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Independent System Operator

2022 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

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Background

- The light load forecast was developed as a load scenario for use in the 2022 RNA
- 2023 to 2032 forecast horizon
- The 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)
- Reflects April/May weekend day
  - Maximum BTM solar impacts across the year
  - Weekend load levels are lower than weekday levels

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Forecast Methodology

- **Forecast originates at the NYCA (system) level**
- **4/30/2022 used as a starting point**
  - Saturday with low net load level and very high BTM solar generation
  - Metered net loads
  - 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, interconnecting large loads, energy efficiency savings, and other impacts
  - Informed by end-use growth trends from the 2022 Gold Book annual energy and summer peak forecasts
- **Electric Vehicle (EV) impacts**
  - Projected spring weekday EV charging load added to the light load hour forecast
  - Reflective of EV saturation trends from the 2022 Gold Book

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Forecast Methodology (cont.)

- **Building Electrification impacts**
  - Projected impacts of non-weather sensitive building appliance electrification added to the forecast
  - Reflective of electrification saturations assumed in the 2022 Gold Book forecast
- **Energy Storage charging**
  - Additional load due to behind-the-meter storage charging during midday hours added to the forecast
  - Informed by BTM storage capacity forecast from the 2022 Gold Book
- **NYCA midday light load forecast**
  - Gross load forecast calculated as the sum of existing gross load, base load growth, EV charging, storage charging, and electrification impacts
  - NYCA BTM solar generation determined by 2022 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, and BTM storage levels and trends specific to each zone
  - Zonal BTM solar generation determined by 2022 Gold Book Table I-9d: Maximum BTM Solar PV Generation
  - Zonal net load forecast derived from zonal gross load and BTM solar generation

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Light Load Forecast Summary

Forecast Buildup

2022 RNA NYCA Midday Light Load Forecast

Year	(a) Base Gross Load	(b) (+) EV Charging	(c) (+) Building Electrification	(d) (+) BTM Storage Charging	(e) = a + b + c + d Final Gross Load	(f) (-) BTM Solar Generation	(g) = e - f Net Load Forecast
2023	14,925	88	53	195	15,261	3,329	11,932
2024	14,848	128	77	292	15,345	3,986	11,359
2025	14,667	183	114	333	15,297	4,656	10,641
2026	14,532	258	145	375	15,310	5,283	10,027
2027	14,416	353	192	422	15,383	5,872	9,511
2028	14,292	472	238	466	15,468	6,415	9,053
2029	14,200	615	294	512	15,621	6,878	8,743
2030	14,106	781	356	558	15,801	7,247	8,554
2031	14,032	965	420	604	16,021	7,487	8,534
2032	13,955	1,160	493	650	16,258	7,655	8,603

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

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

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

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

(e) - Final Gross Load - represents total demand

(f) - BTM Solar Generation - reflects solar generation during the NYCA midday light load hour and maximum BTM solar hour (2022 GB Table I-9d)

(g) - Net Load Forecast - represents metered load to be served by the wholesale market

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Zonal Forecast Values

2022 RNA 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
2023	1,230	765	1,122	638	407	758	491	252	478	4,619	1,172	11,932
2024	1,088	717	1,016	624	311	667	440	253	477	4,644	1,122	11,359
2025	935	670	898	613	214	567	385	246	463	4,605	1,045	10,641
2026	834	632	797	598	133	476	322	242	452	4,578	963	10,027
2027	740	600	707	586	60	393	275	239	441	4,564	906	9,511
2028	649	569	625	575	-7	319	234	236	432	4,562	859	9,053
2029	577	547	560	565	-57	263	211	236	432	4,585	824	8,743
2030	523	532	516	557	-96	222	202	240	433	4,625	800	8,554
2031	499	527	498	551	-114	205	207	245	438	4,684	794	8,534
2032	489	528	489	544	-119	201	211	246	445	4,760	809	8,603

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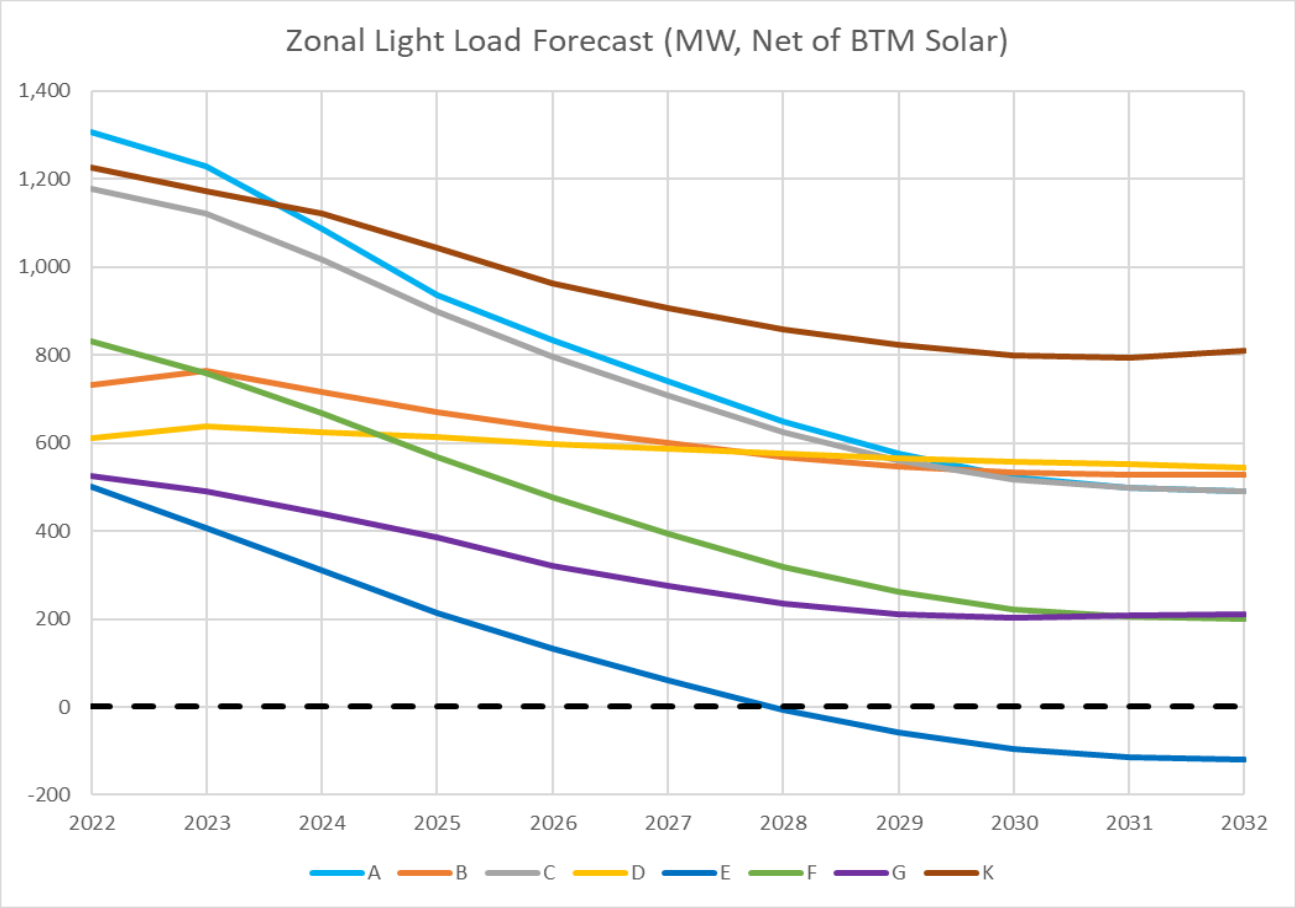
Zonal Forecast Graph



