

2024-33 Light Load Forecast

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Agenda

- **Background**
- **Forecast Methodology**
- **Light Load Forecast Summary**
- **BTM Solar Impacts**
- **Light Load Day Load Shapes**
- **Midday Net Light Load Trends**

Background

- The midday light load and minimum load forecasts were developed for use in planning studies
- 2024 to 2033 forecast horizon
- The light load forecast reflects a low midday net load hour with high BTM solar generation, approaching or equal to the overall NYCA annual minimum load hour
- NYCA-coincident forecast for hour beginning 12 (solar noon with largest BTM solar impacts)
 - The minimum load often occurs a couple hours later, in the early afternoon
- Reflects April/May weekend day
 - Maximum BTM solar impacts across the year
 - Weekend load levels are lower than weekday levels

Forecast Methodology

- **Forecast originates at the NYCA (system) level**
- **4/9/2023 used as a starting point**
 - Sunday Holiday with low net load level and very high BTM solar generation
 - Metered net loads (including transmission losses)
 - Estimated actual BTM solar generation based on sampled inverter data and BTM PV capacity schedule
 - Gross load shape derived from net loads and estimated BTM solar generation
- **Base gross load growth**
 - Light load hour base gross load growth driven by econometric trends, energy efficiency savings, and other impacts
 - Informed by growth trends from the 2023 Gold Book annual energy forecasts (base load growth excluding electrification, BTM solar, and other impacts)

Forecast Methodology (cont.)

■ Electric Vehicle (EV) impacts

- Projected spring weekend EV charging load added to the light load hour forecast
- Uses EV saturation trends from the 2023 Gold Book

■ Building Electrification impacts

- Projected impacts of non-weather sensitive building appliance electrification added to the forecast
- Reflective of electrification saturations assumed in the 2023 Gold Book forecast

■ Energy Storage charging

- Additional load due to behind-the-meter storage charging during midday hours added to the forecast
- Considers potential impacts from hybrid solar and storage sites
- Informed by BTM storage capacity forecast from the 2023 Gold Book

■ Large Loads

- Projected light load hour impacts from existing and future interconnecting large loads
- Informed by 2023 Gold Book large load annual energy and seasonal peak forecasts

Forecast Methodology (cont.)

■ NYCA midday light load forecast

- Gross load forecast calculated as the sum of existing gross load, base load growth, large load growth, EV charging, storage charging, and electrification impacts
- NYCA BTM solar generation determined by 2023 Gold Book Table I-9d: Maximum BTM Solar PV Generation
- Net load forecast derived from gross load and BTM solar generation

■ Zonal light load forecast

- Initial forecast developed at the NYCA level
- Zonal forecasts are based on existing gross load and relative econometric growth; and the relative magnitude of EV, building electrification, large load, and BTM storage levels and trends specific to each zone
- Zonal BTM solar generation determined by 2023 Gold Book Table I-9d: Maximum BTM Solar PV Generation
- Zonal net load forecast derived from zonal gross load and BTM solar generation

■ Midday minimum load forecast

- Calculated using the same shape analyses as the light load hour forecast (noon hour)
- Selects the smallest net load hour from the projected load shape (2pm hour)

Light Load Forecast Summary

Forecast Buildup

2023-24 NYCA Midday Light Load Forecast - MW

Year	(a) Base Gross Load	(b) (+) Large Loads	(c) (+) EV Charging	(d) (+) Building Electrification	(e) (+) BTM Storage Charging	(f) = a+ b+ c+ d+ e Final Gross Load	(g) (-) BTM Solar Generation	(h) = f - g Light Load Forecast	(i) Minimum Load Forecast
2024	14,889	440	42	18	57	15,446	3,915	11,531	11,149
2025	14,691	590	101	42	108	15,532	4,569	10,963	10,598
2026	14,504	850	187	69	159	15,769	5,186	10,583	10,227
2027	14,340	990	304	103	218	15,955	5,737	10,218	9,864
2028	14,188	1,040	442	140	271	16,081	6,205	9,876	9,520
2029	14,030	1,060	600	182	317	16,189	6,587	9,602	9,244
2030	13,882	1,120	778	228	352	16,360	6,889	9,471	9,110
2031	13,762	1,120	972	278	378	16,510	7,133	9,377	9,013
2032	13,649	1,120	1,184	335	400	16,688	7,360	9,328	8,962
2033	13,567	1,120	1,415	397	420	16,919	7,566	9,353	8,987

(a) - Base Gross Load - reflects projected load trends due to baseline impacts such as econometric growth, end-use saturations, energy efficiency, and BTM non-solar DER

(b) - Total large load impacts expected during the light load day (including existing load levels)

(c) - Electric Vehicle charging during the light load hour

(d) - Building Electrification impacts during the light load hour

(e) - BTM storage charging during the light load hour, including potential storage charging from hybrid solar/storage systems

(f) - Final Gross Load - represents total demand

(g) - BTM Solar Generation - reflects solar generation during the NYCA midday light load hour and maximum BTM solar hour (2023 GB Table I-9d)

(h) - Net Light Load Forecast - represents metered load to be served by the wholesale market during Hour Beginning 12 on the light load day

(i) - Minimum Load Forecast - minimum hourly metered load served by the wholesale market during the light load day (Hour Beginning 14)

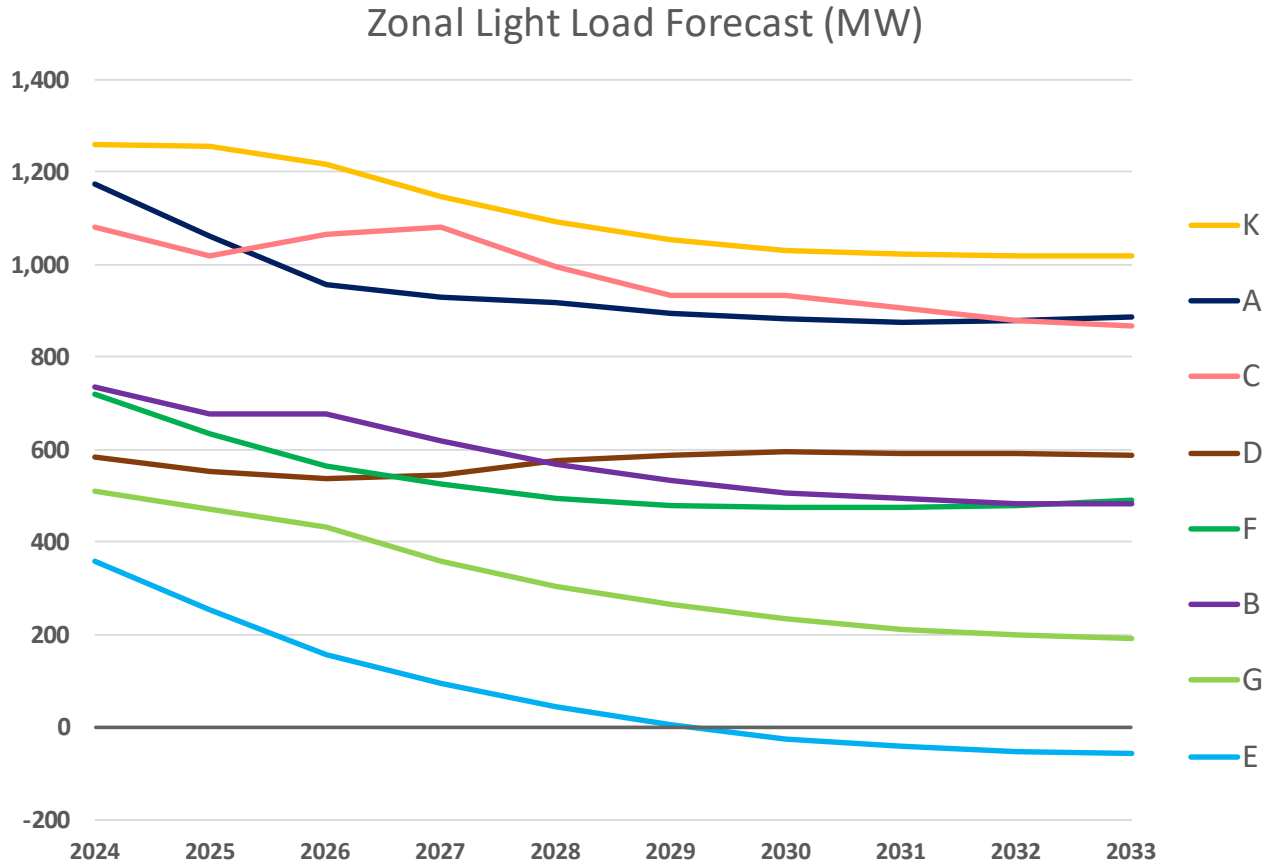
Zonal Forecast Values

2024-33 NYCA Midday Light Load Forecast - Net Load

Net Load by Zone - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2024	1,173	737	1,081	584	358	719	509	242	438	4,430	1,260	11,531
2025	1,061	677	1,019	552	254	633	473	238	429	4,371	1,256	10,963
2026	958	678	1,066	538	157	564	431	230	421	4,322	1,218	10,583
2027	930	619	1,080	545	95	527	360	223	413	4,277	1,149	10,218
2028	918	570	996	576	43	495	304	220	409	4,252	1,093	9,876
2029	896	532	932	589	4	480	264	216	406	4,229	1,054	9,602
2030	884	507	935	595	-25	474	234	212	406	4,220	1,029	9,471
2031	876	493	905	592	-40	476	212	211	408	4,222	1,022	9,377
2032	880	483	879	590	-52	480	201	210	410	4,228	1,019	9,328
2033	888	482	867	586	-58	490	192	210	419	4,258	1,019	9,353

