New York ISO
Independent System Operator

Forecasts for Reliability Planning Studies

Max Schuler

Demand Forecasting & Analysis

Load Forecasting Task Force

May 29, 2025

Agenda

- **Light Load Forecast**
  - Used for Light Load case in transmission security analyses
- **Gross Peak Forecast**
  - Used in resource adequacy GE MARS modeling
- **Transmission Security Margin Demand Shapes**
  - Projected load shapes during New York Control Area summer and winter peak days

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Light Load Forecast

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Light Load Forecast Background

- The Light Load Forecast reflects a low midday net load hour with high behind-the-meter (BTM) solar generation, approaching or equal to the overall New York Control Area (NYCA) annual minimum load hour
- NYCA-Coincident Forecast for hour beginning 12 (solar noon with largest BTM solar impacts)
  - The minimum load often occurs an hour or two later, in the early afternoon
- Assumes a spring weekend day
  - Maximum BTM solar impacts across the year
  - Weekend load levels are lower than weekday levels
- 4/20/2025 used as a starting point (recent spring holiday weekend with low load and high solar)

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Light Load Forecast Background

- **Gross Light Load Day Forecast accounts for**
  - Base load growth driven by econometric trends, energy efficiency savings, and other impacts
  - Electric Vehicles (EVs) projected spring weekend charging load
  - Electrification of non-weather sensitive building appliances
  - BTM storage charging during the midday hours. Includes potential impacts from hybrid solar and storage resources
  - Projected Large Load impacts from existing and future interconnection of Large Loads
- **Light Load hour BTM solar is deducted from the Gross Forecast**
  - From 2025 Gold Book Table I-9d – maximum hourly NYCA 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 (1 pm or noon hour)

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Light Load Forecast Buildup

2025 CRP NYCA Midday Light Load Forecast

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
2026	14,972	850	160	40	35	16,057	5,477	10,580	10,530
2027	14,877	1,110	210	67	74	16,338	6,091	10,247	10,208
2028	14,780	1,250	290	95	113	16,528	6,626	9,902	9,873
2029	14,685	1,430	372	128	148	16,763	7,075	9,688	9,669
2030	14,548	1,670	487	165	191	17,061	7,460	9,601	9,589
2031	14,521	1,830	592	206	228	17,377	7,783	9,594	9,591
2032	14,442	1,960	738	251	263	17,654	8,069	9,585	9,585
2033	14,361	2,070	901	300	298	17,930	8,319	9,611	9,611
2034	14,263	2,120	1,110	355	333	18,181	8,535	9,646	9,646
2035	14,191	2,150	1,340	413	370	18,464	8,720	9,744	9,744

(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 (2025 GB Table I-9d)

(h) - Net 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 - ninimum hourly metered load served by the wholesale market during the light load day (Hour Beginning 12 or 13)

Zonal Forecast Values

2025 CRP 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	Upstate	GHI
2026	1,253	404	852	818	209	514	447	191	498	4,302	1,092	10,580	4,050	1,136
2027	1,200	330	802	912	137	457	420	184	493	4,265	1,047	10,247	3,838	1,097
2028	1,145	269	788	908	80	387	394	178	490	4,237	1,026	9,902	3,577	1,062
2029	1,103	223	810	899	40	330	359	175	493	4,211	1,045	9,688	3,405	1,027
2030	1,066	184	882	889	6	293	330	172	493	4,202	1,084	9,601	3,320	995
2031	1,038	157	921	881	-18	265	323	170	496	4,215	1,146	9,594	3,244	989
2032	1,020	132	956	875	-45	242	320	170	498	4,226	1,191	9,585	3,180	988
2033	1,002	117	1,005	870	-61	226	324	173	502	4,243	1,210	9,611	3,159	999
2034	993	106	1,011	867	-77	211	334	175	510	4,269	1,247	9,646	3,111	1,019
2035	986	98	1,015	866	-80	217	343	178	516	4,309	1,296	9,744	3,102	1,037

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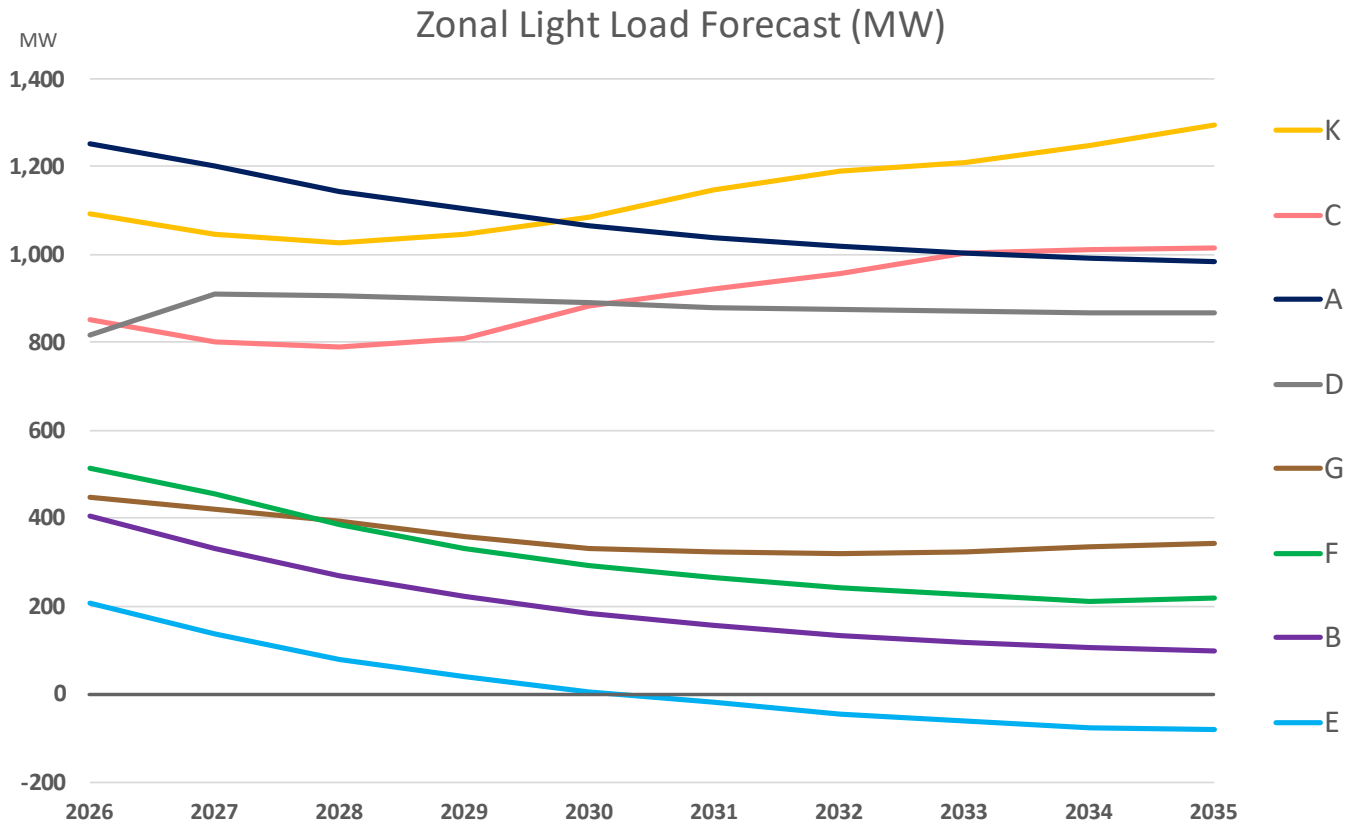