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BTM Solar Impacts

BTM Solar Capacity – Gold Book Forecast

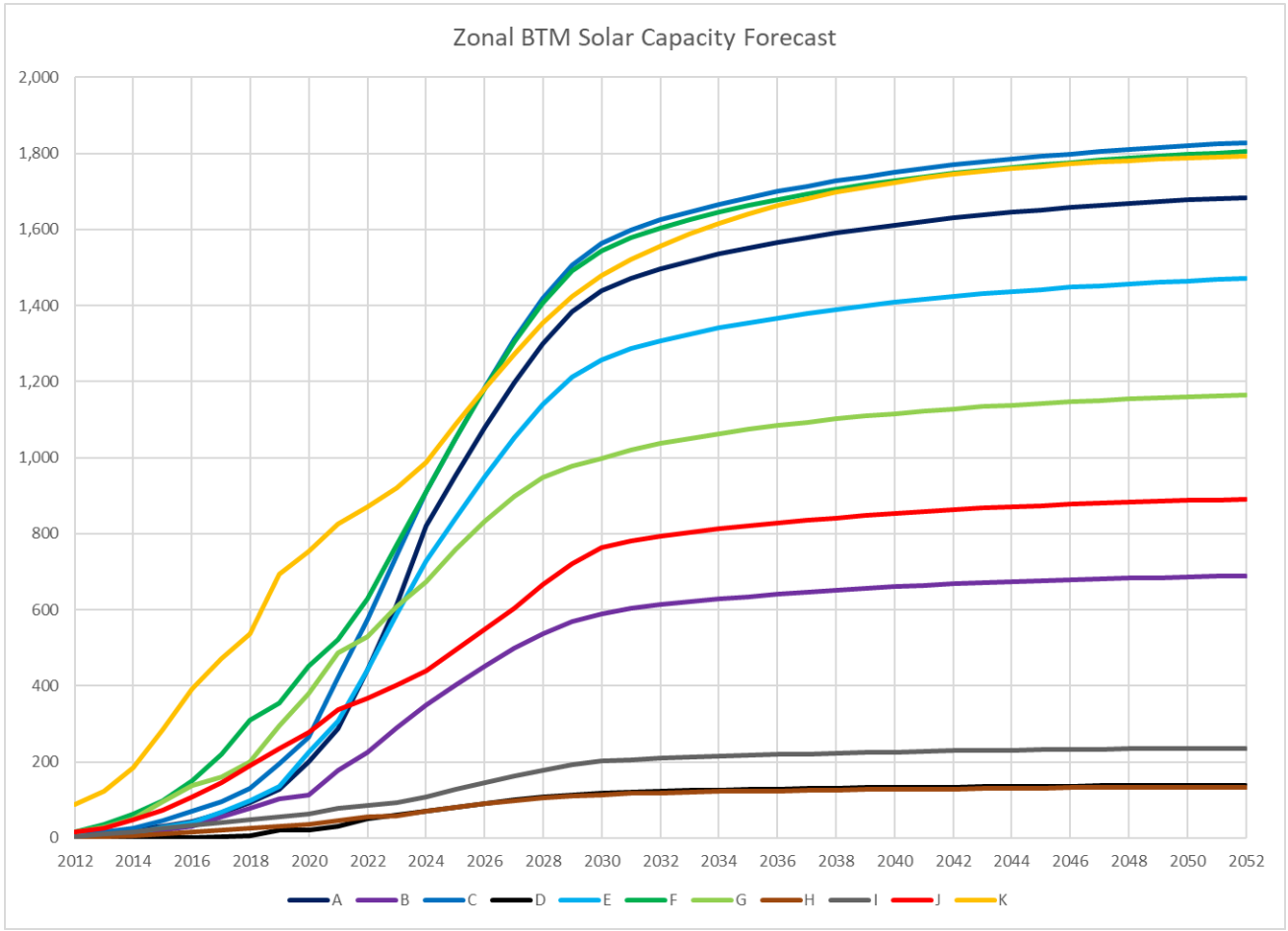
Table I-9a: Solar PV Nameplate Capacity, Behind-the-Meter

Reflects Total Cumulative Nameplate Capacity

Nameplate Capacity by Zone - MW DC

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2012	12	2	8	1	5	17	16	2	4	16	88	171
2013	17	4	16	1	7	35	28	3	10	27	122	270
2014	22	10	26	1	14	64	52	5	16	48	186	444
2015	32	20	45	2	28	99	95	10	25	73	286	715
2016	43	31	71	2	41	151	137	16	34	108	392	1,026
2017	66	55	96	3	68	221	161	20	41	146	473	1,350
2018	94	77	131	5	99	309	201	25	48	190	537	1,716
2019	128	102	196	20	135	354	296	30	56	234	693	2,244
2020	200	112	265	20	225	453	379	37	64	277	754	2,786
2021	287	178	422	30	307	522	488	47	77	338	827	3,523
2022	443	225	573	50	443	628	530	55	85	367	870	4,269
2023	615	289	743	62	589	770	609	59	94	401	921	5,152
2024	822	349	910	70	729	911	674	70	109	439	988	6,071
2025	953	402	1,051	81	842	1,049	759	80	128	494	1,087	6,926
2026	1,079	452	1,185	91	951	1,181	834	90	146	549	1,182	7,740
2027	1,197	499	1,311	100	1,053	1,304	899	98	164	603	1,272	8,500
2028	1,299	538	1,419	108	1,140	1,407	947	106	179	666	1,353	9,162
2029	1,384	570	1,507	114	1,212	1,491	979	111	192	721	1,424	9,705
2030	1,439	590	1,563	118	1,258	1,544	998	114	202	763	1,479	10,068
2031	1,472	603	1,598	121	1,286	1,578	1,020	117	206	780	1,521	10,302
2032	1,496	613	1,625	123	1,307	1,604	1,037	119	210	793	1,557	10,484

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



Year	NYCA	Growth
2012	171	
2013	270	99
2014	444	174
2015	715	271
2016	1,026	311
2017	1,350	324
2018	1,716	366
2019	2,244	528
2020	2,786	542
2021	3,523	737
2022	4,269	746
2023	5,152	883
2024	6,071	919
2025	6,926	855
2026	7,740	814
2027	8,500	760
2028	9,162	662
2029	9,705	543
2030	10,068	363

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
2022	267	153	318	15	245	365	398	38	61	244	651	2,755
2023	398	194	426	23	345	441	439	44	68	265	686	3,329
2024	546	244	542	28	448	535	499	48	76	290	730	3,986
2025	700	291	653	32	544	629	554	57	88	320	788	4,656
2026	807	333	750	37	625	720	621	64	103	359	864	5,283
2027	908	373	841	41	702	807	677	71	118	398	936	5,872
2028	1,002	409	925	45	773	885	726	78	131	437	1,004	6,415
2029	1,082	438	997	48	832	950	761	83	141	480	1,066	6,878
2030	1,146	462	1,052	51	879	1,001	785	86	150	517	1,118	7,247
2031	1,185	476	1,087	52	909	1,033	800	89	156	542	1,158	7,487
2032	1,211	487	1,110	54	928	1,055	817	92	160	552	1,189	7,655

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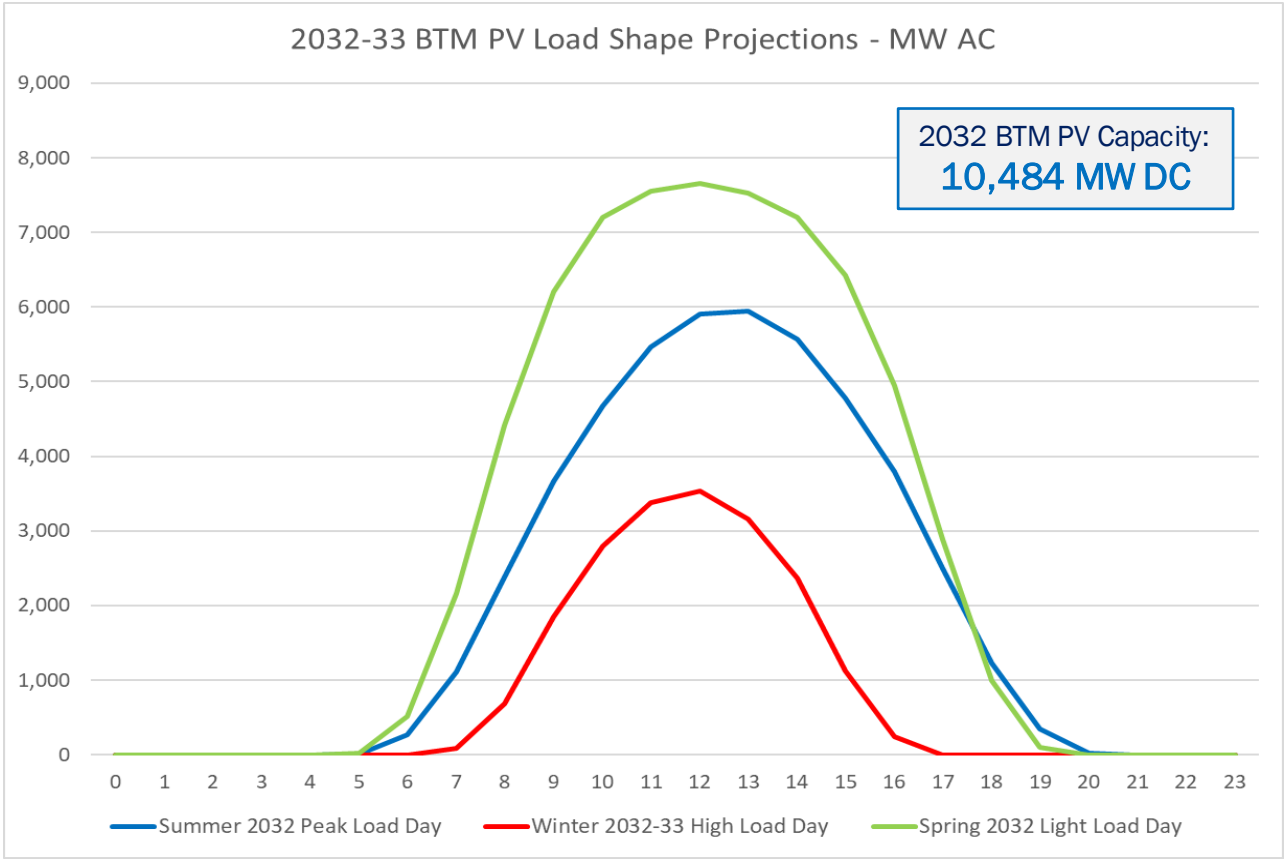
Projected BTM Solar Shapes



