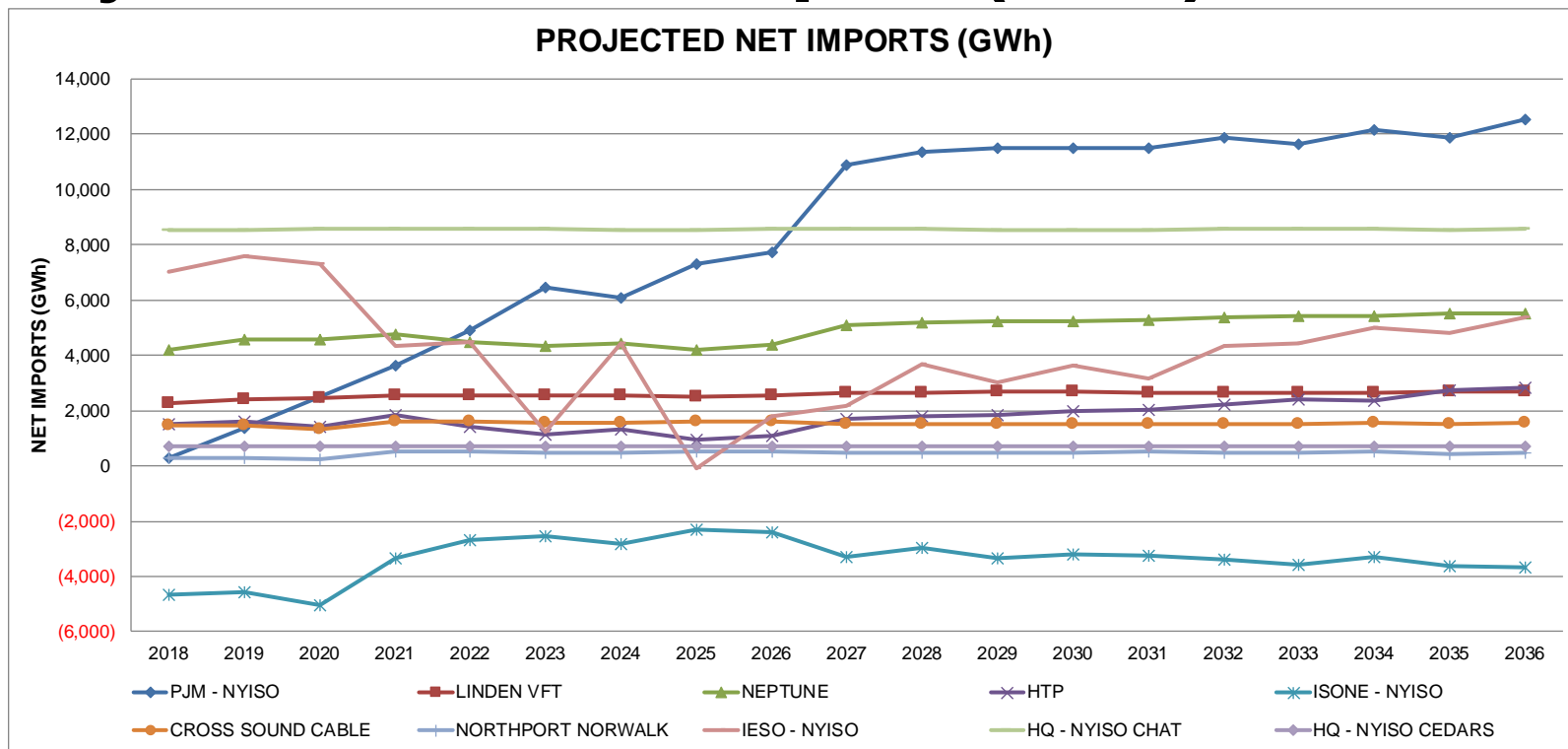
Projected NYCA Generation (GWh)



Projected NYCA Net Imports(GWh)