2035 Light Load Hour - Percent of Gross Load Served by BTM Solar

A	B	C	D	E	F	G	H	I	J	K
42%	90%	61%	18%	108%	84%	72%	44%	25%	15%	47%

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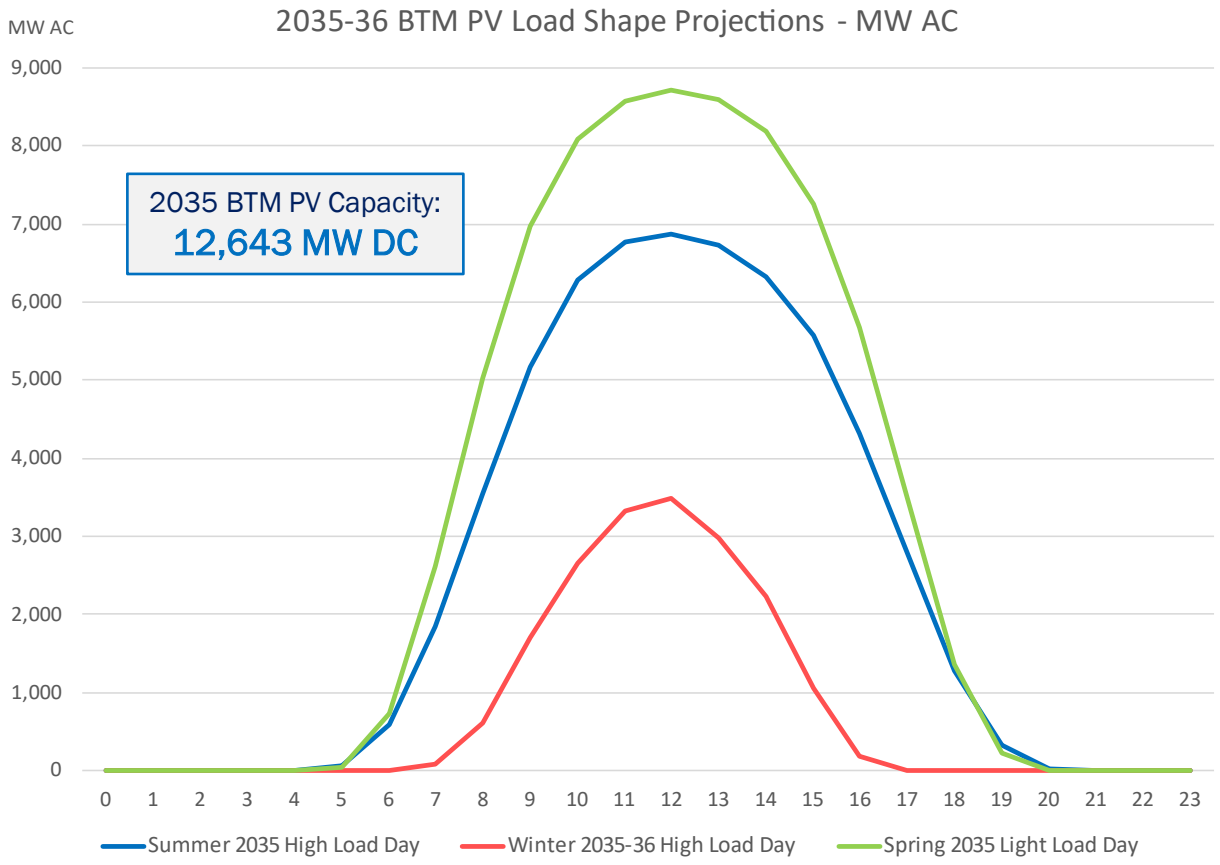
Projected BTM Solar Shapes



- Representative shapes showing potential BTM solar impact in 2035-36
- Summer representative shape used for the Gross Peak Forecast
- Winter representative shape from the 2025 Gold Book supplemental graphs
- Spring representative shape based on data from recent spring high solar days, scaled up to the 2035 maximum BTM Solar Generation Forecast

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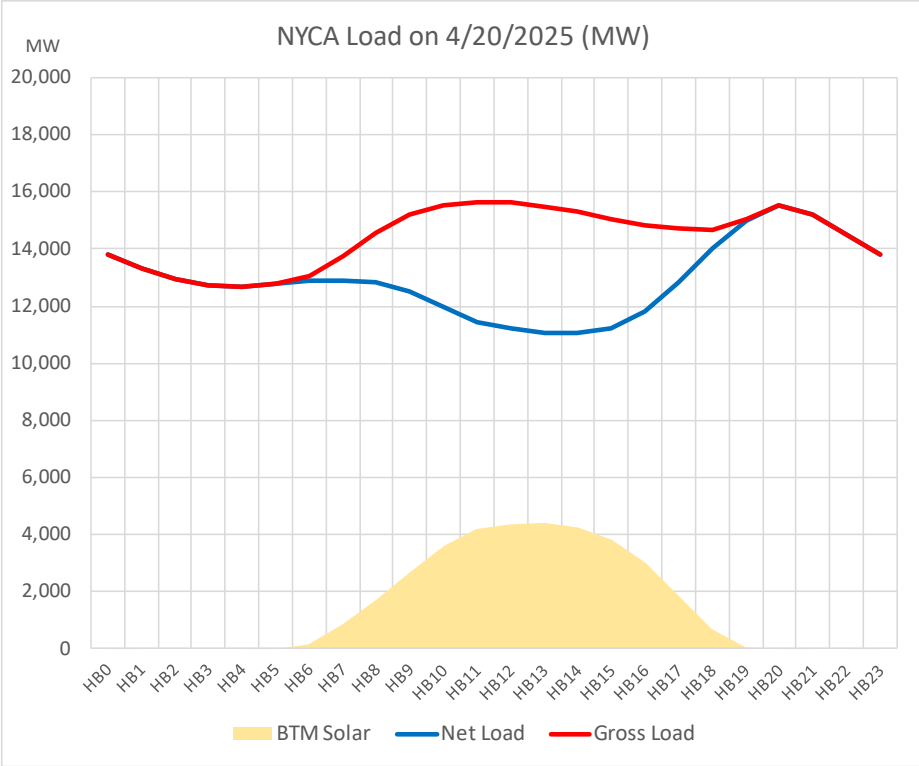
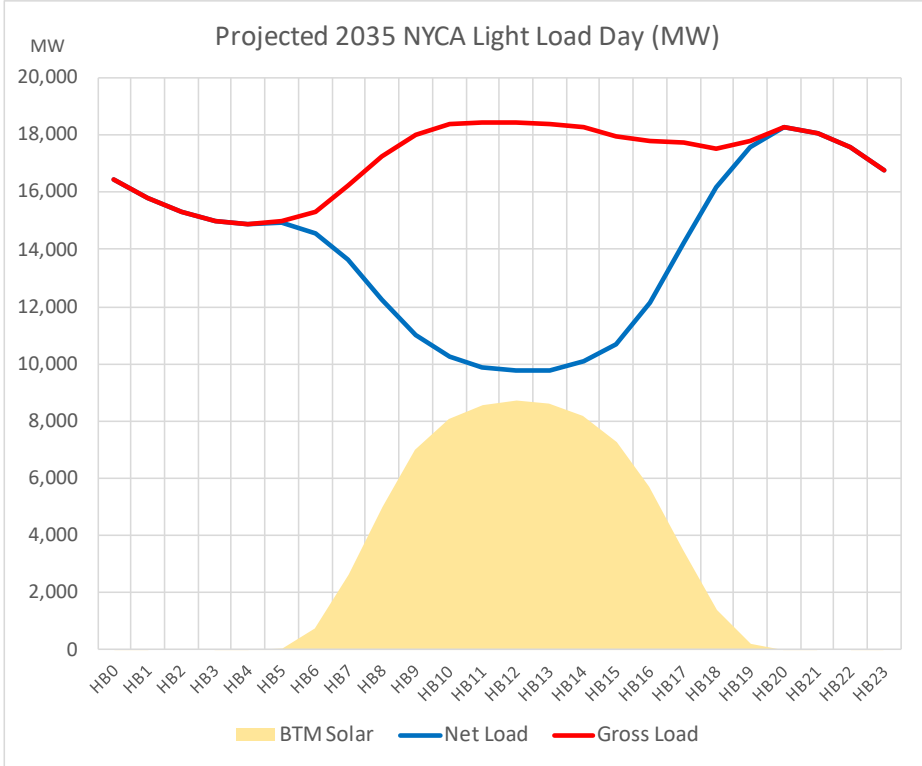
NYCA Light Load Day Shapes