- Representative shapes reflective of potential BTM solar impact in 2032-33
- Summer representative shape reflective of that used for the gross peak forecast, and calculated based on historical estimated actual BTM solar data on NYCA peak days
- Winter representative shape reflective of that reported in the 2022 Gold Book supplemental graphs
- Spring representative shape reflects estimated actual 4/30/22 shape, scaled up to the 2032 maximum BTM solar generation forecast

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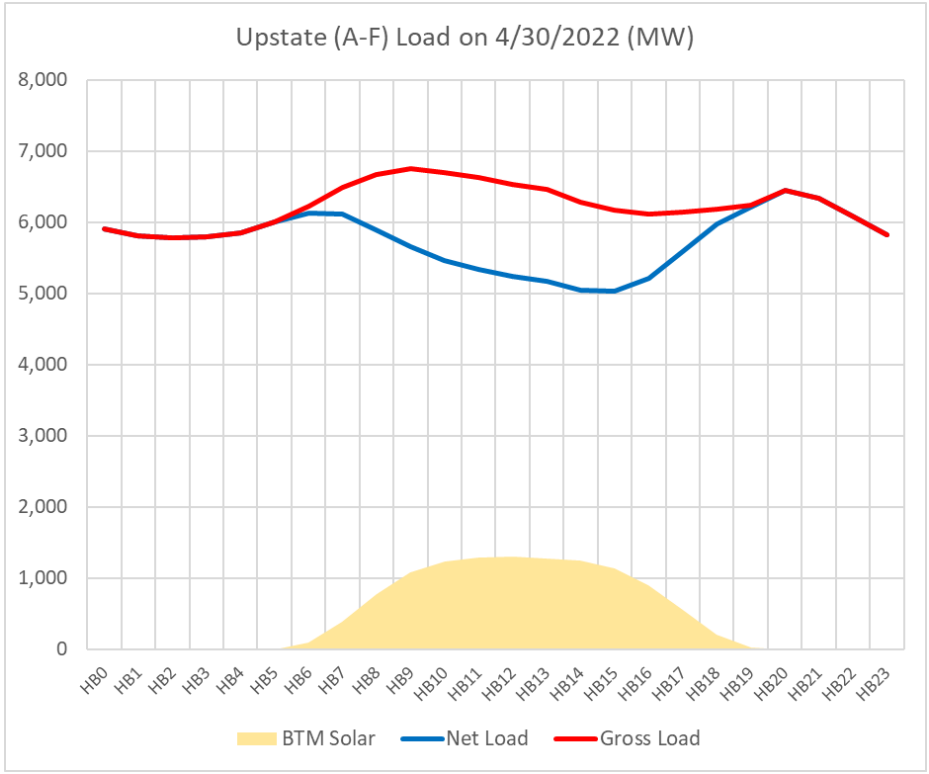
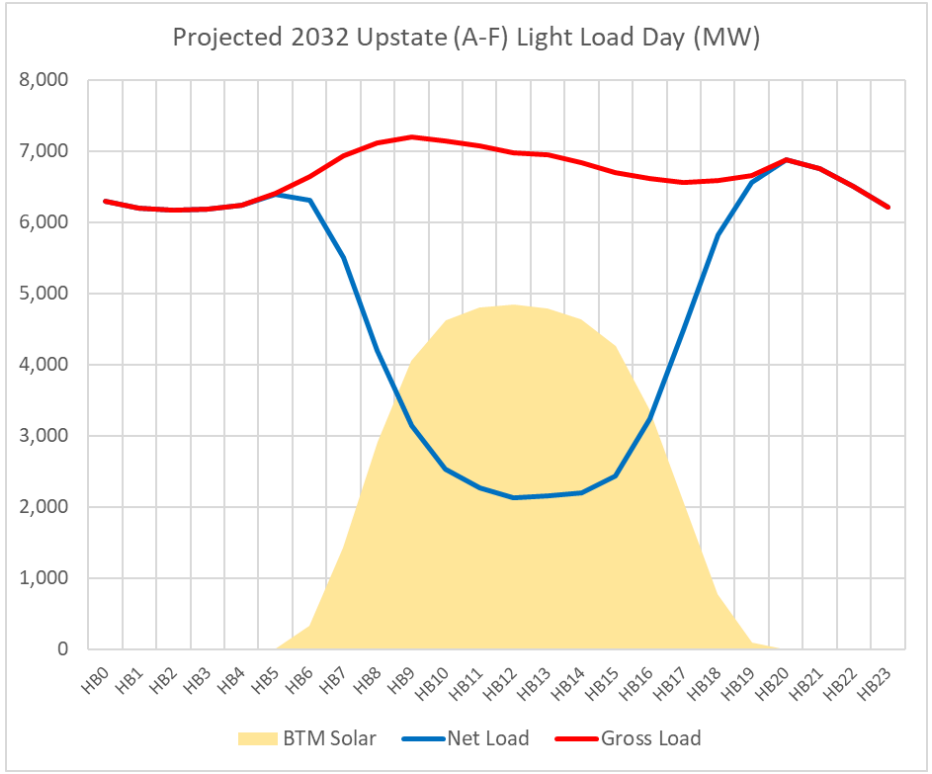
Light Load Day Load Shapes