Zonal Forecast Graph



BTM Solar Impacts

BTM Solar Capacity – Gold Book Forecast

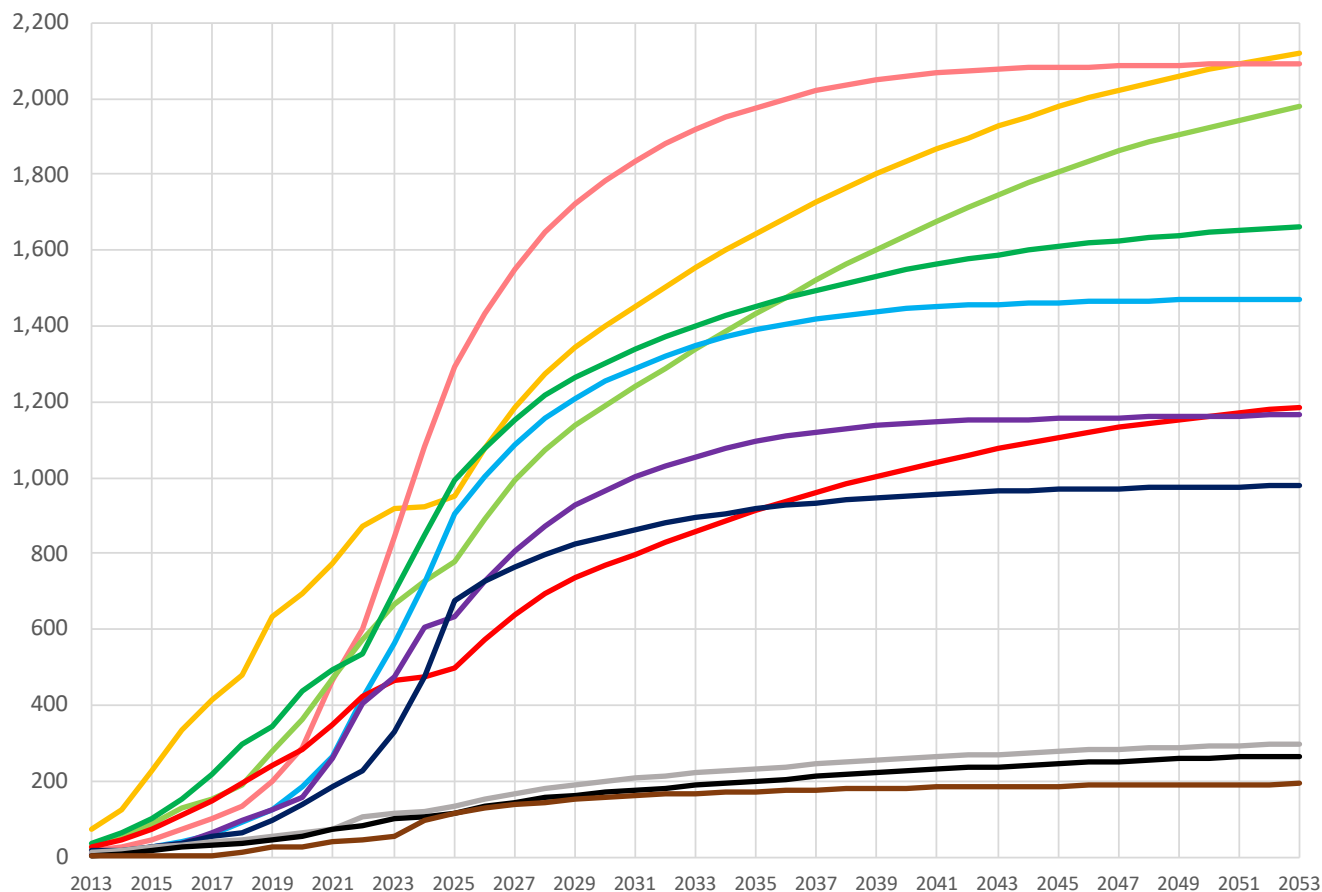
Table I-9a: Solar PV Nameplate Capacity, Behind-the-Meter

Reflects Total Cumulative Nameplate Capacity

Nameplate Capacity by Zone - MW DC

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2013	15	6	16	1	7	35	27	4	10	27	74	222
2014	19	13	26	2	14	65	49	7	15	47	126	383
2015	27	25	46	3	26	100	89	15	24	73	225	653
2016	34	37	73	4	38	151	128	24	33	109	333	964
2017	53	63	101	4	61	219	151	29	40	147	413	1,281
2018	65	97	134	10	90	298	189	36	47	194	478	1,638
2019	94	126	199	25	126	342	276	44	54	240	632	2,158
2020	139	159	289	28	187	436	361	52	63	285	696	2,695
2021	183	258	464	38	266	495	469	72	75	349	774	3,443
2022	226	404	602	45	418	537	573	83	107	423	872	4,290
2023	329	474	846	56	562	701	667	102	115	465	917	5,234
2024	476	607	1,082	95	720	850	729	106	120	476	925	6,186
2025	677	635	1,294	116	905	992	777	117	134	499	951	7,097
2026	725	728	1,431	127	1,002	1,079	892	132	152	574	1,077	7,919
2027	765	808	1,548	137	1,086	1,154	991	145	167	639	1,185	8,625
2028	799	874	1,645	145	1,155	1,216	1,073	155	180	692	1,274	9,208
2029	825	926	1,723	151	1,210	1,265	1,138	163	190	734	1,345	9,670
2030	846	967	1,783	156	1,253	1,303	1,189	170	198	767	1,400	10,032
2031	864	1,002	1,834	160	1,289	1,338	1,239	176	206	799	1,453	10,360
2032	880	1,031	1,879	164	1,321	1,370	1,288	182	213	829	1,503	10,660
2033	894	1,056	1,917	167	1,348	1,399	1,337	188	220	858	1,552	10,936

Behind-the-Meter Solar Capacity Forecast (MW DC)



Year	NYCA	Growth
2013	222	
2014	383	161
2015	653	270
2016	964	311
2017	1,281	317
2018	1,638	357
2019	2,158	520
2020	2,695	537
2021	3,443	748
2022	4,290	847
2023	5,234	944
2024	6,186	952
2025	7,097	911
2026	7,919	822
2027	8,625	706
2028	9,208	583
2029	9,670	462
2030	10,032	362
2031	10,360	328
2032	10,660	300
2033	10,936	276
2043	12,682	
2053	13,400	