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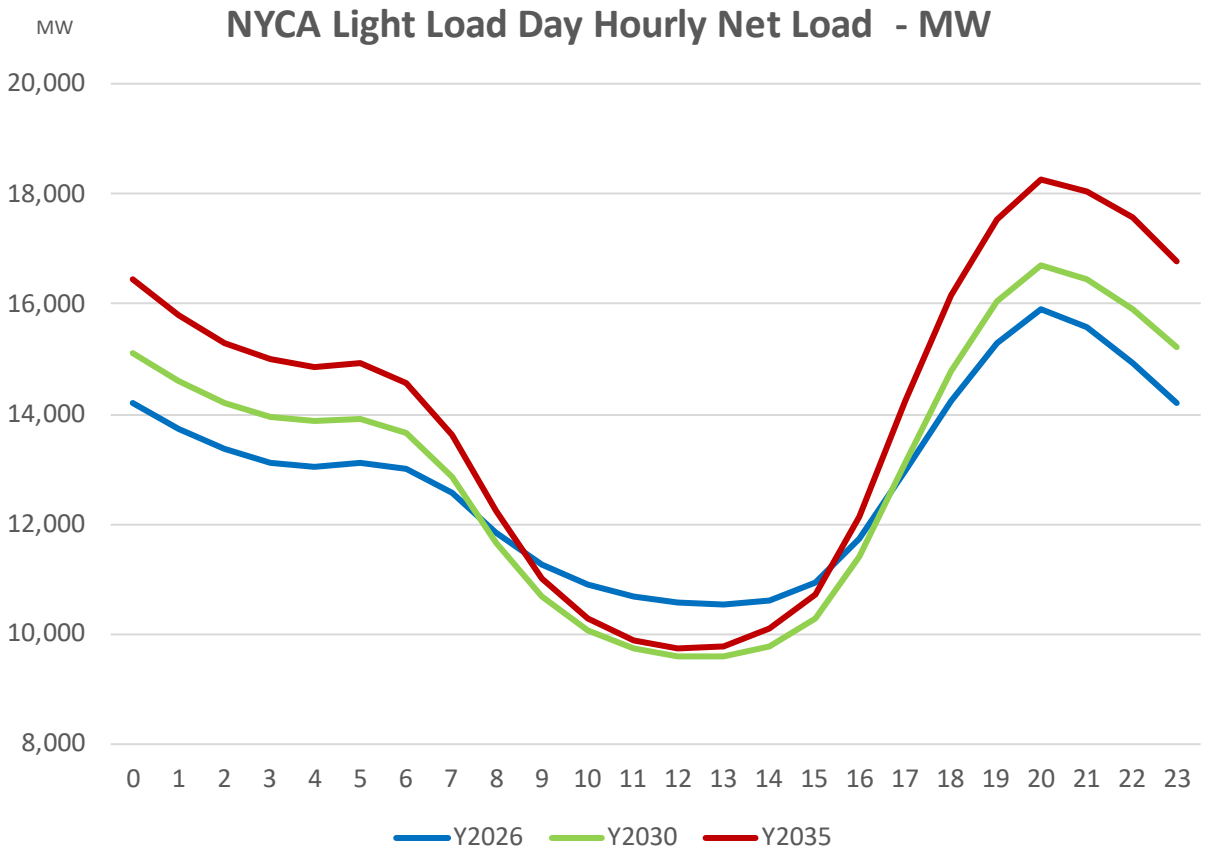
NYCA Light Load Day Shape Evolution



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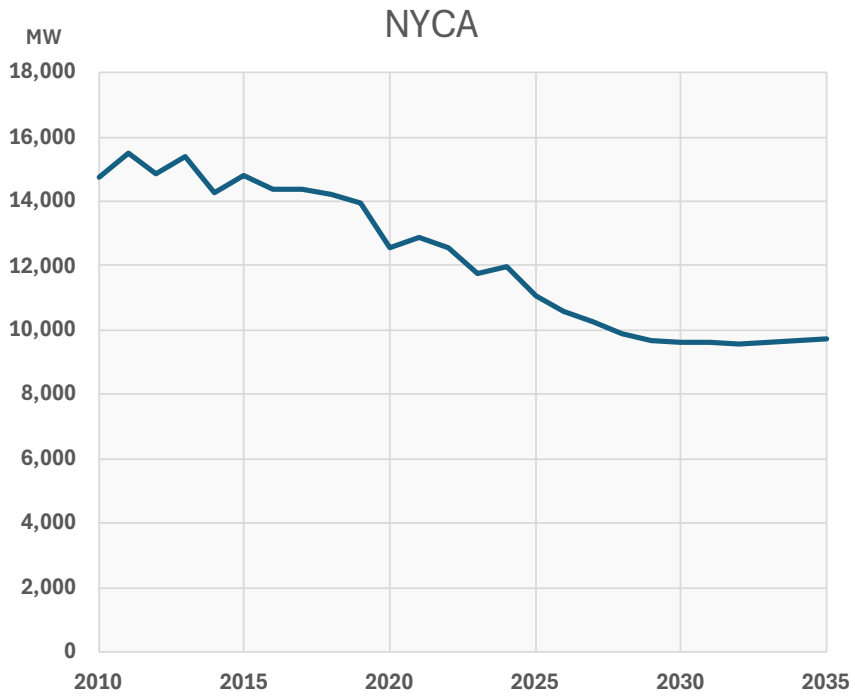
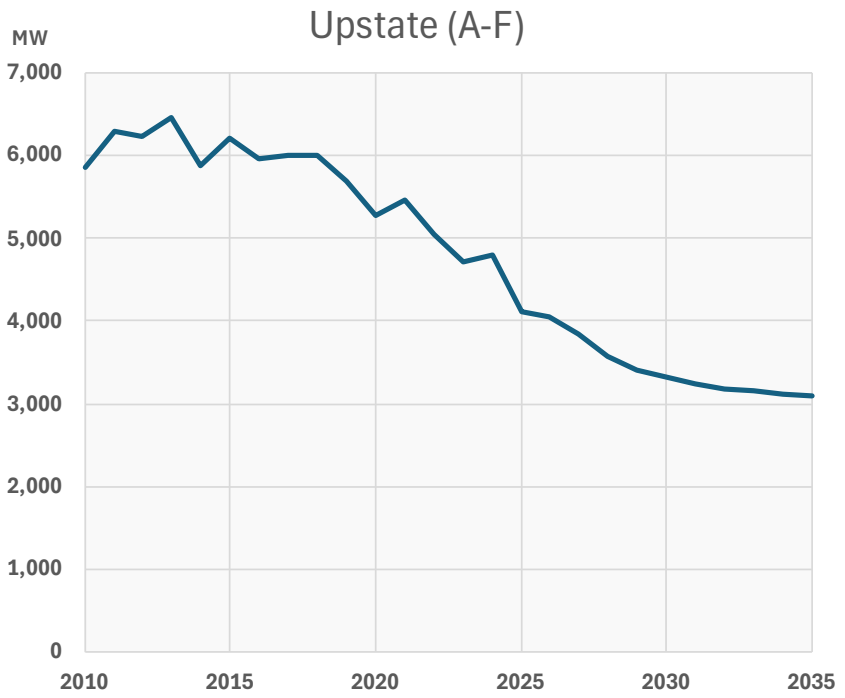
Spring Midday Light Load Trends