Upstate Shapes





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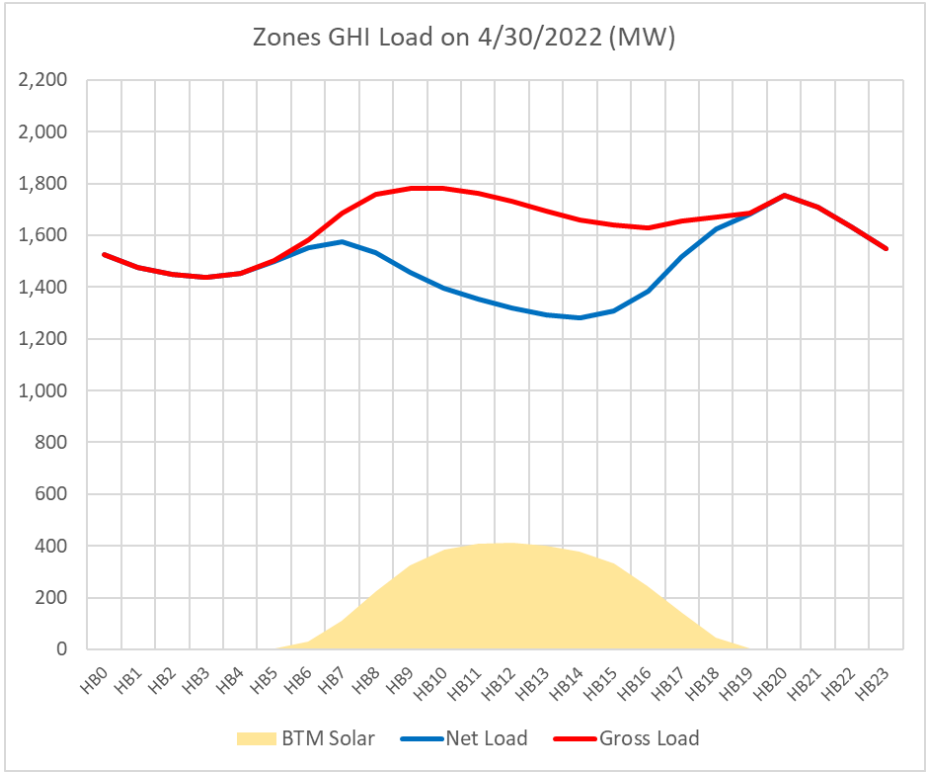
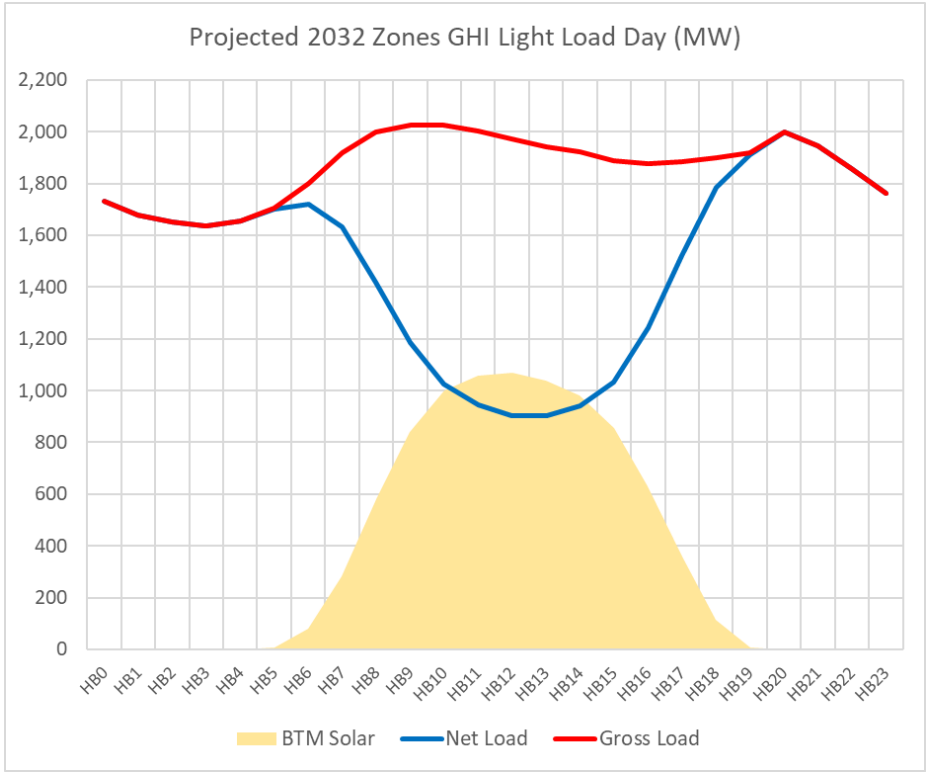
Zones GHI Shapes





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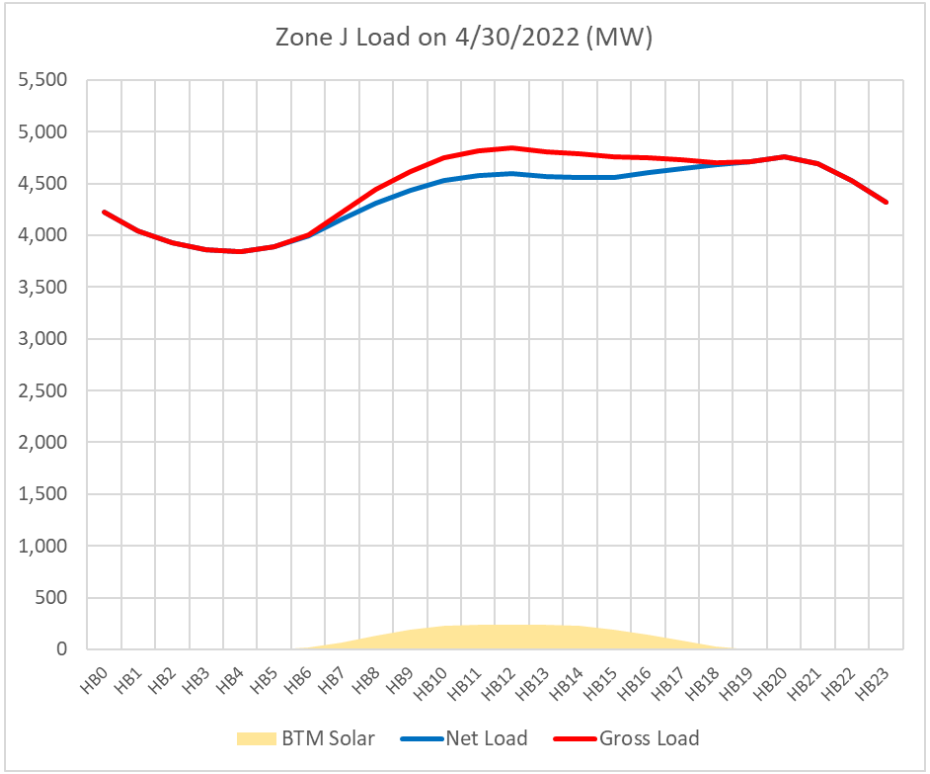
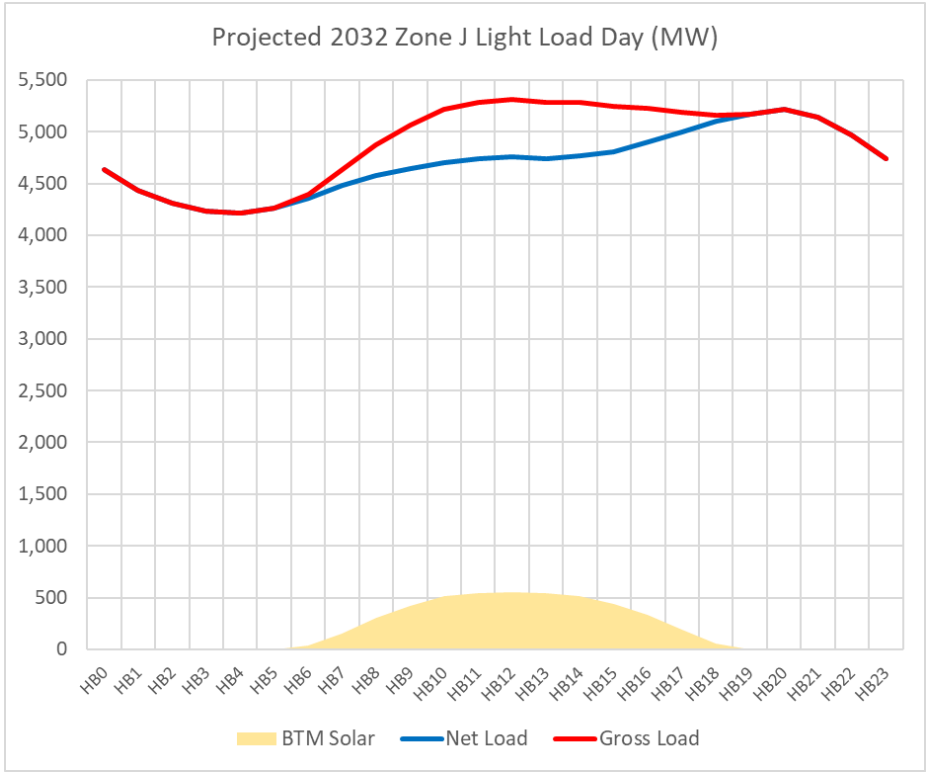
Zone J Shapes