NET IMPORTS (GWh)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
PJM - NYISO	264	1,352	2,505	3,627	4,920	6,461	6,060	7,294	7,721	10,864	11,365	11,509	11,520	11,477	11,864	11,616	12,164	11,871	12,528
LINDEN VFT	2,259	2,403	2,464	2,558	2,544	2,532	2,568	2,511	2,559	2,650	2,665	2,681	2,676	2,652	2,653	2,654	2,655	2,669	2,680
NEPTUNE	4,216	4,551	4,592	4,768	4,498	4,341	4,452	4,219	4,378	5,069	5,184	5,233	5,256	5,296	5,381	5,403	5,414	5,508	5,524
HTP	1,512	1,592	1,413	1,839	1,426	1,135	1,307	928	1,068	1,716	1,795	1,857	1,998	2,025	2,236	2,386	2,370	2,728	2,826
ISONE - NYISO	(4,665)	(4,583)	(5,029)	(3,347)	(2,666)	(2,546)	(2,825)	(2,292)	(2,383)	(3,292)	(2,984)	(3,347)	(3,210)	(3,230)	(3,365)	(3,561)	(3,274)	(3,619)	(3,681)
CROSS SOUND CABLE	1,472	1,445	1,311	1,621	1,621	1,552	1,562	1,628	1,588	1,500	1,492	1,494	1,527	1,533	1,507	1,511	1,578	1,532	1,578
NORTHPORT NORWALK	286	269	236	504	542	498	471	542	506	470	493	460	463	500	454	481	530	447	476
IESO - NYISO	7,014	7,569	7,284	4,343	4,467	1,225	4,434	(111)	1,795	2,177	3,667	3,018	3,647	3,162	4,350	4,416	4,979	4,803	5,396
HQ - NYISO CHAT	8,536	8,546	8,592	8,583	8,585	8,575	8,552	8,548	8,569	8,572	8,598	8,524	8,534	8,548	8,594	8,572	8,575	8,524	8,567
HQ - NYISO CEDARS	719	717	717	715	713	713	720	716	715	715	714	719	717	716	716	713	713	719	718
TOTAL	21,613	23,860	24,083	25,211	26,649	24,486	27,301	23,983	26,517	30,442	32,990	32,149	33,127	32,679	34,391	34,191	35,703	35,183	36,613