Historical values: Minimum load during March, April, & May midday period (hours beginning 11–15)

Forecast values: Spring noon hour Light Load Forecast

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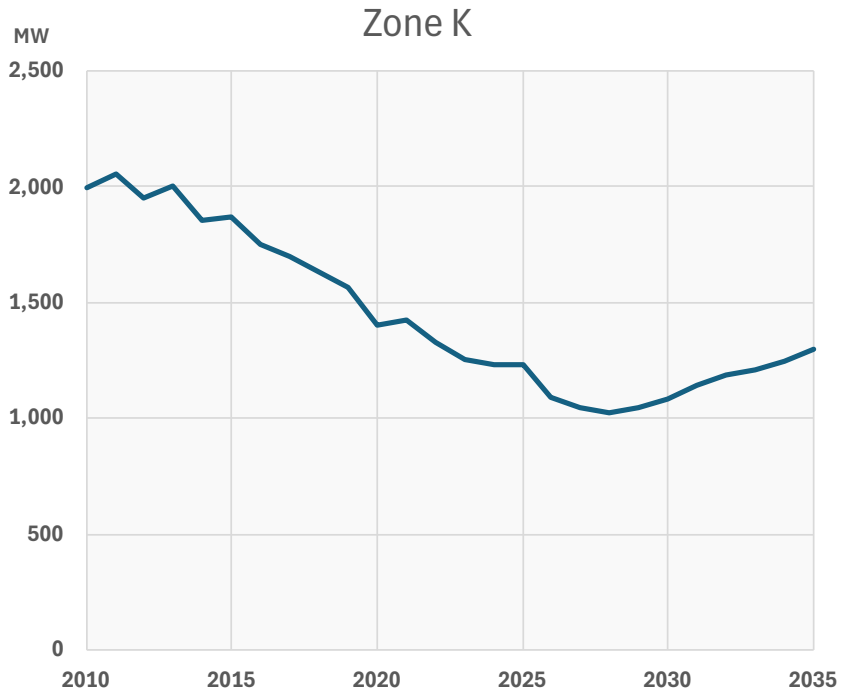
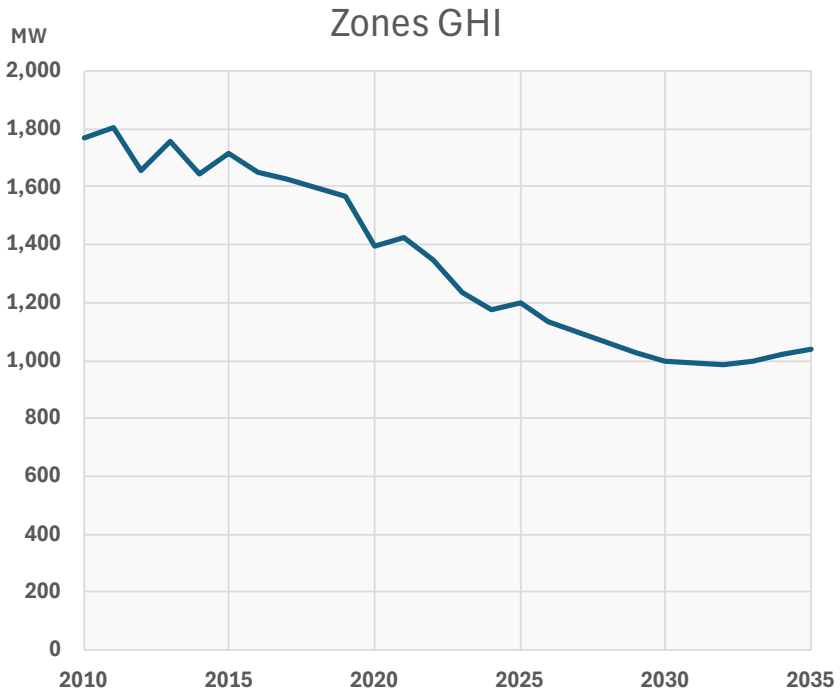
Spring Midday Light Load Trends





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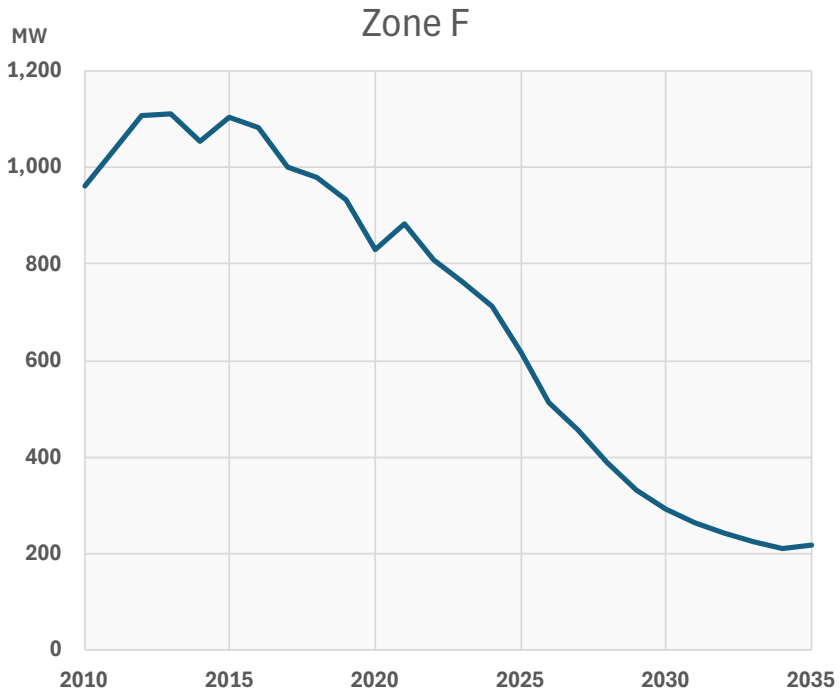