Maximum BTM Solar Generation – Gold Book Forecast

Table I-9d: Maximum Solar PV Generation, Behind-the-Meter

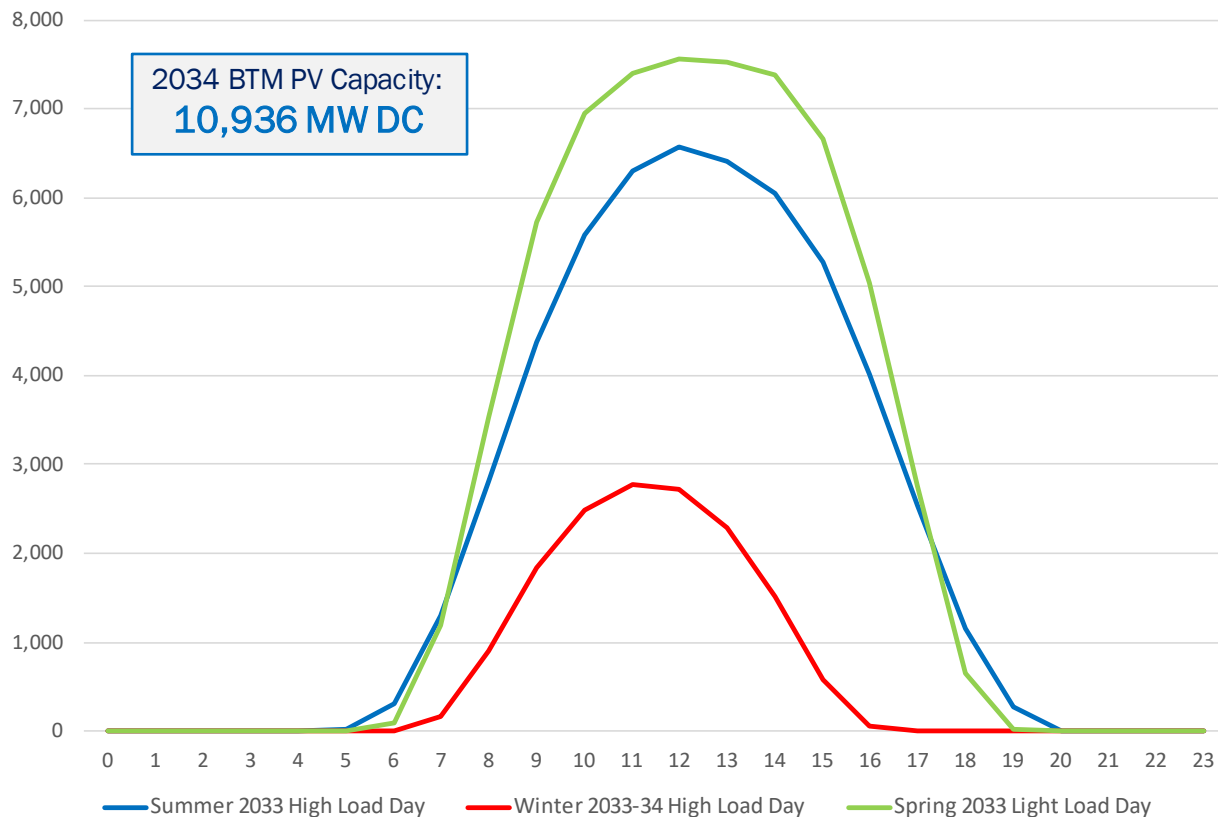
Reflects Total Cumulative Impacts

Maximum Hourly NYCA BTM Solar PV Generation - MW AC

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	192	287	483	42	318	396	447	63	85	315	630	3,258
2024	278	348	651	59	419	500	507	73	91	337	652	3,915
2025	398	413	810	88	532	596	549	78	97	347	661	4,569
2026	509	446	941	103	637	677	599	86	109	376	703	5,186
2027	542	505	1,032	113	700	732	680	96	122	427	788	5,737
2028	570	556	1,110	120	754	778	748	104	134	471	860	6,205
2029	593	597	1,174	126	798	816	804	111	143	507	918	6,587
2030	611	629	1,224	131	833	846	848	117	150	535	965	6,889
2031	625	655	1,264	135	860	870	885	121	156	559	1,003	7,133
2032	638	677	1,299	139	884	893	922	125	162	581	1,040	7,360
2033	649	696	1,328	142	904	913	958	130	168	602	1,076	7,566

Projected BTM Solar Shapes

2033-34 BTM PV Load Shape Projections - MW AC

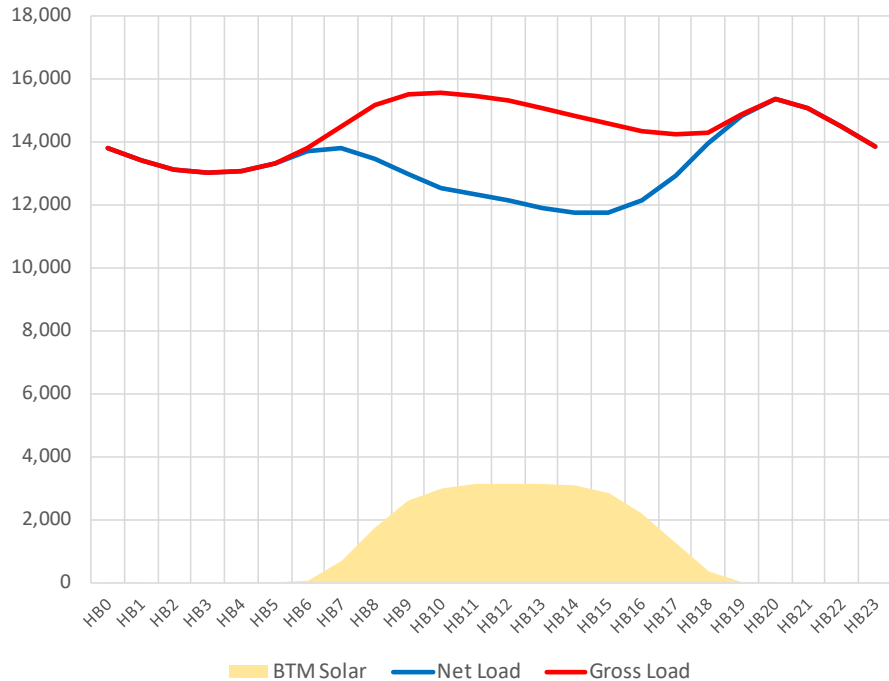


- Representative shapes showing potential BTM solar impact in 2033-34
- Summer representative shape used for the gross peak forecast
- Winter representative shape from the 2023 Gold Book supplemental graphs
- Spring representative shape based primarily on estimated actual 4/9/2023 shape, scaled up to the 2033 maximum BTM solar generation forecast

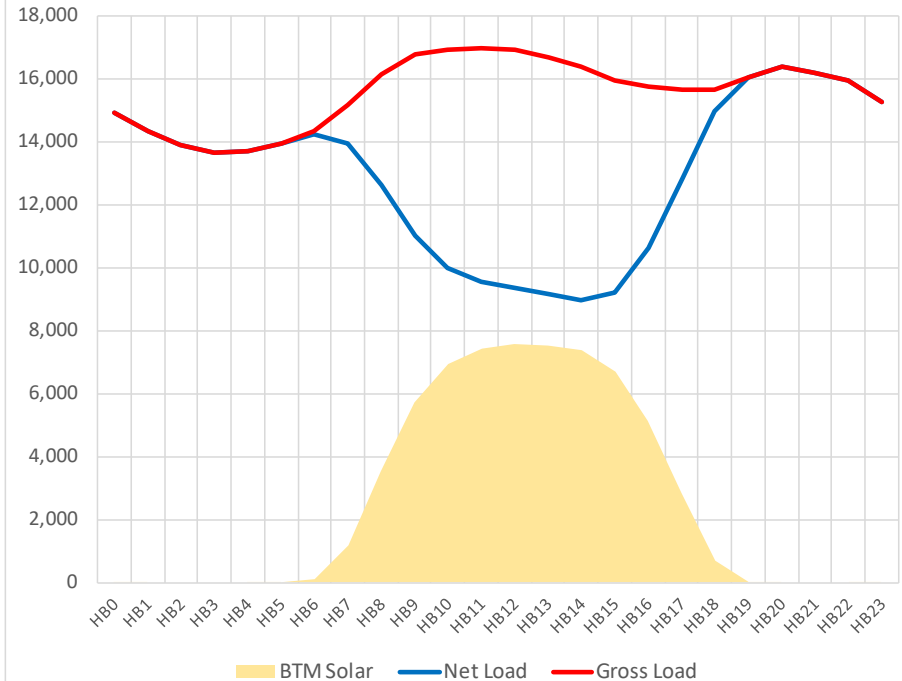
Light Load Day Load Shapes

NYCA Shapes

NYCA Load on 4/9/2023 (MW)

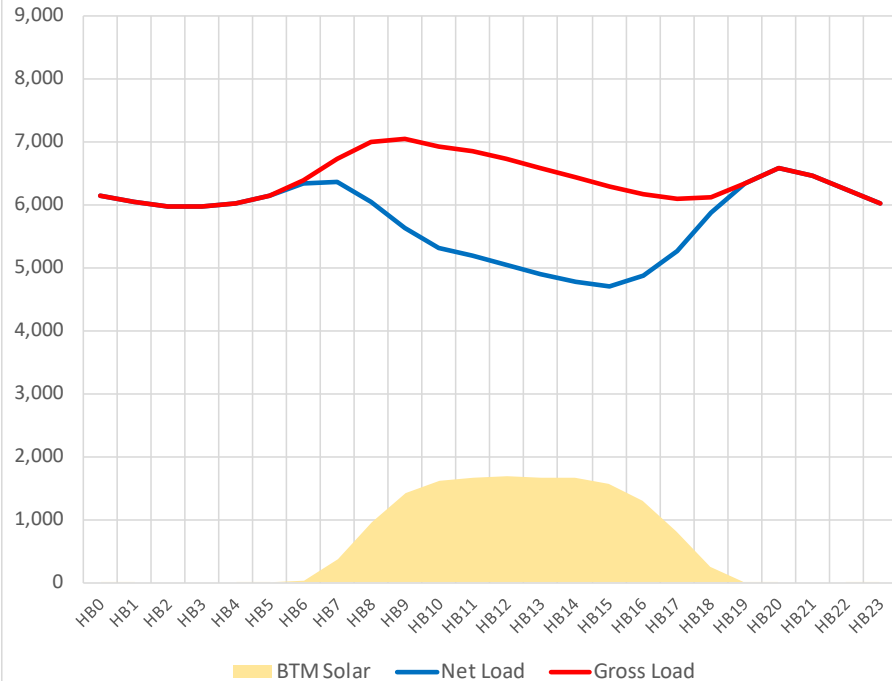


Projected 2033 NYCA Light Load Day (MW)

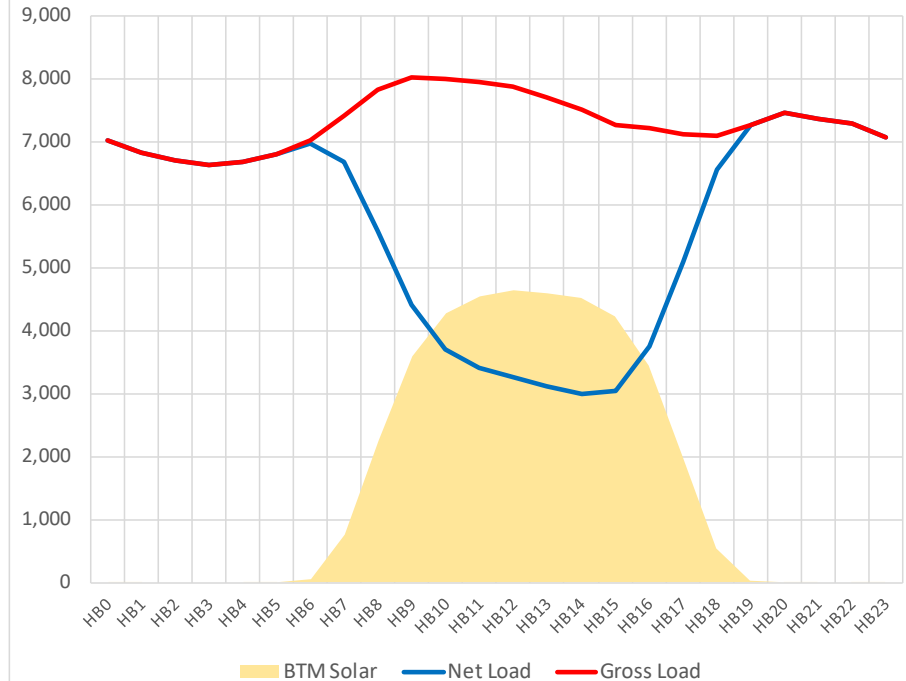


Upstate Shapes

Upstate (A-F) Load on 4/9/2023 (MW)