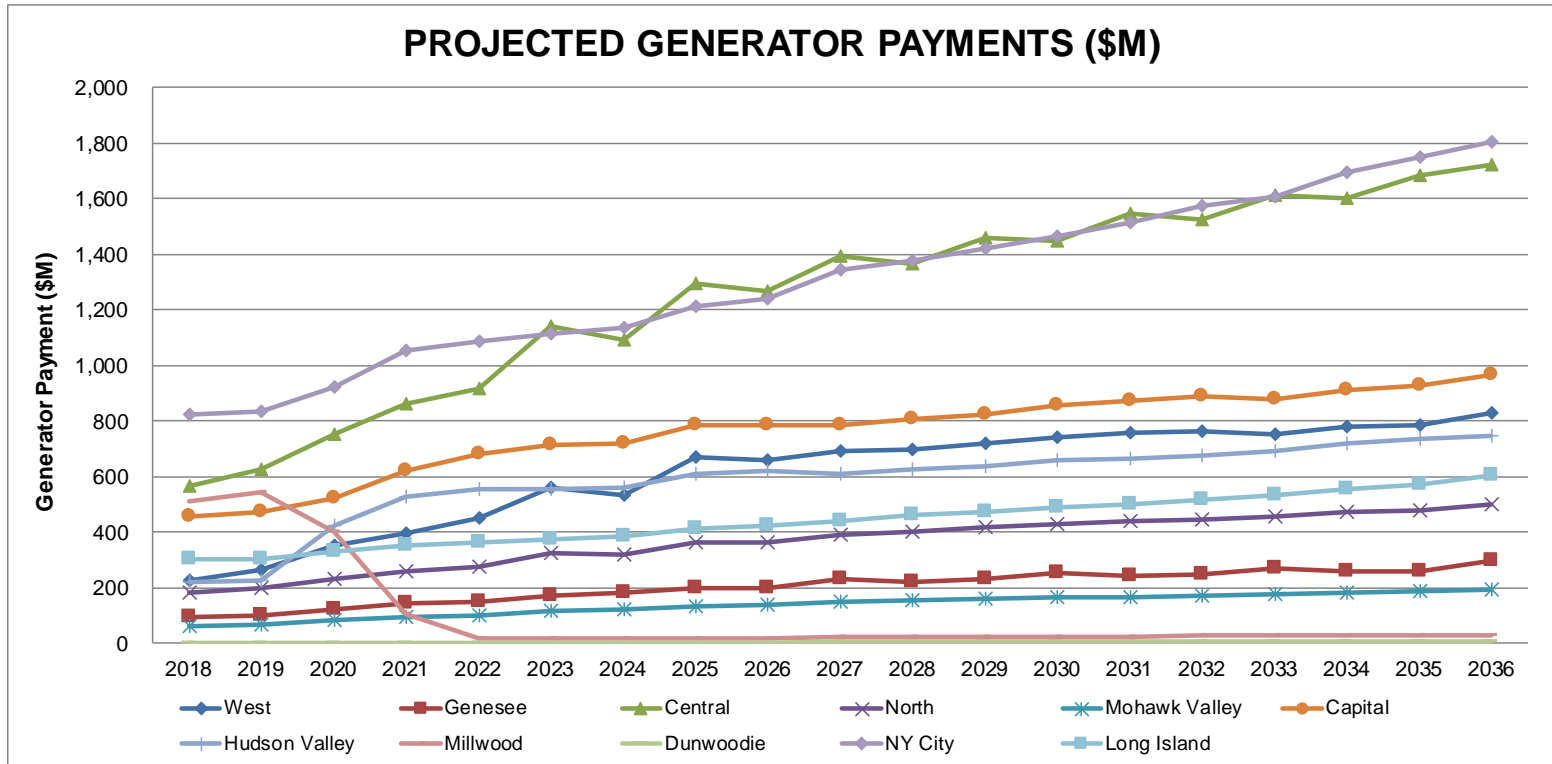
Projected NYCA Net Imports (GWh)



Projected Generator Payments(\$M)

Generator Payment (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	230	265	354	395	452	563	535	670	661	691	698	720	741	760	762	754	782	785	831
Genesee	95	98	122	145	148	175	185	199	200	235	223	230	255	244	247	270	260	262	299
Central	566	626	753	864	919	1,143	1,095	1,298	1,267	1,393	1,368	1,461	1,451	1,546	1,523	1,612	1,605	1,686	1,723
North	185	197	235	259	277	323	322	364	366	394	403	417	428	440	448	456	471	481	502
Mohawk Valley	64	70	85	94	102	120	121	136	138	151	154	160	165	169	172	176	183	187	195
Capital	459	471	524	620	684	713	720	784	789	787	809	826	856	873	890	877	913	930	967
Hudson Valley	223	226	424	527	554	555	559	608	621	609	630	637	660	668	679	691	720	735	748
Millwood	512	542	404	106	17	18	19	20	21	23	24	25	25	26	27	28	29	30	32
Dunwoodie	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	9
NY City	824	838	921	1,056	1,088	1,114	1,137	1,216	1,243	1,345	1,377	1,421	1,465	1,514	1,573	1,607	1,695	1,752	1,806
Long Island	301	305	331	356	365	377	385	413	422	443	462	472	491	502	518	536	558	573	604
NYCA Total	3,460	3,640	4,156	4,426	4,610	5,106	5,082	5,713	5,732	6,076	6,152	6,376	6,545	6,750	6,847	7,014	7,224	7,428	7,715