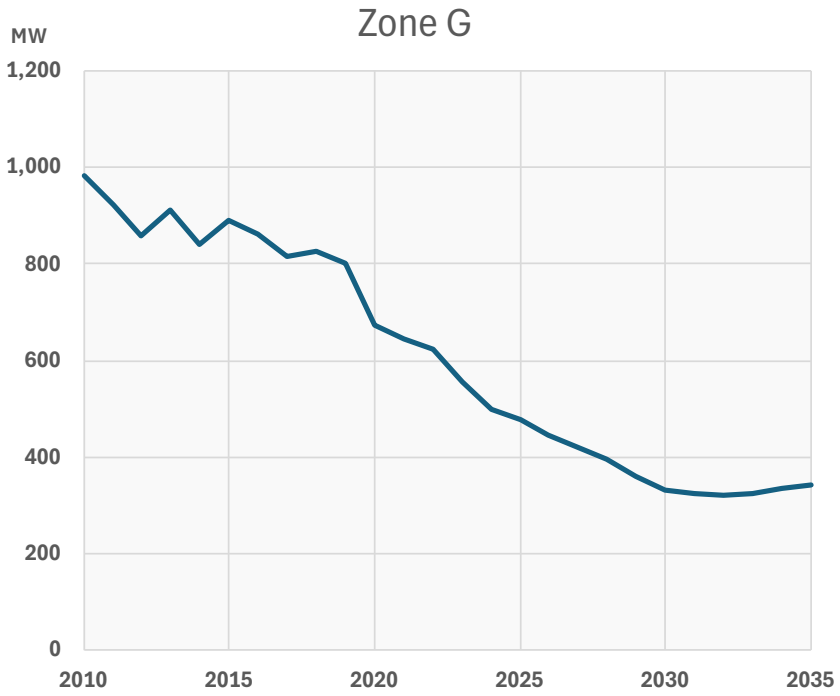

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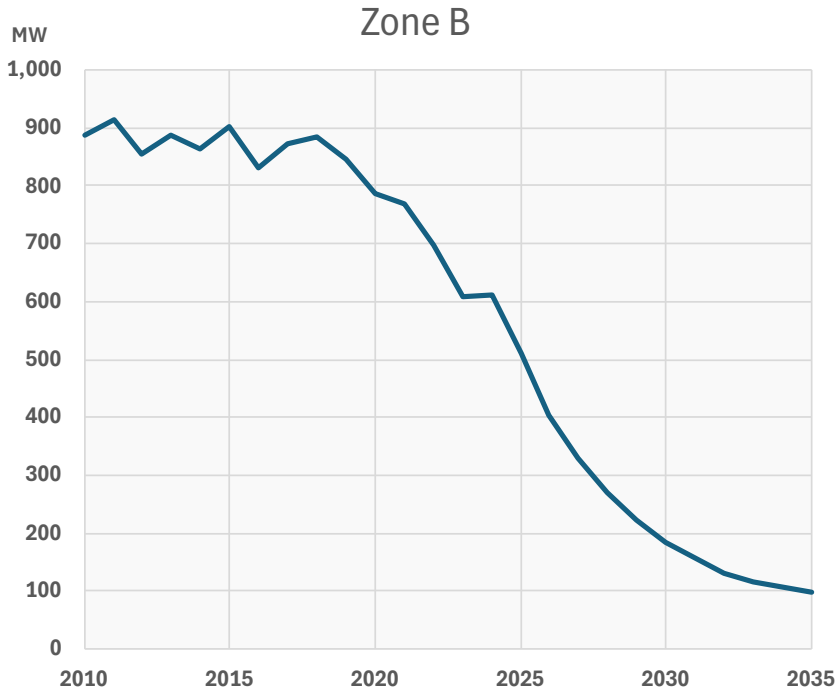

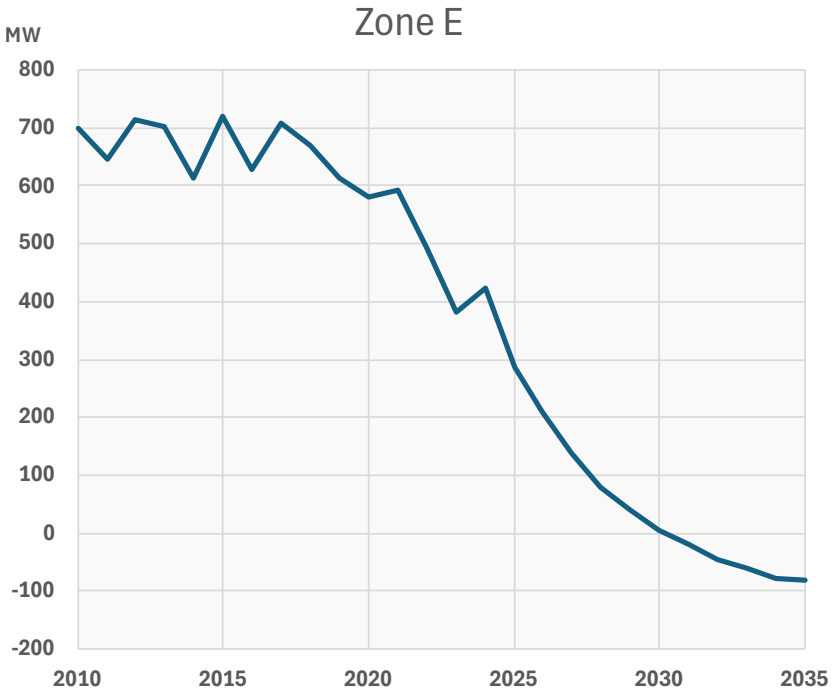

Historical values: Minimum load during March, April, & May midday period (hours beginning 11–15)

Forecast values: Spring noon hour Light Load Forecast

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Light Load Forecast Takeaways

- **Spring minimum midday loads are projected to continue to decrease through 2030 at the NYCA system level, due to strong growth in BTM solar**
- **Many Upstate Zones have significant projected load decreases**
  - Zone E metered net Light Load may become negative around 2030. On recent spring midday low load hours, transmission losses have accounted for a substantial portion (up to 30%) of Zone E metered load. Metered load net of losses may drop below zero during upcoming springs.
  - Zone B metered net light load is projected to drop to around 100 MW by 2035. Zones F and G are both projected to drop below 400 MW in upcoming years.
- **There are significant mitigating load growth impacts assumed in the Light Load Forecast. Without these impacts, load decreases could be more significant**
  - Large loads are assumed to contribute over 2,000 MW to the Light Load by 2035. Without this large load growth, light load levels would be significantly smaller, especially in certain Upstate Zones including Zones C and D.
  - Consistent with the 2025 Gold Book baseline, the Light Load Forecast assumes significant adoption of EV charging and non-weather sensitive building end-use electrification. The Light Load Forecast also assumes BTM storage will be charging from the grid on net during midday low load hours.
  - Without these mitigating factors, NYCA minimum midday low load levels could drop below 7,000 MW by the mid 2030s.

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Gross Peak Forecast

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Gross Peak Forecast Background

- The Gross Peak Forecast was developed for use in planning resource adequacy simulations
- 2025 to 2035 forecast horizon
- The forecast reflects the projected maximum gross demand (measured load plus BTM solar generation) for each summer
- Provides maximum demand targets for GE MARS modeling because BTM solar is modeled as a resource on the supply side (via random selection from five historical solar shapes) rather than as an adjustment to the load
- Winter Gross Peak Forecast matches the 2025 Gold Book Net Peak Forecast. The gross and net peak hours are the same because the projected gross peak demand hour occurs after sunset during the winter peak day

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Gross Peak Forecast Methodology