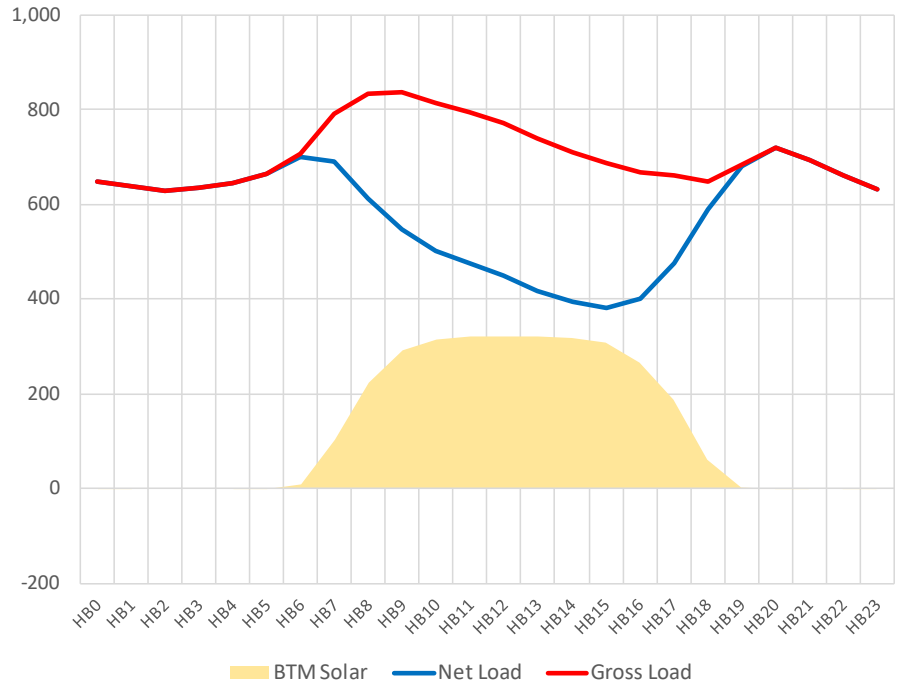


Projected 2033 Upstate (AF) Light Load Day (MW)

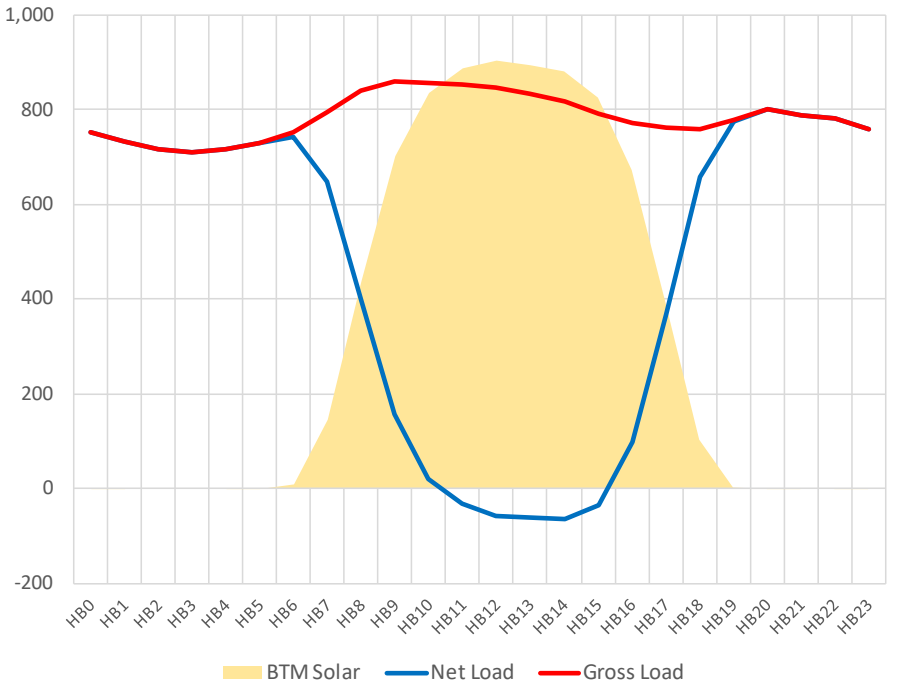


Zone E Shapes

Zone E Load on 4/9/2023 (MW)

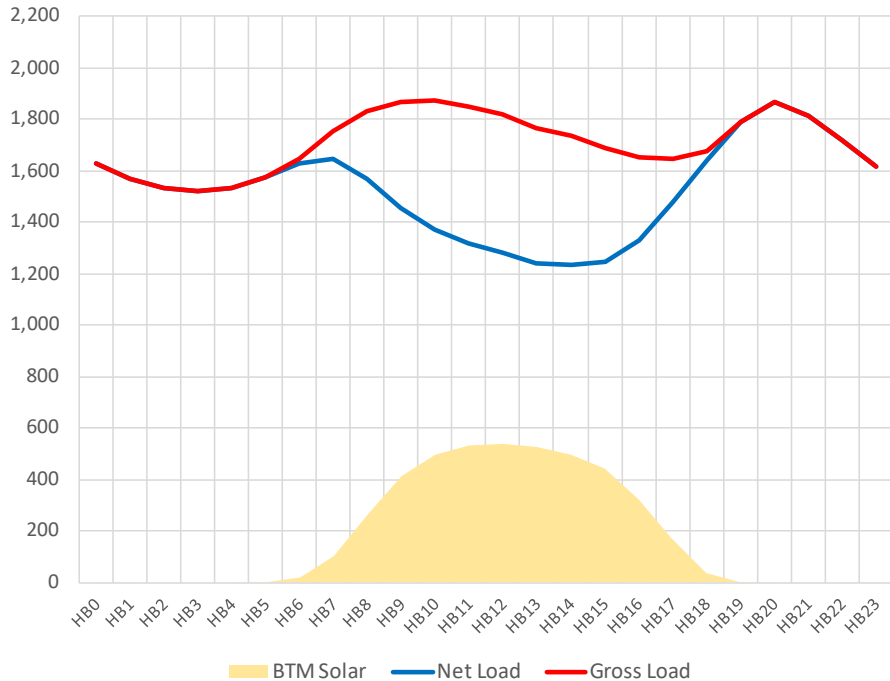


Projected 2033 Zone E Light Load Day (MW)

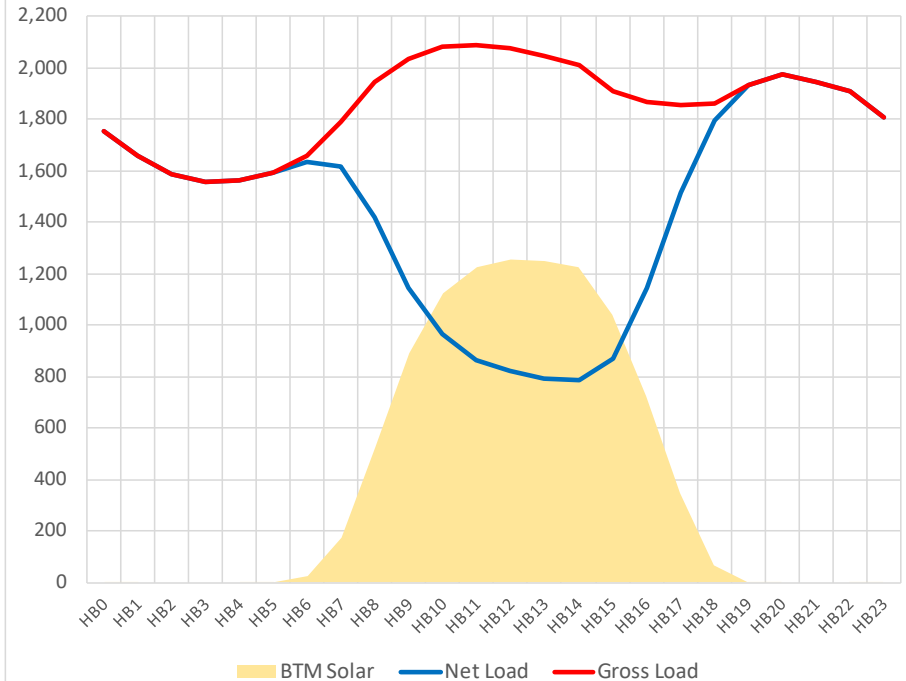


Zones GHI Shapes

Zones GHI Load on 4/9/2023 (MW)