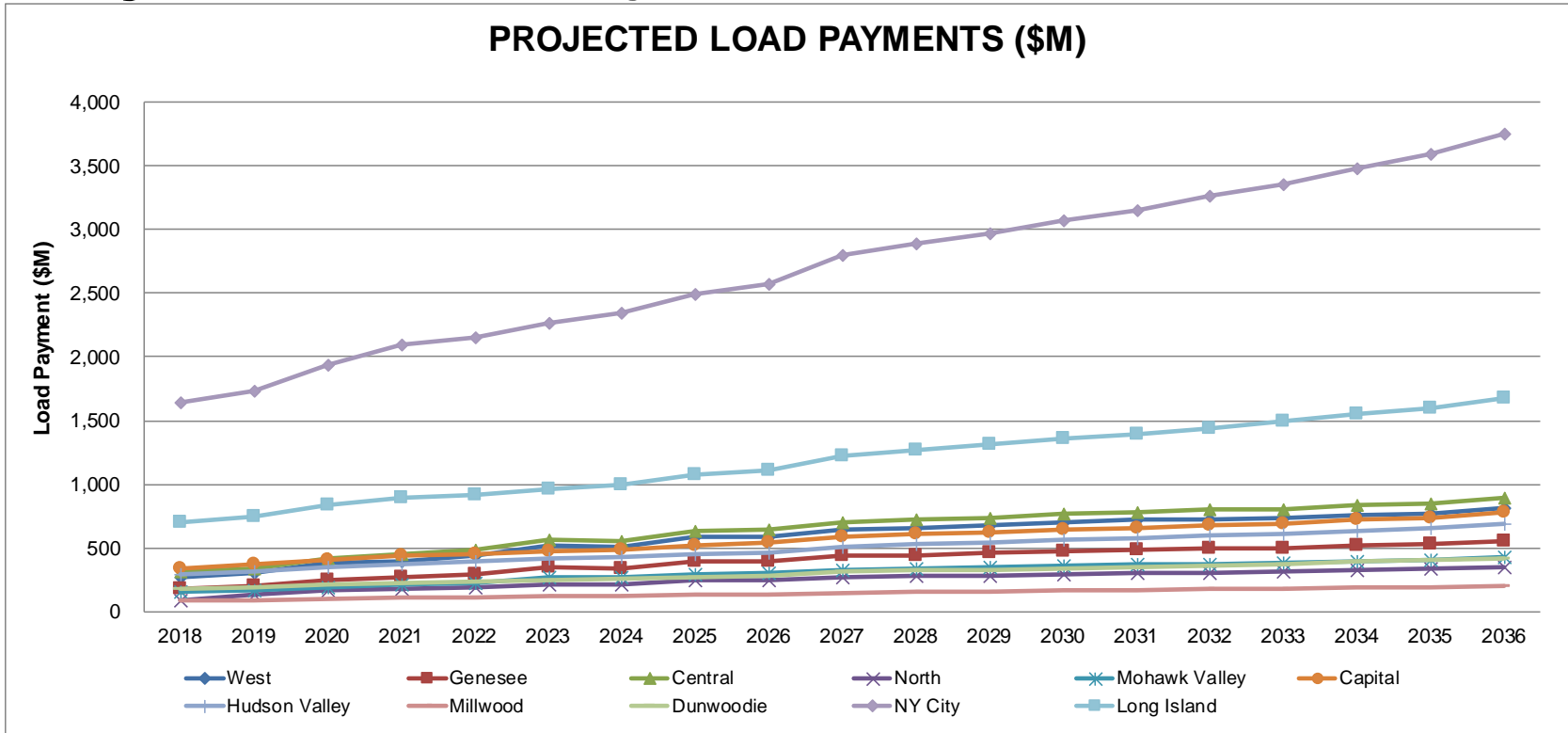
Projected Generator Payments(\$M)



Projected Load Payments(\$M)