- **Generate projected NYCA peak day net load, BTM solar, and gross load shapes**
  - BTM solar projections are based on historical sampled inverter data, Solar Capacity Schedule Forecast, and projected BTM solar site mix and characteristics
- **Calibrate these shapes to reflect 2025 conditions, including 2025 forecasted net peak load and the 2025 projected solar capacity level**
- **Produce annual peak day solar profiles for 2025 through 2035, reflecting increasing capacity levels from the 2025 Gold Book**
- **Calculate 2025-2035 projected peak day net and gross load shapes**
  - Net load peaks match the 2025 Gold Book Peak Load Forecast
  - The divergence in the net and gross shapes increases over time as BTM solar penetration increases
  - Gross load shapes account for shape impacts of increasing electrification over time
- **The NYCA Gross Peak Forecast is the maximum value from the gross load shape**
- **Zonal Forecast Derivation:**
  - Starting point in each zone is the 2025 Gold Book baseline Coincident Net Peak Forecast
  - BTM solar generation is apportioned to the zones via shares of expected BTM solar generation at 4 pm during a summer peak-type load day (the expected gross peak hour is 4 pm)
  - Consistent additions are made to the baseline Zonal Non-Coincident and G-to-J Peak Forecasts and to the Coincident, Non-Coincident, and G-to-J Zonal Higher Demand Scenario Peak Forecasts
  - Baseline and Higher Demand Scenario Annual Gross Energy Forecasts are the sum of the Annual Net Energy Forecasts (Tables I-2 and I-2-H) and the forecast of BTM solar annual energy reductions (Table I-9b)

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Baseline Coincident Peak Forecast

Table I-3a-G: Gross Baseline Summer Coincident Peak Demand Forecast

Includes Impacts of Energy Saving Programs, Electrification, & Large Loads

Coincident Summer Peak Demand by Zone - MW

Gross Forecast (Load plus BTM Solar Generation)

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2025	2,997	2,040	2,790	717	1,516	2,503	2,498	655	1,366	10,956	5,360	33,398
2026	3,104	2,065	2,895	1,080	1,541	2,523	2,548	659	1,373	10,995	5,358	34,141
2027	3,123	2,087	3,002	1,218	1,568	2,564	2,588	665	1,382	11,037	5,386	34,620
2028	3,128	2,091	3,117	1,224	1,586	2,563	2,605	665	1,391	11,060	5,402	34,832
2029	3,132	2,090	3,269	1,232	1,598	2,568	2,609	668	1,398	11,082	5,441	35,087
2030	3,133	2,088	3,464	1,233	1,613	2,574	2,610	668	1,406	11,102	5,506	35,397
2031	3,143	2,090	3,585	1,235	1,617	2,587	2,625	671	1,413	11,153	5,573	35,692
2032	3,152	2,093	3,703	1,238	1,624	2,599	2,650	675	1,422	11,231	5,628	36,015
2033	3,166	2,096	3,827	1,241	1,635	2,609	2,677	680	1,430	11,299	5,685	36,345
2034	3,177	2,098	3,872	1,243	1,646	2,623	2,704	685	1,437	11,385	5,729	36,599
2035	3,198	2,104	3,904	1,244	1,660	2,643	2,733	689	1,451	11,461	5,787	36,874

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Zonal Baseline Non-Coincident Peak Forecasts

Table I-4a-G: Gross Baseline Summer Non-Coincident Peak Demand Forecast

Includes Impacts of Energy Saving Programs, Electrification, & Large Loads

Non-Coincident Summer Peak Demand by Zone - MW

Gross Forecast (Load plus BTM Solar Generation)

Year	A	B	C	D	E	F	G	H	I	J	K
2025	3,143	2,086	2,869	739	1,551	2,558	2,549	669	1,396	11,197	5,436
2026	3,267	2,110	2,975	1,123	1,576	2,578	2,600	673	1,403	11,235	5,434
2027	3,286	2,132	3,085	1,266	1,603	2,620	2,641	679	1,412	11,277	5,463
2028	3,290	2,136	3,203	1,272	1,621	2,618	2,658	679	1,421	11,300	5,479
2029	3,294	2,135	3,359	1,280	1,633	2,623	2,662	682	1,428	11,322	5,519
2030	3,295	2,132	3,560	1,281	1,648	2,629	2,663	682	1,436	11,342	5,585
2031	3,305	2,134	3,684	1,283	1,652	2,643	2,679	685	1,443	11,393	5,653
2032	3,315	2,138	3,806	1,286	1,660	2,655	2,704	689	1,453	11,481	5,709
2033	3,330	2,141	3,934	1,290	1,671	2,665	2,732	694	1,461	11,549	5,767
2034	3,341	2,143	3,980	1,292	1,682	2,680	2,760	699	1,468	11,635	5,812
2035	3,364	2,149	4,014	1,293	1,697	2,700	2,789	703	1,482	11,711	5,871