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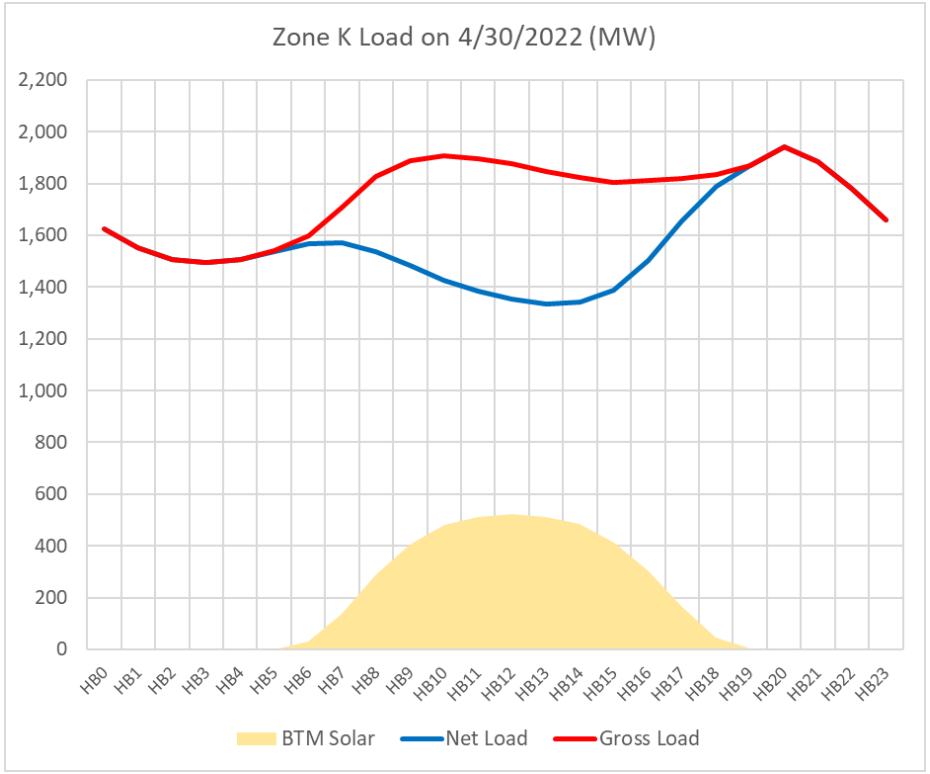
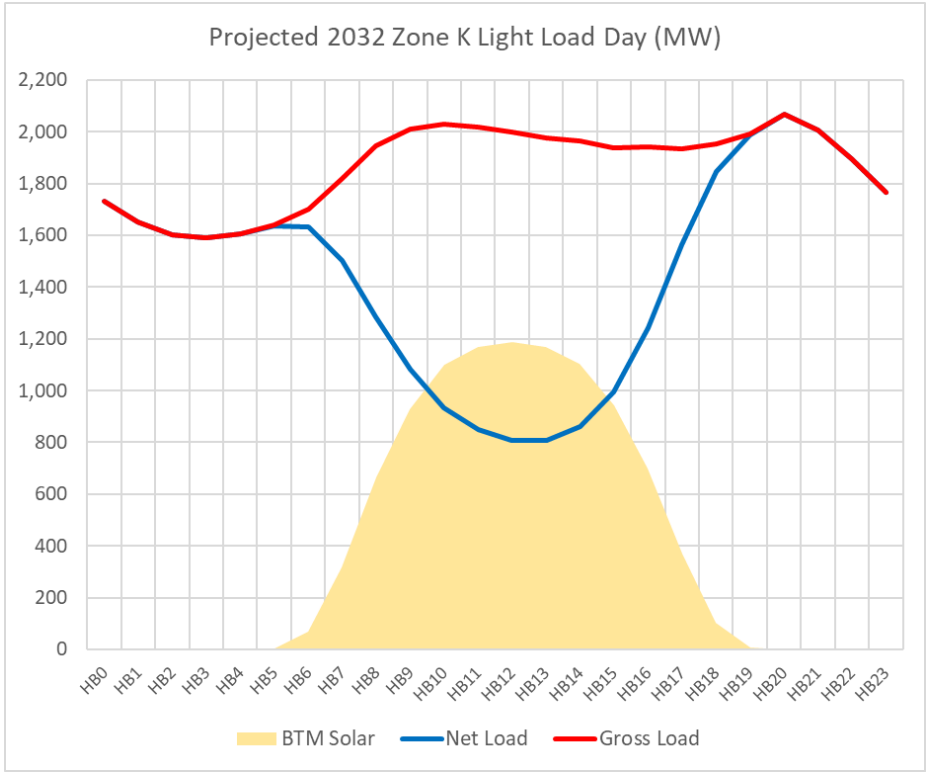
Zone K Shapes





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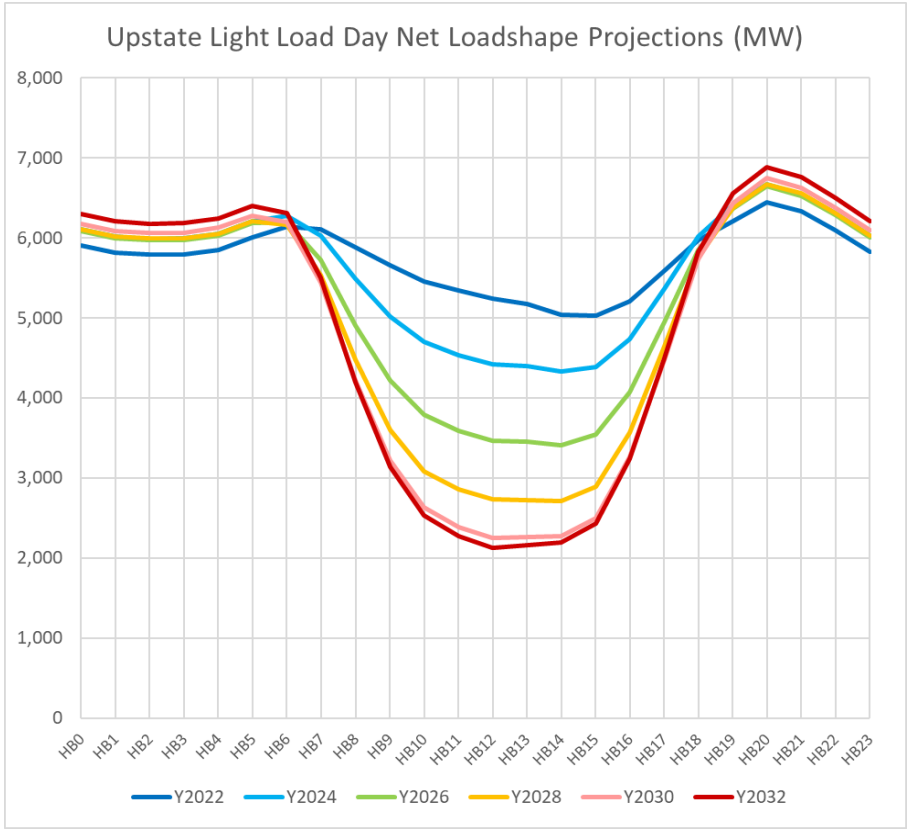
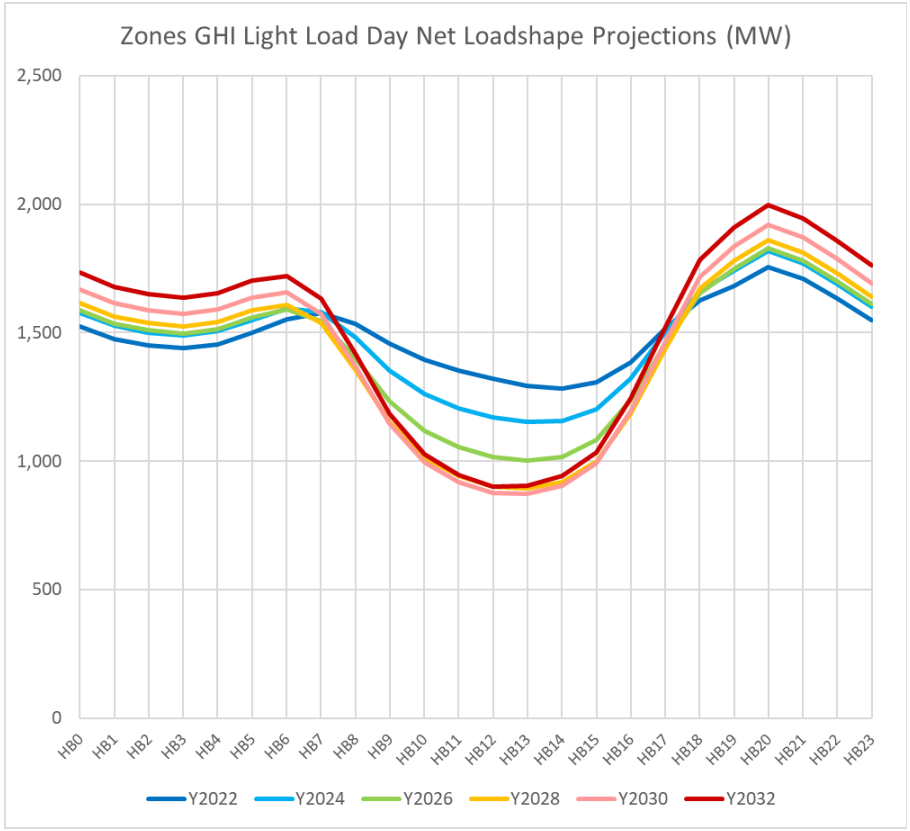
Regional Shape Evolution