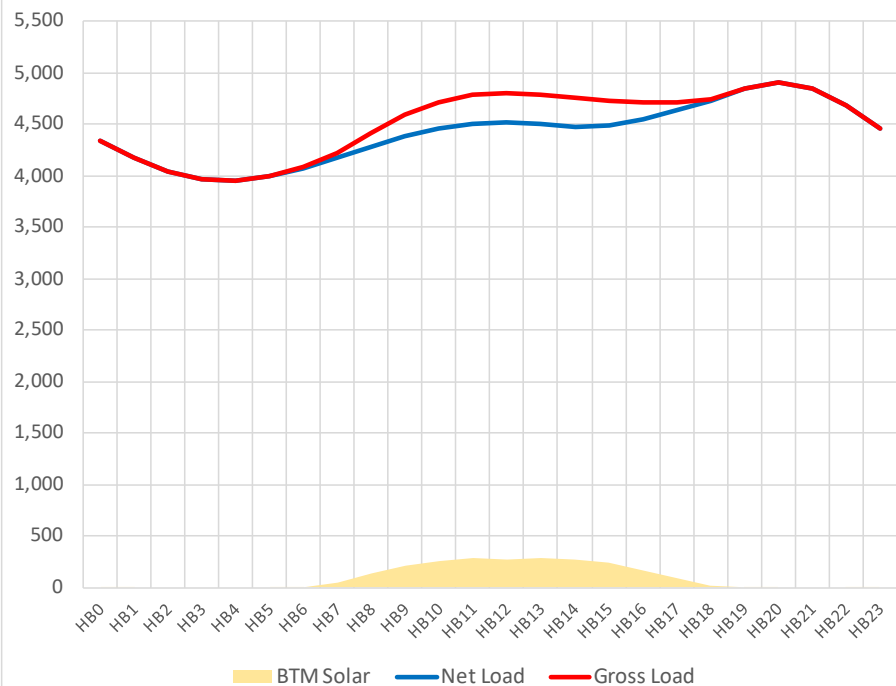


Projected 2033 Zones GHI Light Load Day (MW)

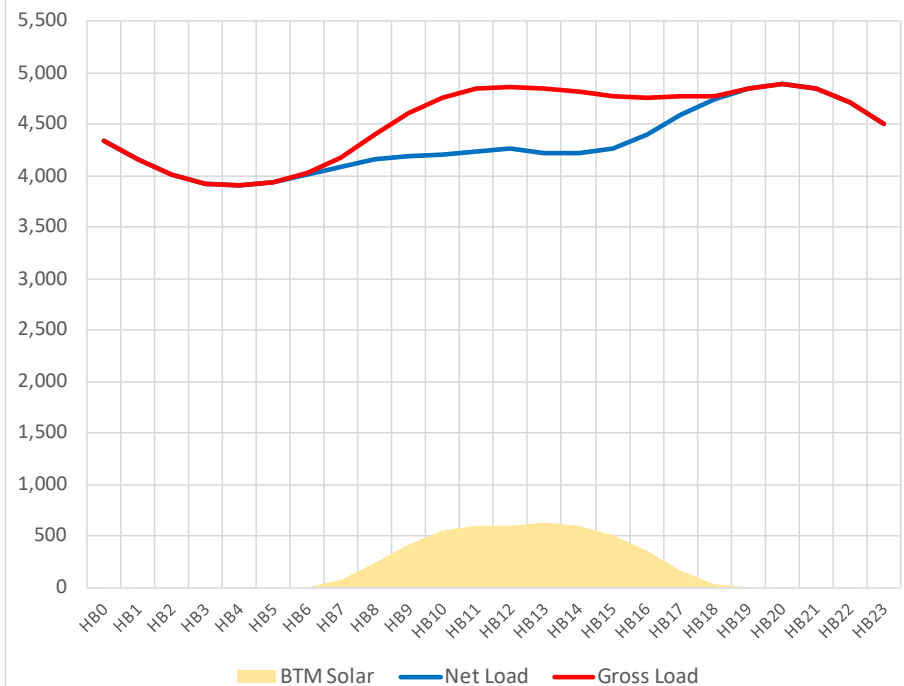


Zone J Shapes

Zone J Load on 4/9/2023 (MW)

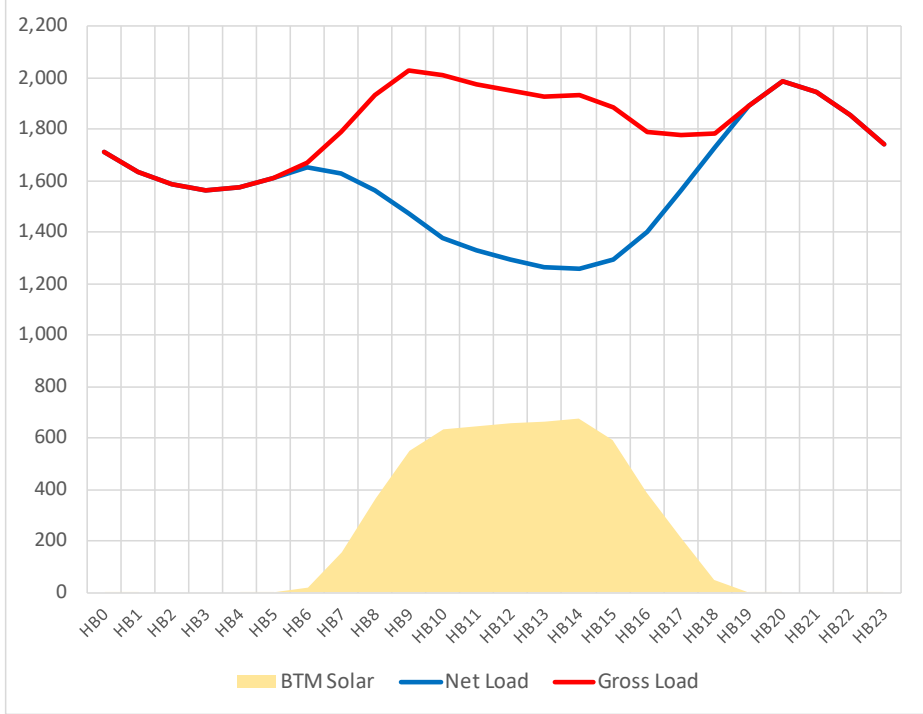


Projected 2033 Zone J Light Load Day (MW)

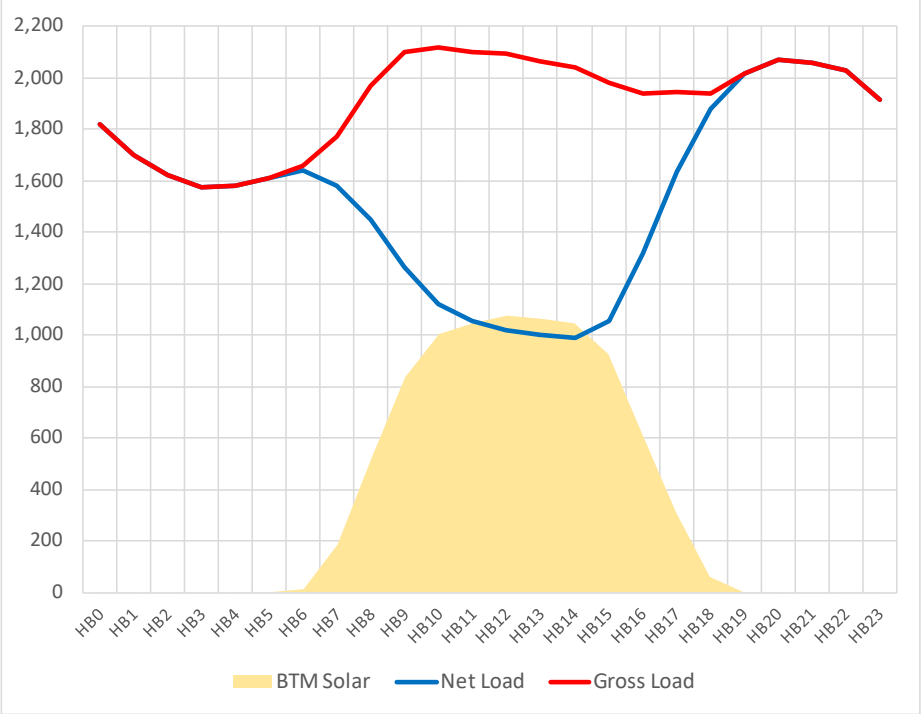


Zone K Shapes

Zone K Load on 4/9/2023 (MW)