Load Payment (\$M)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	267	310	383	399	438	515	504	590	592	649	660	681	702	723	729	733	759	768	812
Genesee	183	201	248	271	296	346	340	393	397	436	445	459	474	488	495	499	519	527	555
Central	317	343	418	451	489	560	559	631	641	703	719	741	765	785	800	808	838	852	897
North	94	136	163	179	191	219	219	245	248	272	278	287	295	304	310	316	326	334	349
Mohawk Valley	156	165	195	211	225	265	268	296	301	330	338	349	359	370	378	385	398	407	427
Capital	341	368	411	438	457	475	491	525	539	587	605	622	645	661	680	694	721	741	777
Hudson Valley	294	311	347	378	393	412	427	454	468	509	526	541	561	576	595	612	636	656	686
Millwood	87	92	102	111	116	121	126	134	138	151	156	161	167	172	177	183	190	196	205
Dunwoodie	180	190	211	230	239	250	259	276	285	311	322	332	344	354	366	377	392	404	423
NY City	1,641	1,734	1,935	2,093	2,158	2,264	2,343	2,492	2,568	2,796	2,893	2,974	3,072	3,154	3,262	3,352	3,483	3,588	3,752
Long Island	704	747	838	895	921	967	1,001	1,072	1,111	1,225	1,271	1,310	1,355	1,396	1,443	1,493	1,551	1,593	1,680
NYCA Total	4,264	4,596	5,251	5,657	5,922	6,394	6,537	7,107	7,287	7,970	8,214	8,456	8,739	8,983	9,235	9,452	9,814	10,066	10,563

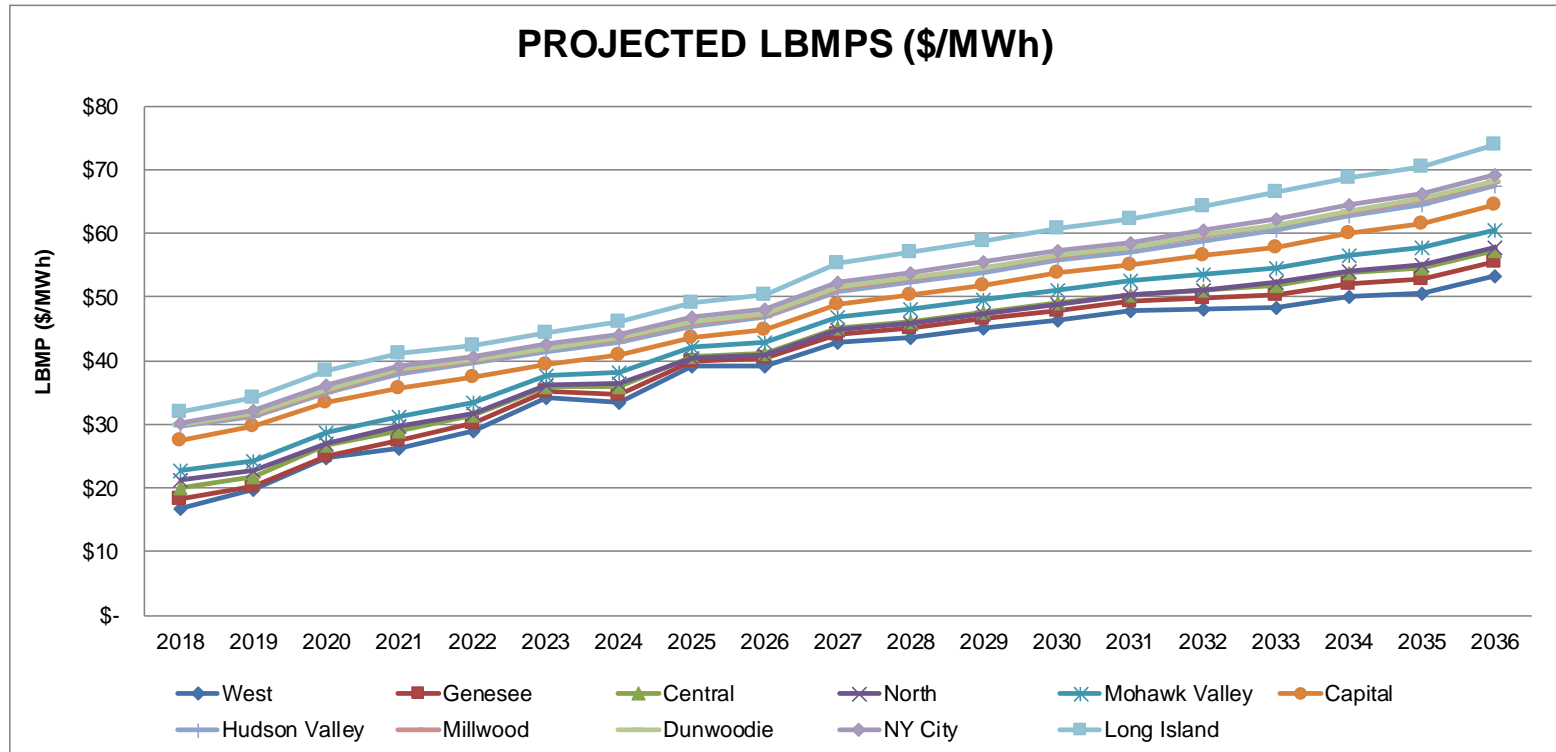
Projected Load Payments(\$M)