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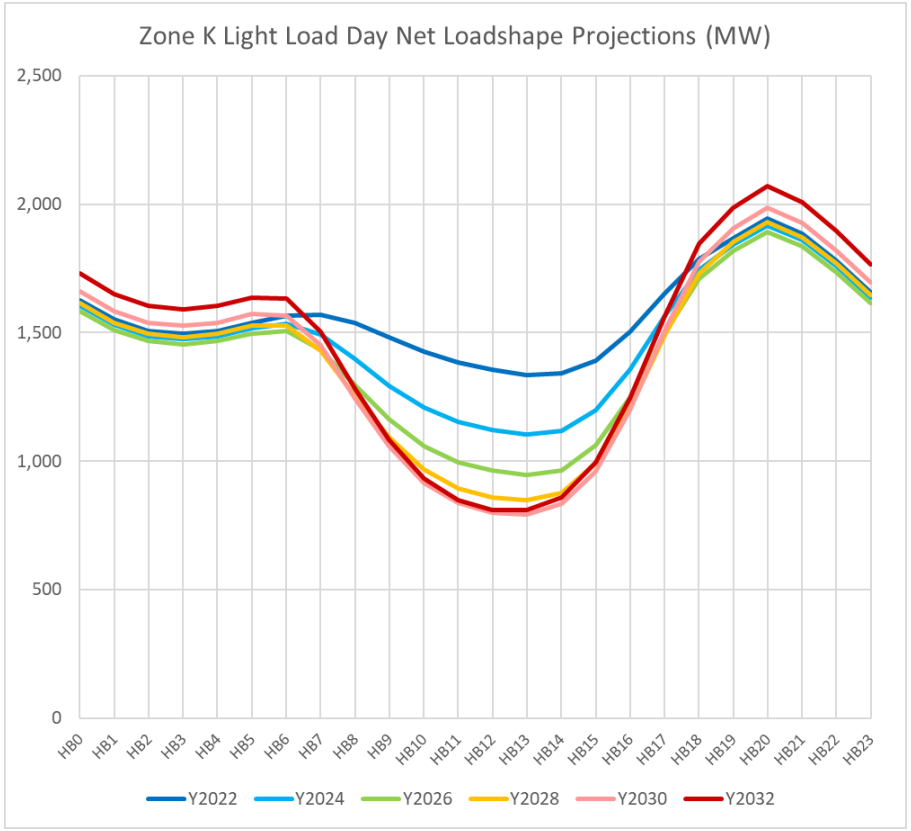
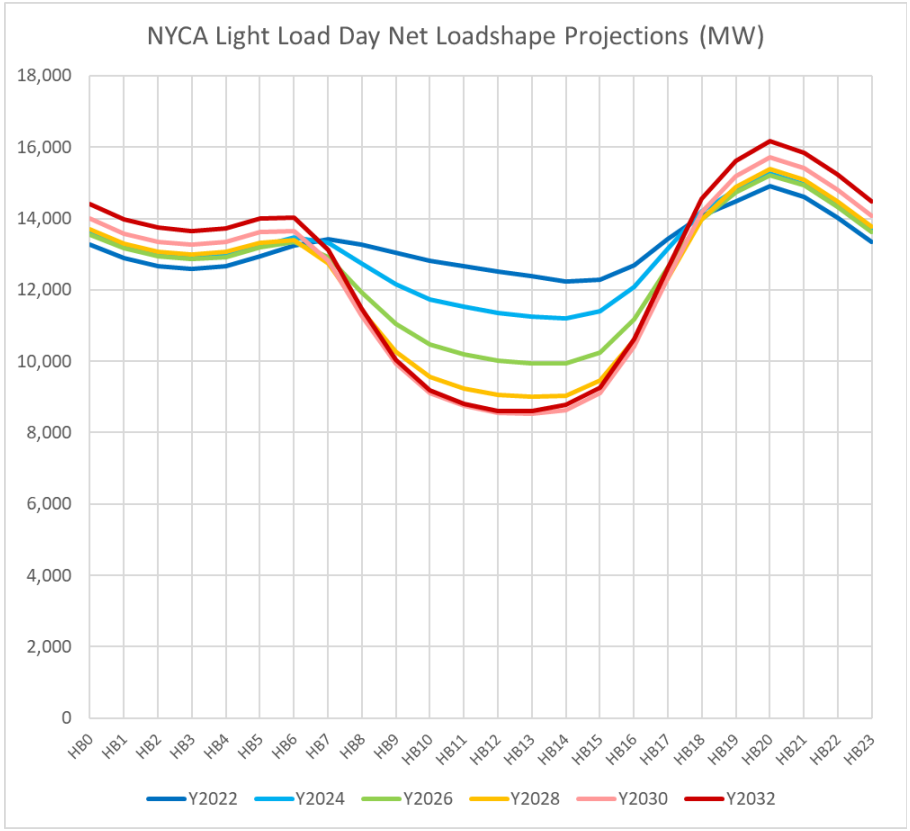
Zone K and System Shape Trends





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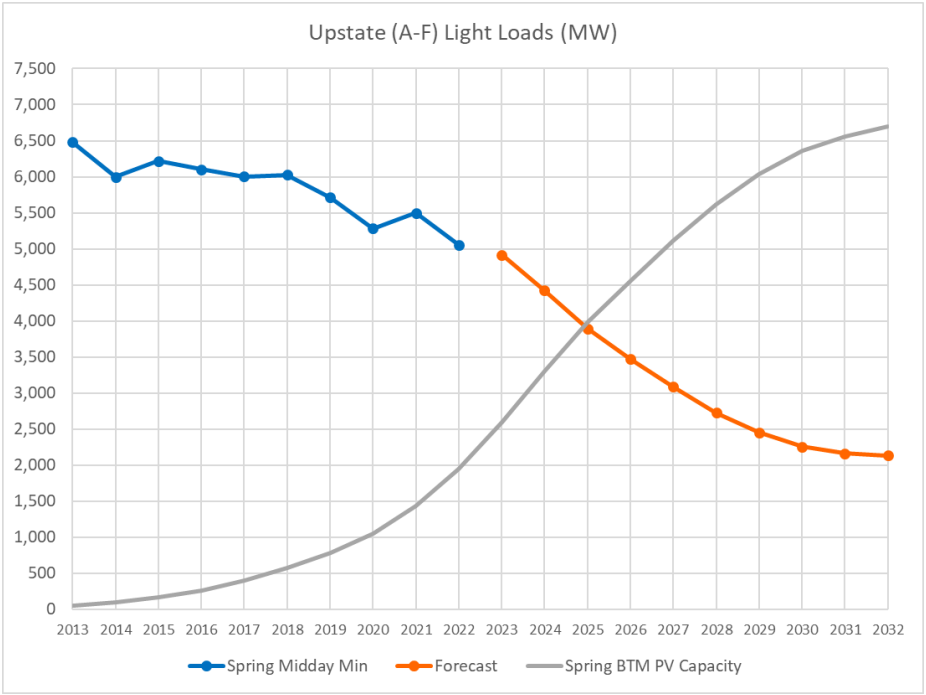
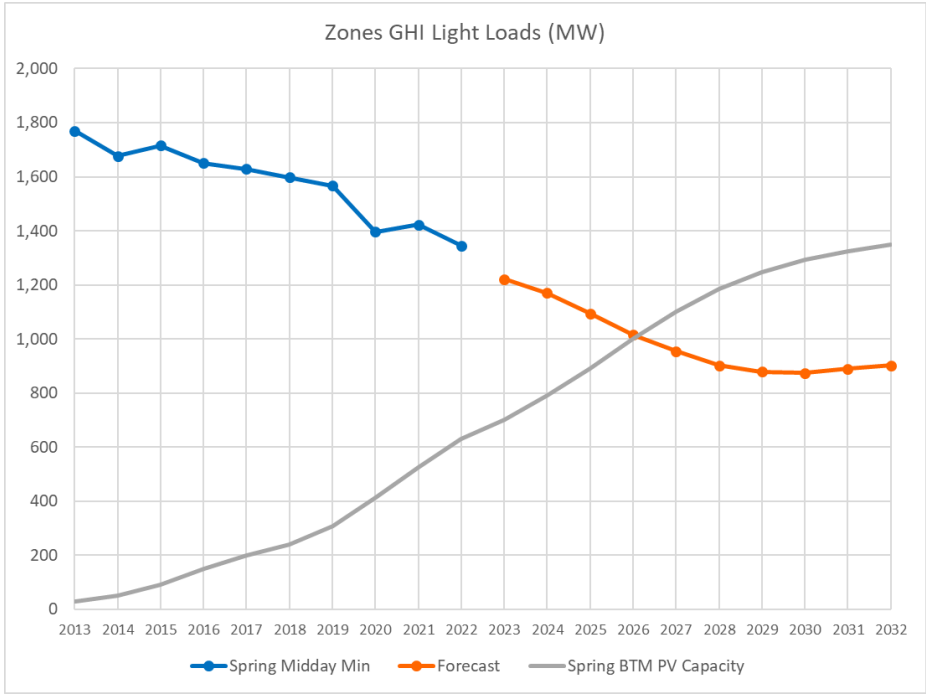
Midday Net Light Load Trends