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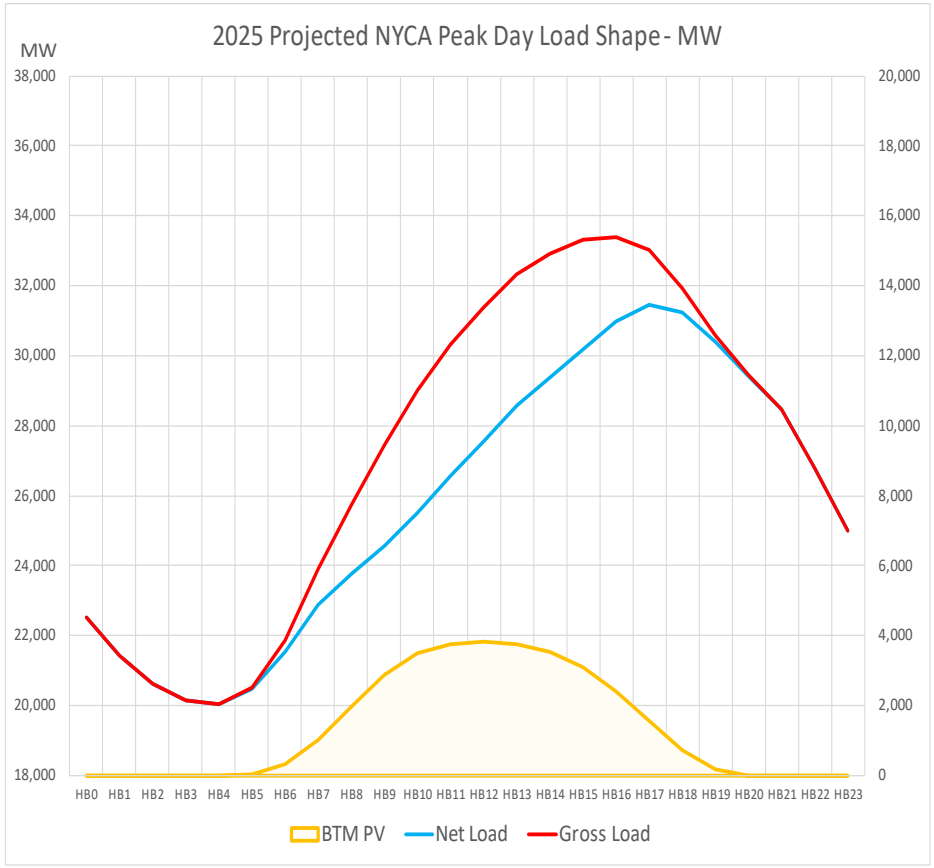
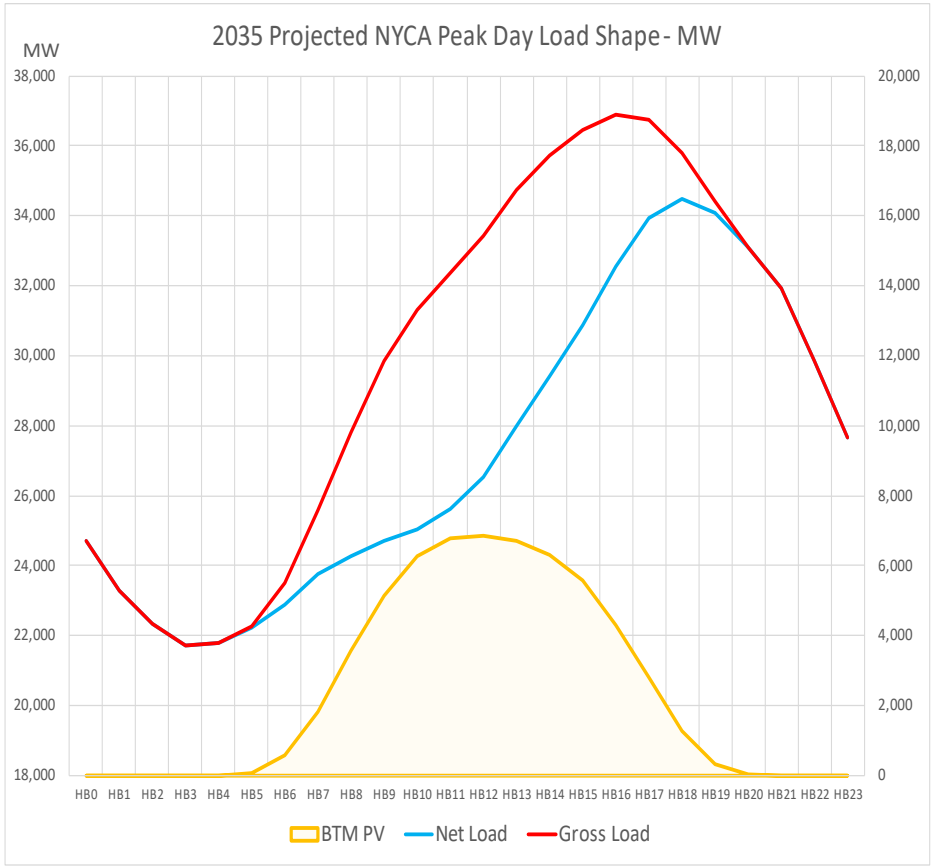
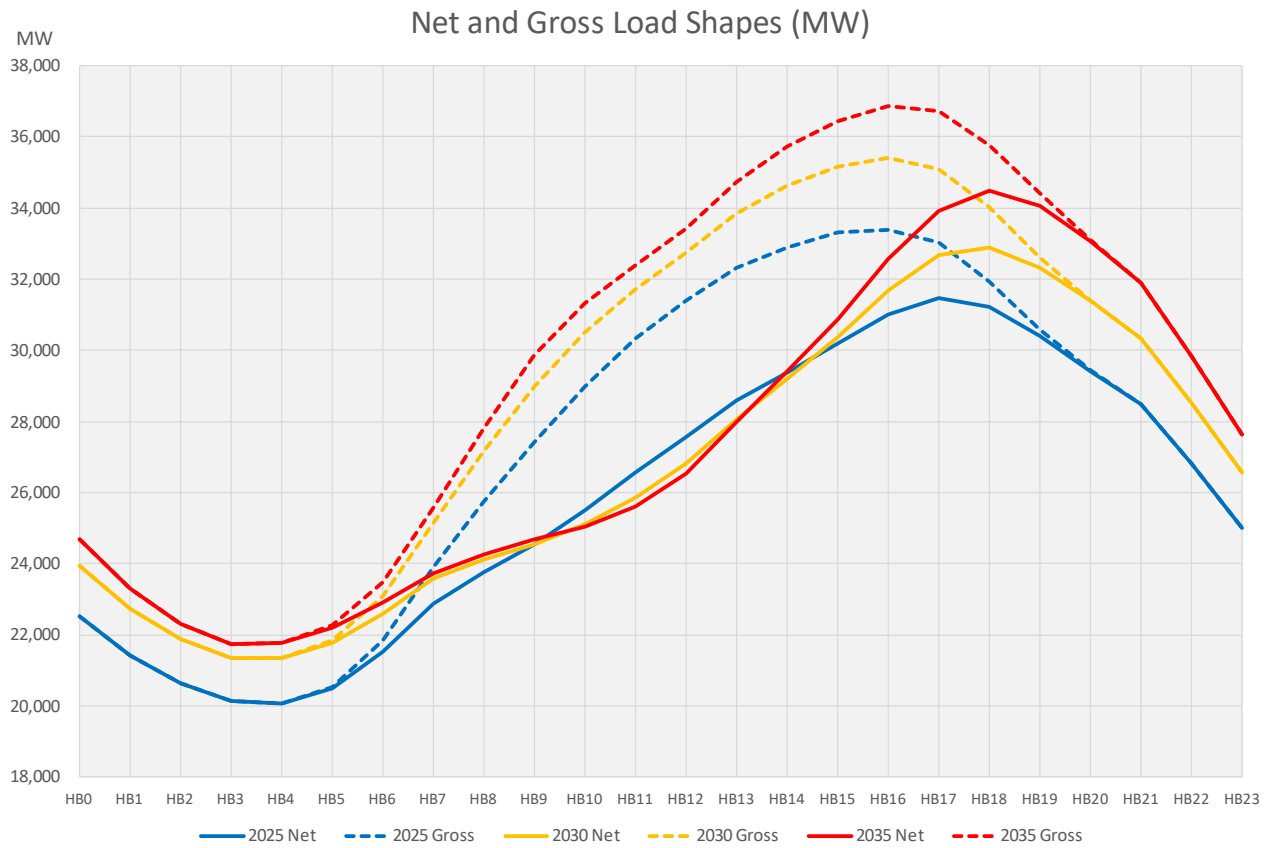
Peak Day Net and Gross Shapes (MW)





Peak Day Shape Trends



Year	2025	2030	2035
Gross Peak Hour	HB 16	HB 16	HB 16
Gross Peak MW	33,398	35,397	36,874
Net Peak Hour	HB 17	HB 18	HB 18
Net Peak MW	31,471	32,910	34,500
Noon BTM Solar MW	3,820	5,913	6,861
Delta MW*	1,927	2,487	2,374

*Gross Peak less Net Peak

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Transmission Security Margin Demand Shapes

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Transmission Security Margin Demand Shapes

- **Summer and winter peak day load shapes are under development for purposes of transmission security margin analyses**
  - Regional demand shapes during the NYCA baseline summer peak day (corresponding to the Localities)
  - NYCA summer peak day demand shapes (baseline expected weather, 90th and 99th percentile weather, and higher demand scenario)
  - NYCA winter peak day demand shapes
- **These shapes account for the projected load shape impacts of increasing BTM solar, EV charging and building electrification**
  - Summer peak building electrification is largely driven by the electrification of non-weather sensitive appliances such as water heaters and stovetops. The impacts of building electrification on the summer peak load shape are relatively minor
  - EV charging impacts become more significant in the outer years, peaking around the 7pm hour
- **The combination of BTM solar reductions and EV charging are expected to push the NYCA baseline summer peak out to the 6pm hour in the late 2020s**
- **The resulting demand shapes will be consistent with assumptions used in the Summer Gross Peak Forecast and the 2025 Gold Book high load day shapes (shown on the following slides)**