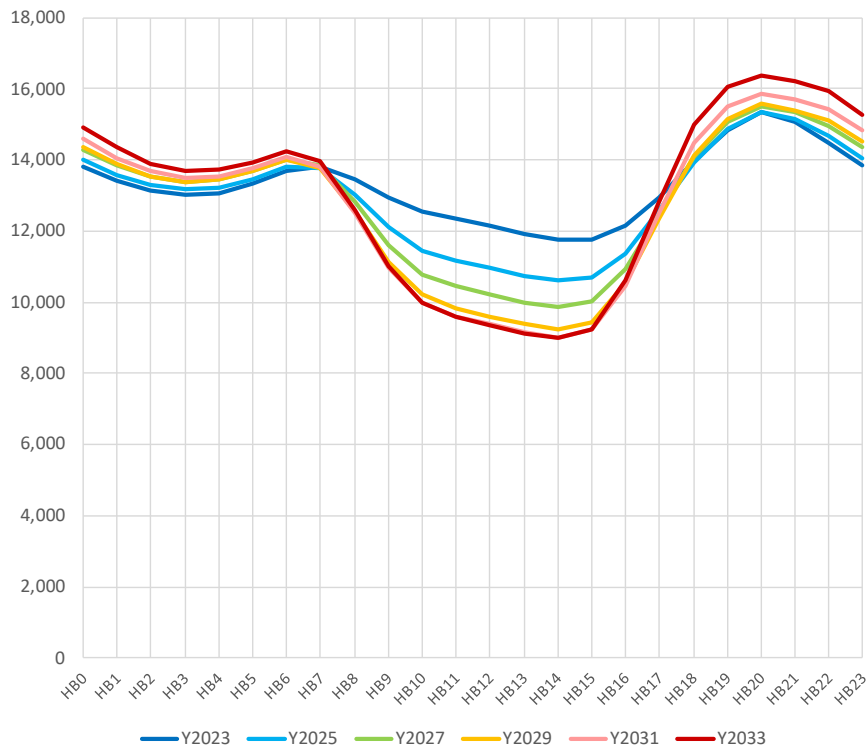


Projected 2033 Zone K Light Load Day (MW)

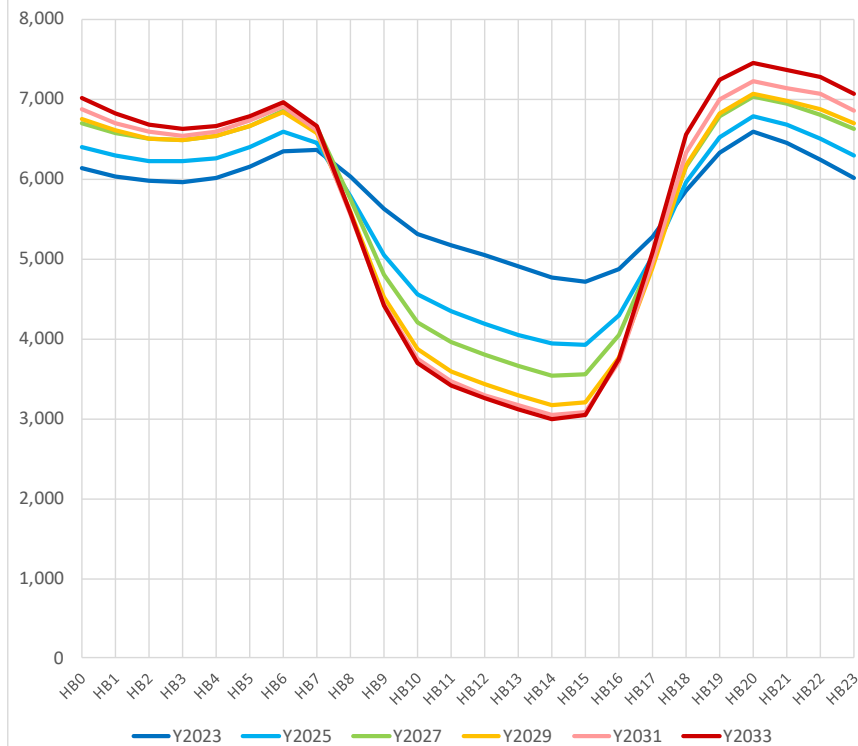


System & Upstate Shape Evolution

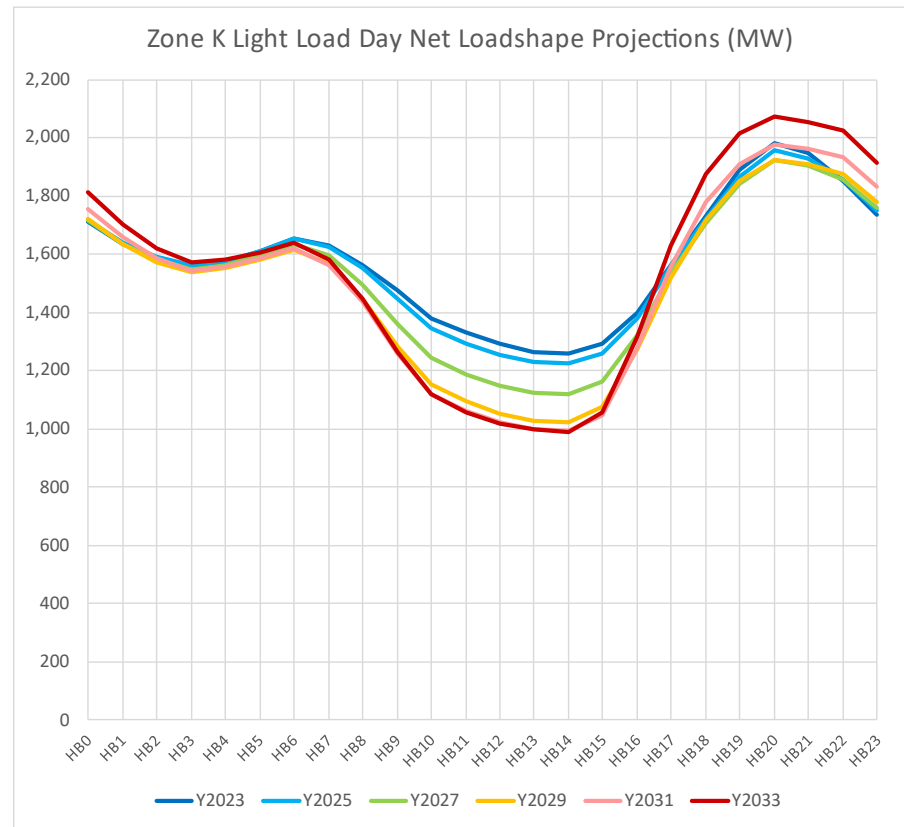
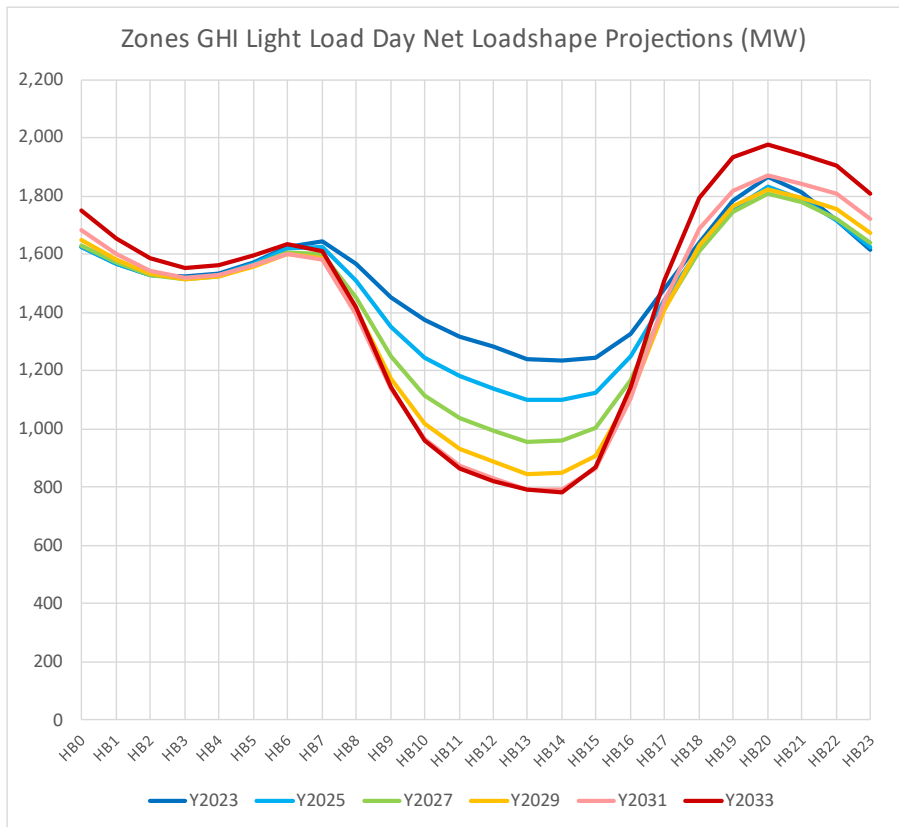
NYCA Light Load Day Net Loadshape Projections (MW)



Upstate Light Load Day Net Loadshape Projections (MW)