Regional Light Load Trends





Note: Historical values reflect minimum loads from April and May hours beginning 10 through 14

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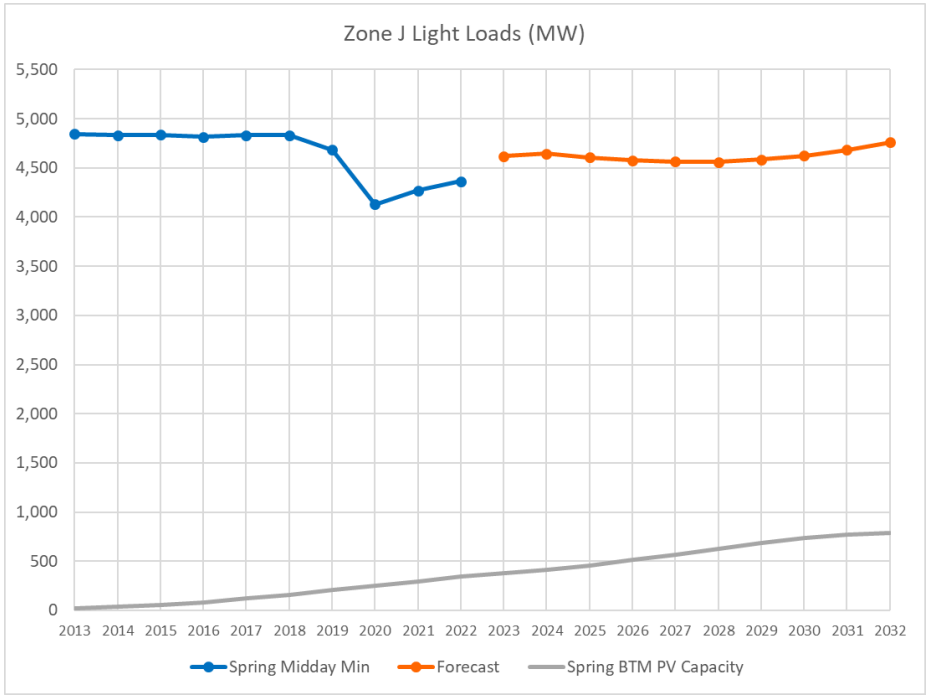
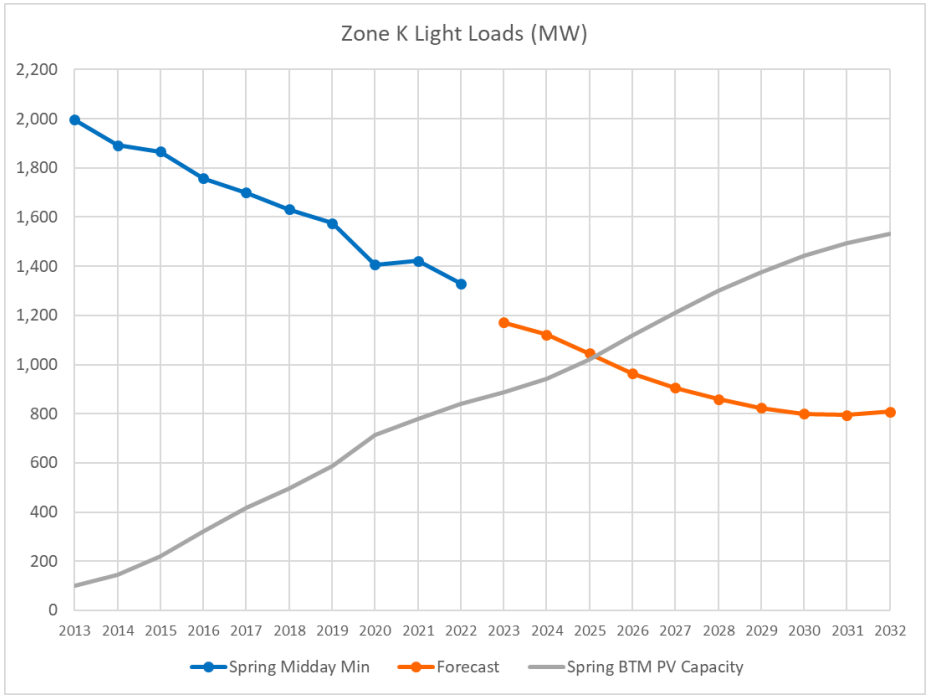
Zonal Light Load Trends





Note: Historical values reflect minimum loads from April and May hours beginning 10 through 14

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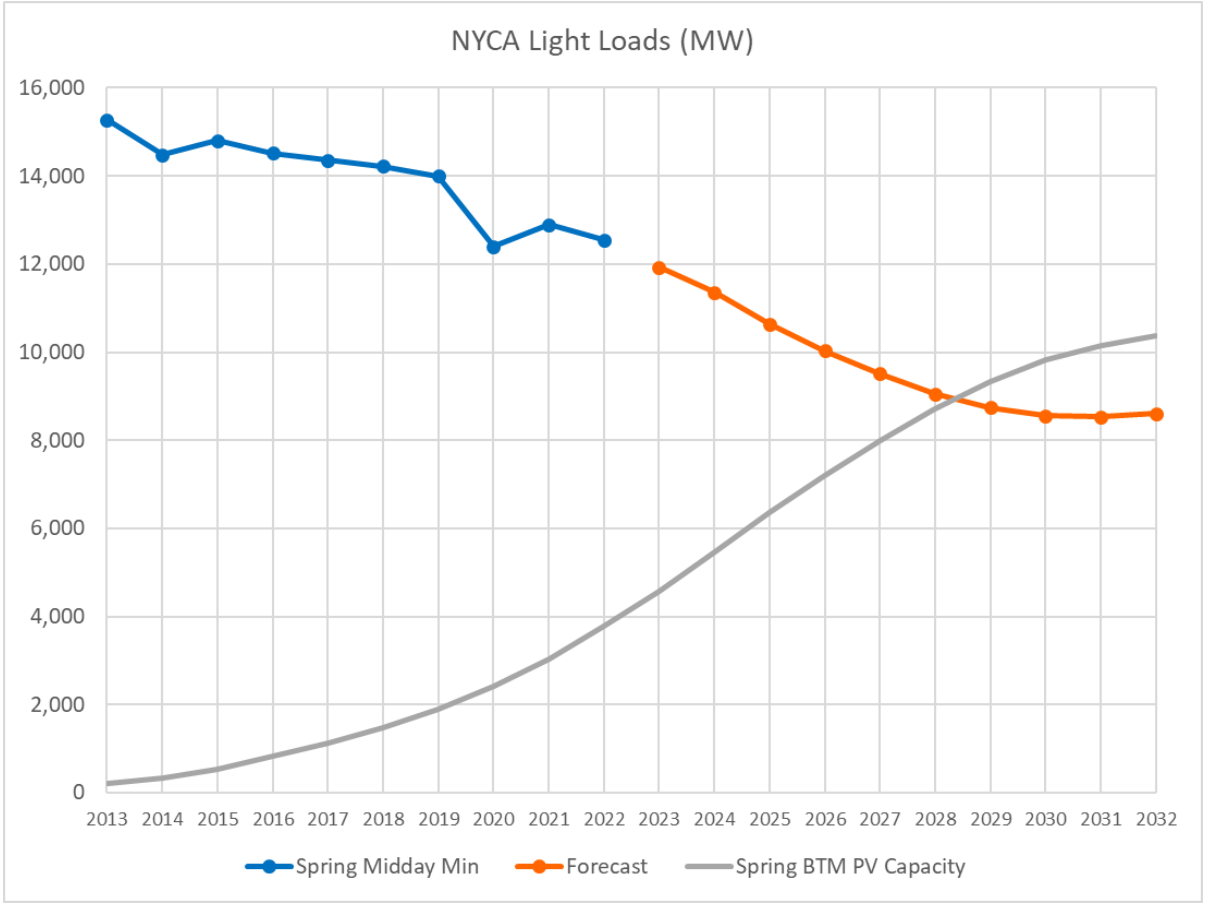
System Light Load Trends