Projected LBMP (\$/MWh)

LBMP (\$/MWh)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
West	16.94	19.83	24.81	26.19	28.91	34.19	33.51	39.12	39.21	43.02	43.59	45.14	46.43	47.87	48.11	48.49	50.13	50.65	53.47
Genesee	18.33	20.27	25.09	27.57	30.19	35.28	34.78	40.02	40.32	44.21	45.03	46.56	47.88	49.31	49.86	50.32	52.15	52.86	55.59
Central	20.02	21.84	26.66	28.95	31.42	36.06	36.06	40.61	41.20	45.17	46.14	47.63	49.09	50.41	51.23	51.86	53.72	54.52	57.39
North	21.24	22.74	27.01	29.70	31.68	36.17	36.33	40.45	40.94	44.95	45.91	47.51	48.81	50.25	51.19	52.30	54.02	55.20	57.76
Mohawk Valley	22.76	24.24	28.69	31.34	33.44	37.76	38.15	42.11	42.85	46.93	48.05	49.61	51.09	52.49	53.60	54.66	56.55	57.72	60.49
Capital	27.40	29.73	33.41	35.82	37.54	39.54	40.87	43.71	44.87	48.96	50.40	51.82	53.77	55.01	56.53	57.81	59.97	61.53	64.57
Hudson Valley	29.64	31.32	34.92	38.06	39.58	41.48	42.95	45.51	46.79	50.90	52.43	53.95	55.80	57.17	58.91	60.57	62.73	64.57	67.43
Millwood	29.87	31.57	35.24	38.46	39.95	41.83	43.35	45.89	47.22	51.36	52.93	54.49	56.35	57.75	59.50	61.19	63.37	65.23	68.12
Dunwoodie	30.02	31.72	35.41	38.65	40.11	41.99	43.54	46.04	47.39	51.52	53.10	54.66	56.52	57.93	59.69	61.40	63.59	65.46	68.34
NY City	30.31	32.17	36.20	39.29	40.61	42.66	44.19	46.84	48.13	52.30	53.95	55.50	57.27	58.66	60.55	62.20	64.42	66.24	69.18
Long Island	32.06	34.12	38.36	41.07	42.31	44.47	46.02	49.00	50.48	55.40	57.15	58.88	60.78	62.37	64.26	66.41	68.70	70.43	74.05

Projected LBMP (\$/MWh)



2018 CARIS Phase 2 Next Steps

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Next Steps

- Follow-up presentation to address comments
- Additional Base Case Results
- Present Final Base Case to BIC for review and comment

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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