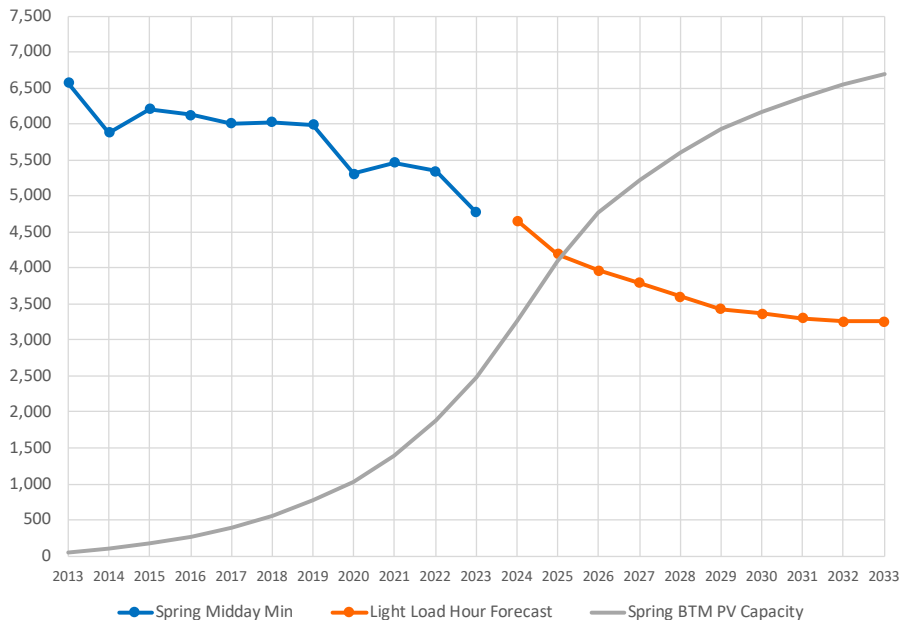
Zones GHI & Zone K Shape Evolution



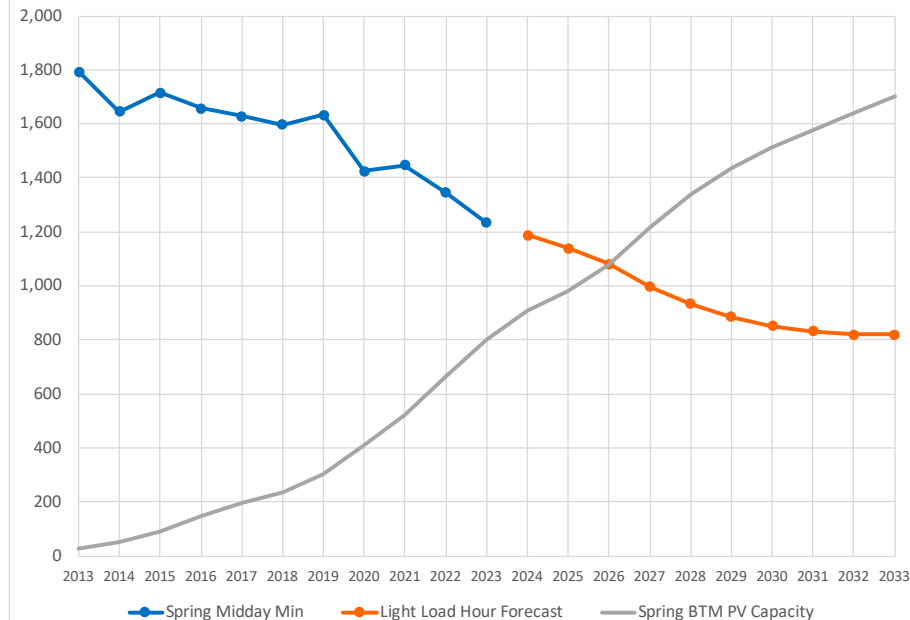
Midday Net Light Load Trends

Regional Light Load Trends

Upstate (A-F) Light Loads (MW)



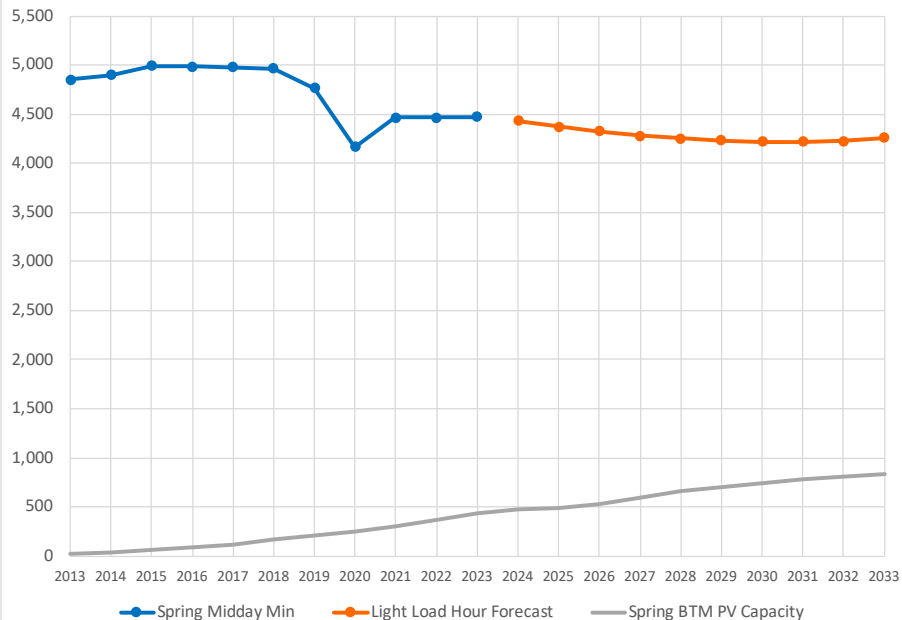
Zones GHI Light Loads (MW)



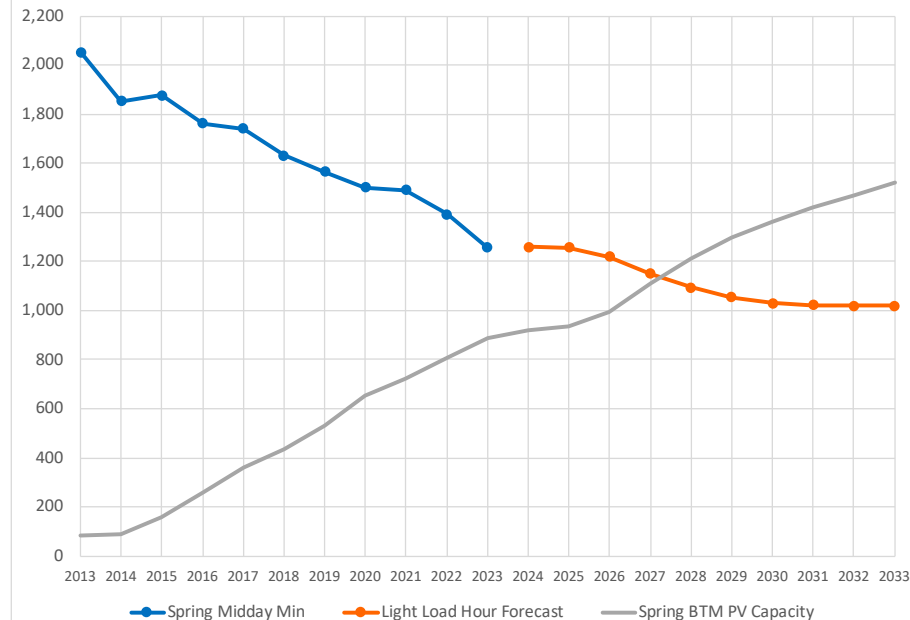
Notes: Historical values reflect NYCA-coincident minimum loads from April and May hours beginning 10 through 15
BTM PV capacity measured in MW DC

Zonal Light Load Trends

Zone J Light Loads (MW)

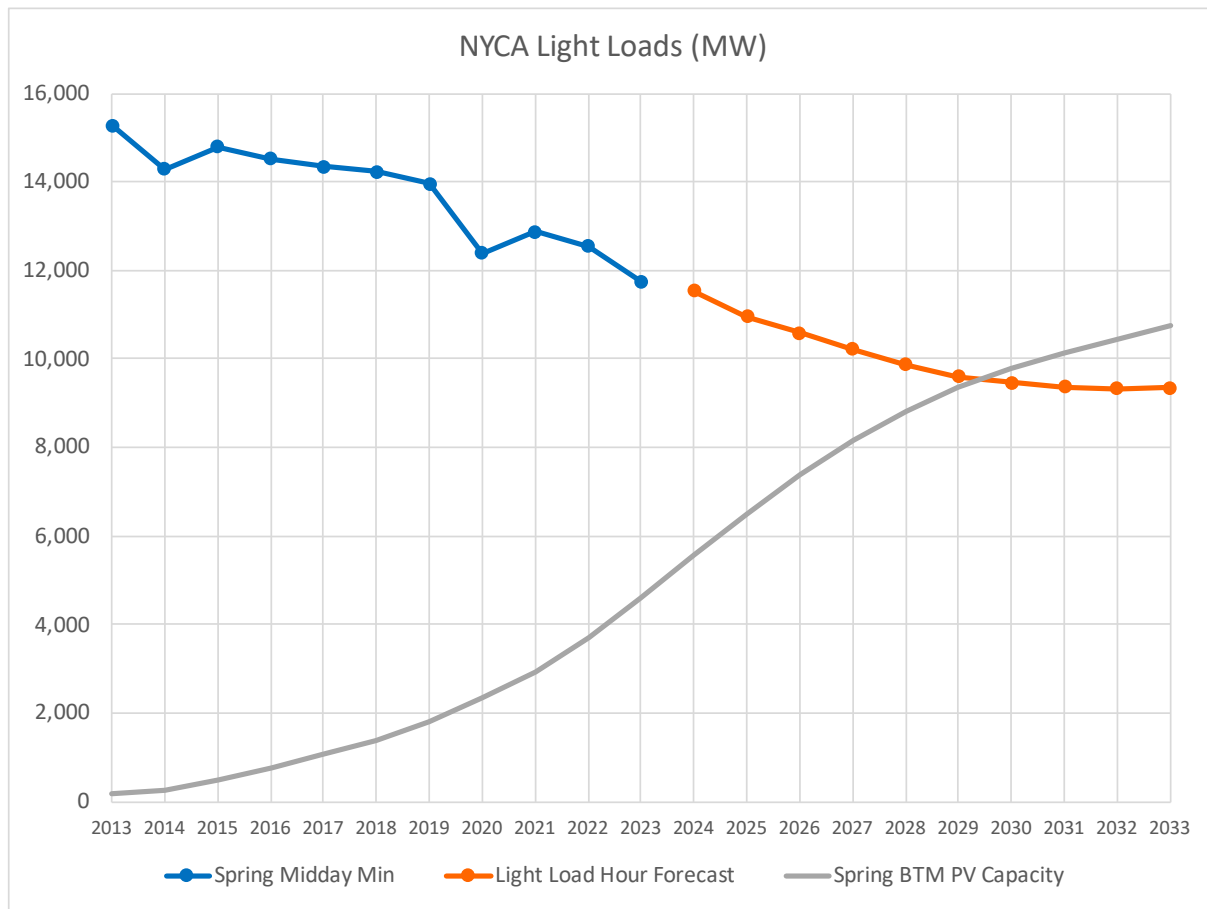


Zone K Light Loads (MW)