Note: Historical values reflect minimum loads from April and May hours beginning 10 through 14

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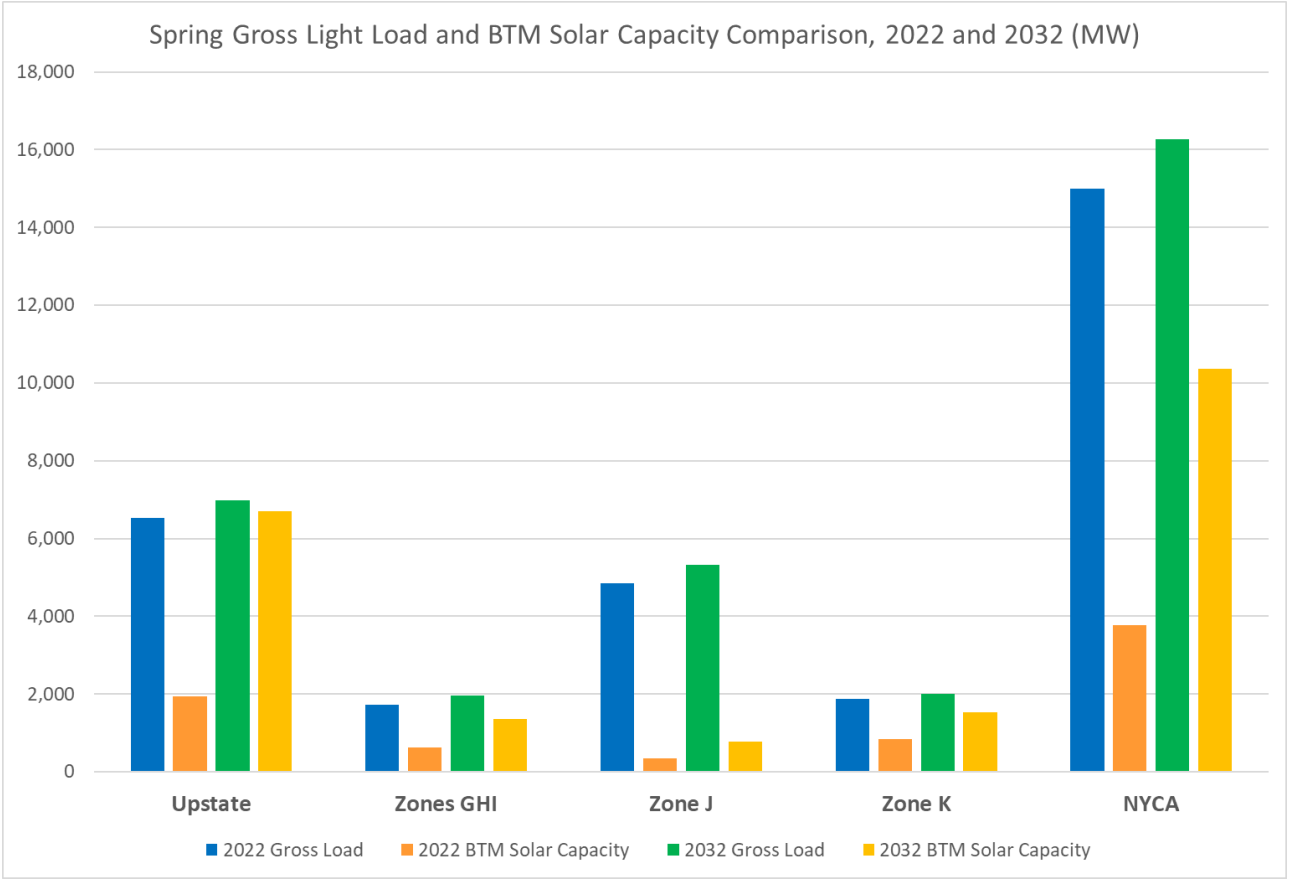
Regional BTM Solar Intensities



Ratio of Spring BTM PV Capacity to Gross Light Load		
Area	**2022 Ratio**	**2032 Ratio**
Upstate (A-F)	30%	96%
Zones GHI	36%	69%
Zone J	7%	15%
Zone K	45%	77%
NYCA	**25%**	**64%**

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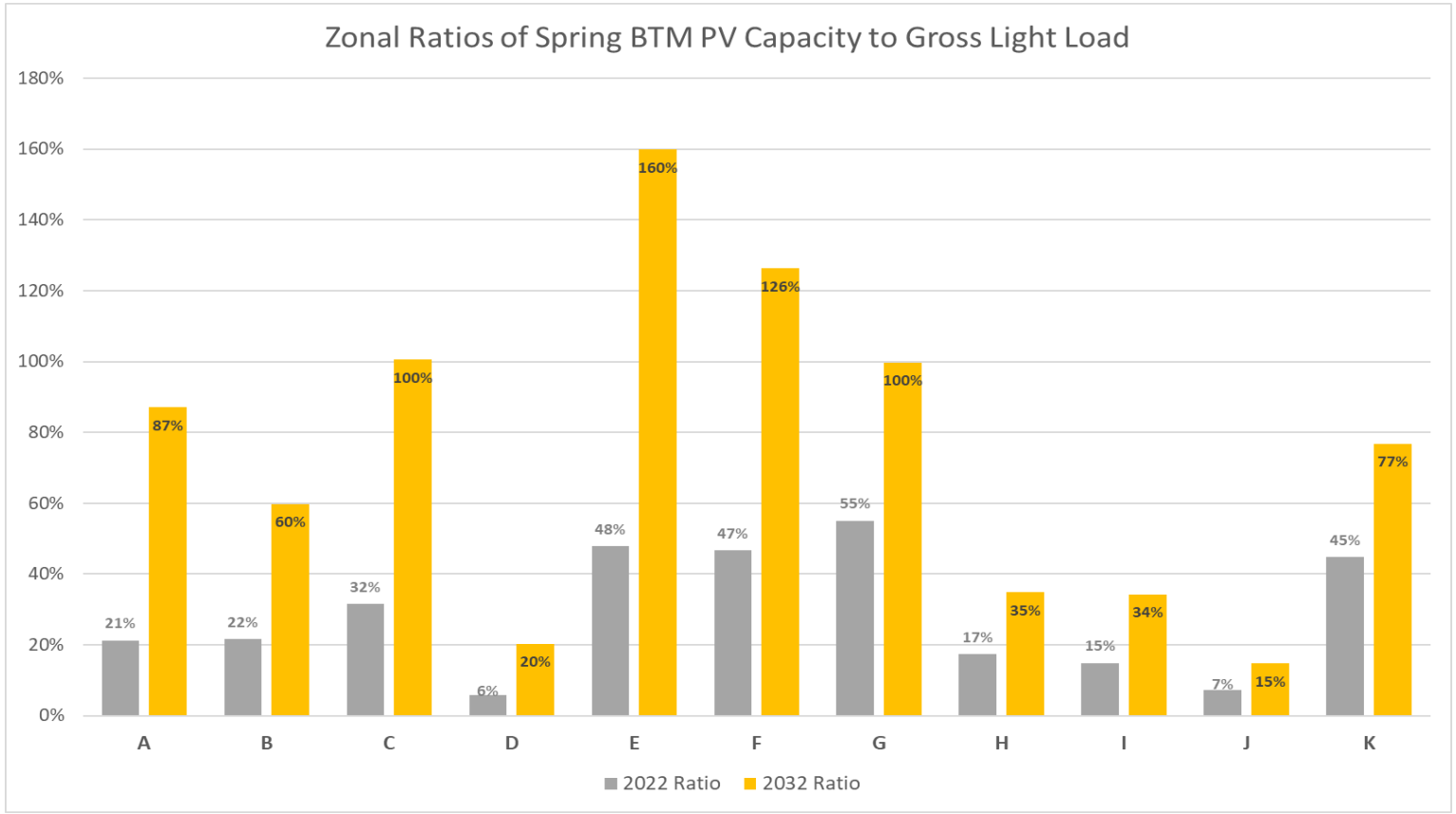
Zonal BTM Solar Intensities



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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

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