Notes: Historical values reflect NYCA-coincident minimum loads from April and May hours beginning 10 through 15
BTM PV capacity measured in MW DC

System Light Load Trends



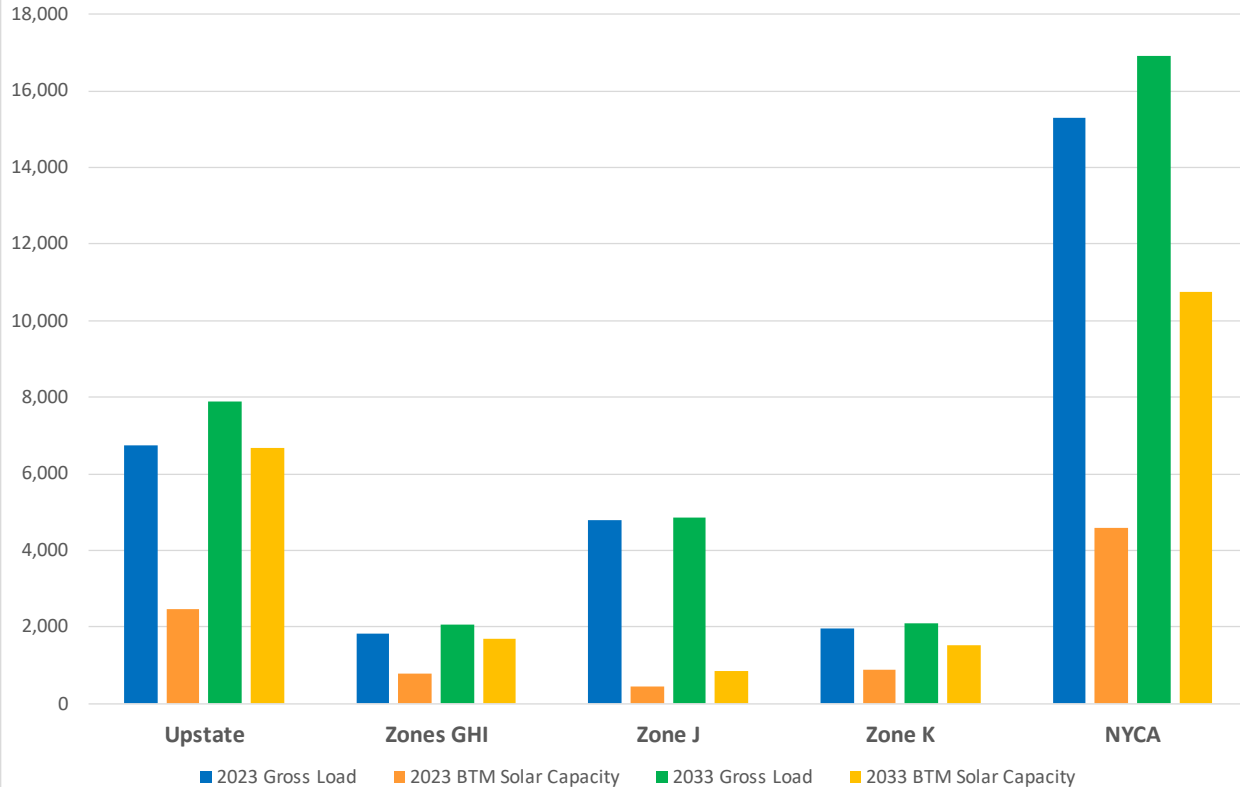
Notes:

Historical values reflect NYCA-coincident minimum loads from April and May hours beginning 10 through 15

BTM PV capacity measured in MW DC

Regional BTM Solar Intensities

Spring Gross Light Load and BTM Solar Capacity Comparison, 2023 and 2033 (MW)

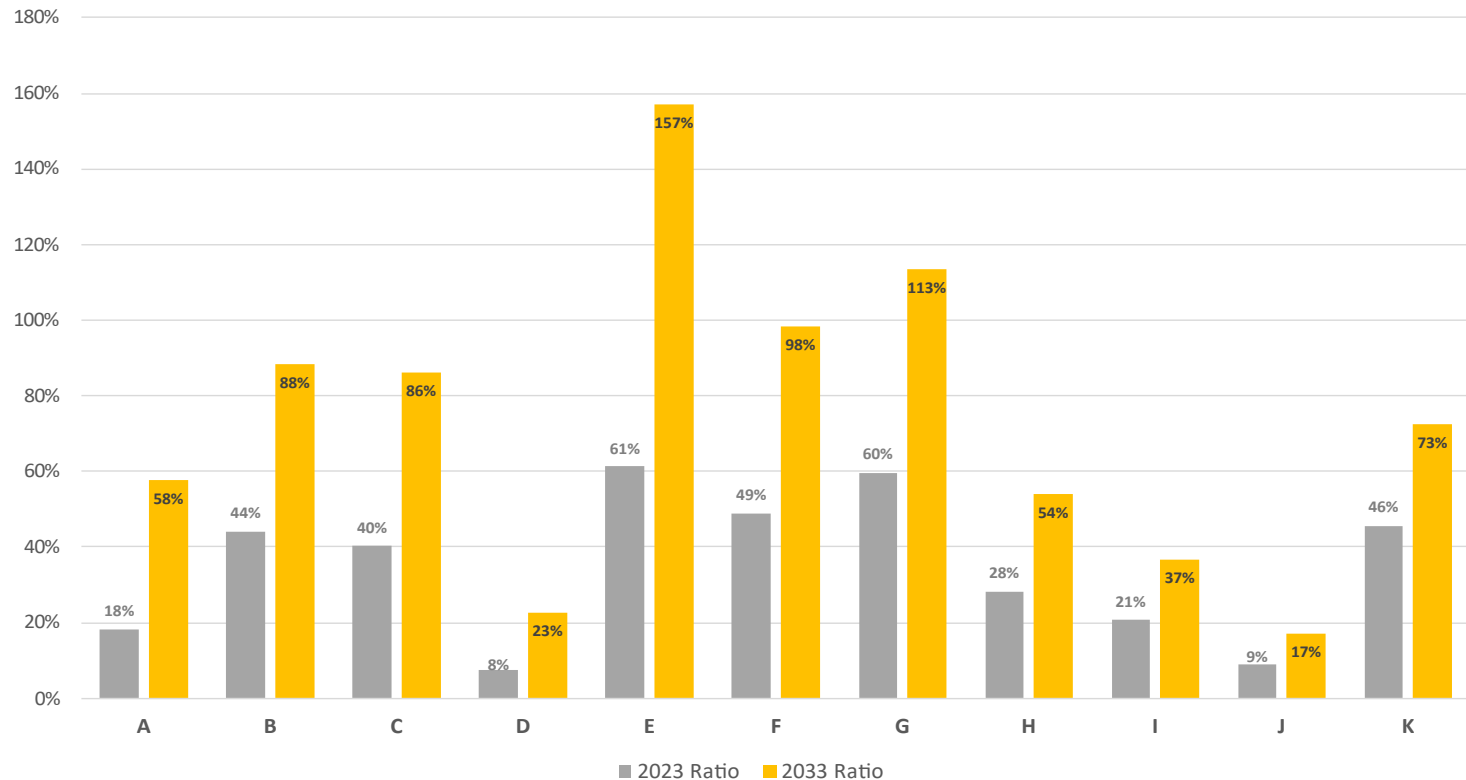


Ratio of Spring BTM PV Capacity to Gross Light Load		
Area	2023 Ratio	2033 Ratio
Upstate (A-F)	37%	85%
Zones GHI	44%	82%
Zone J	9%	17%
Zone K	46%	73%
NYCA	30%	64%

Note: BTM PV capacity measured in MW DC

Zonal BTM Solar Intensities

Zonal Ratios of Spring BTM PV Capacity to Gross Light Load



Note: BTM PV capacity measured in MW DC

Questions?

Our Mission & Vision



Mission

Ensure power system reliability
and competitive markets for New
York in a clean energy future



Vision

Working together with stakeholders
to build the cleanest, most reliable
electric system in the nation