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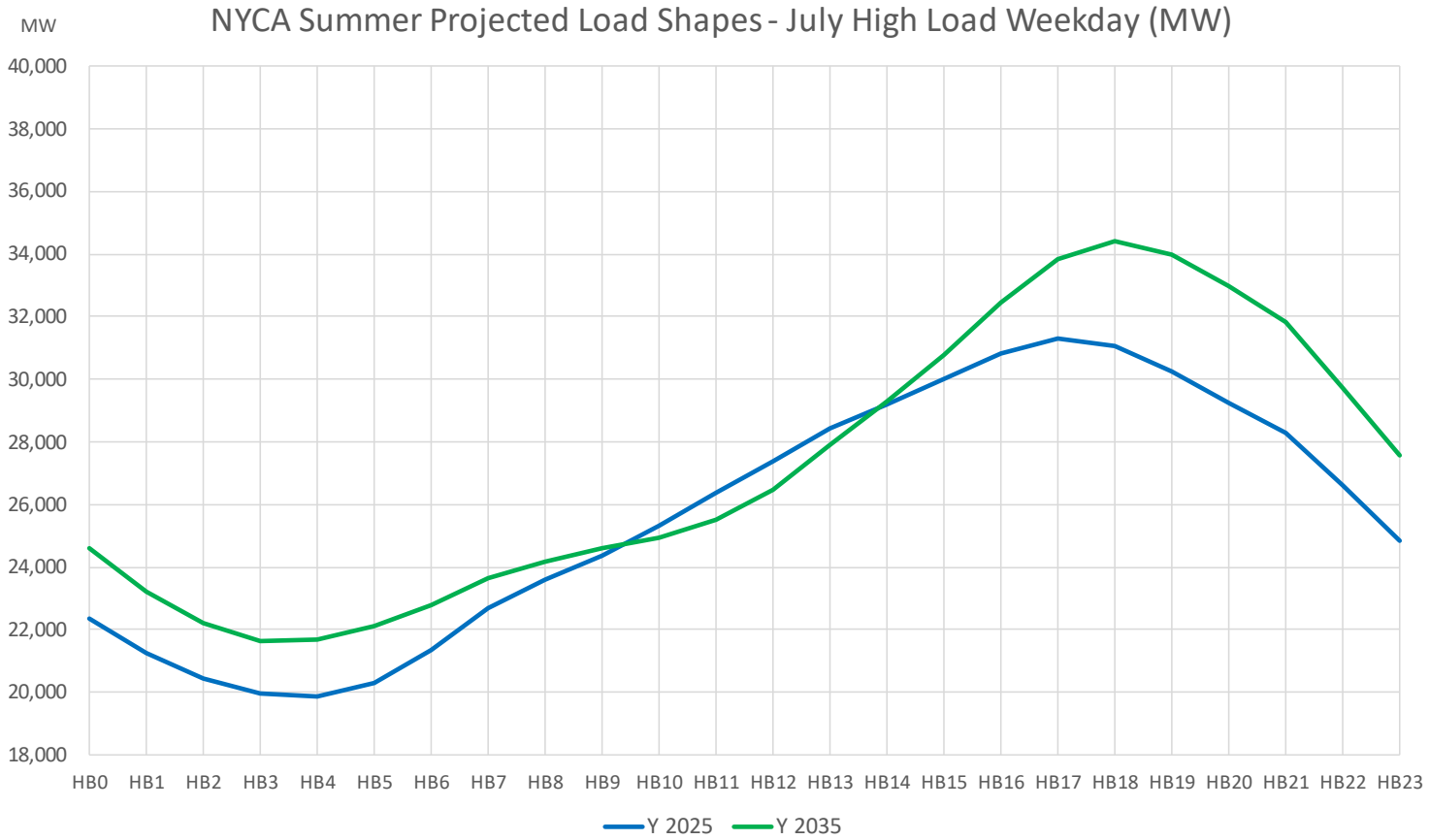
Projected Summer Load Shapes



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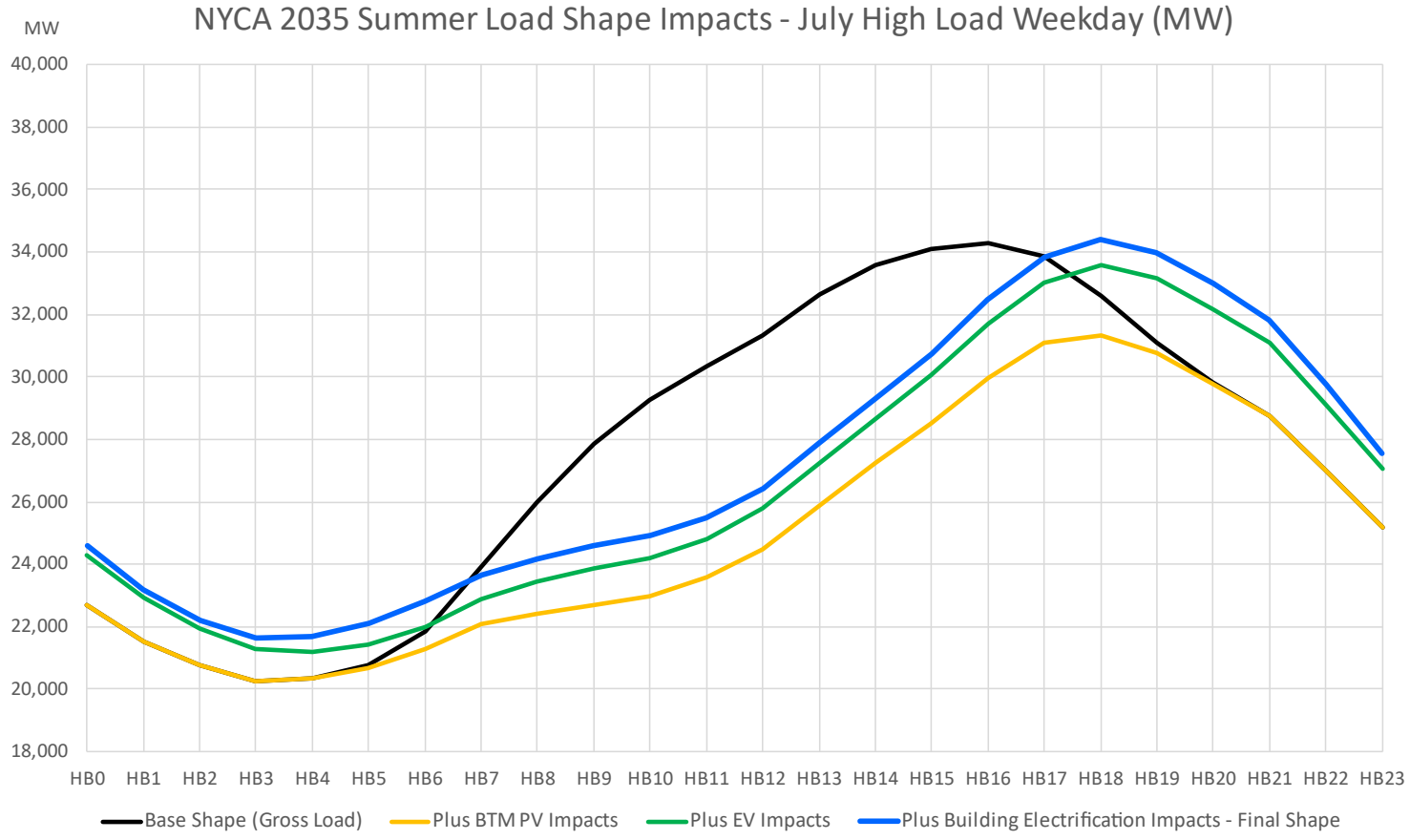
2035 Summer Load Shape Impacts



Black line shows projected base load shape (gross load).

Yellow line shows base load shape plus BTM solar reductions.

Green line shows base load shape plus BTM solar reductions and EV charging impacts.

Blue line shows final projected load shape – base shape plus BTM PV, EV, and building electrification impacts.

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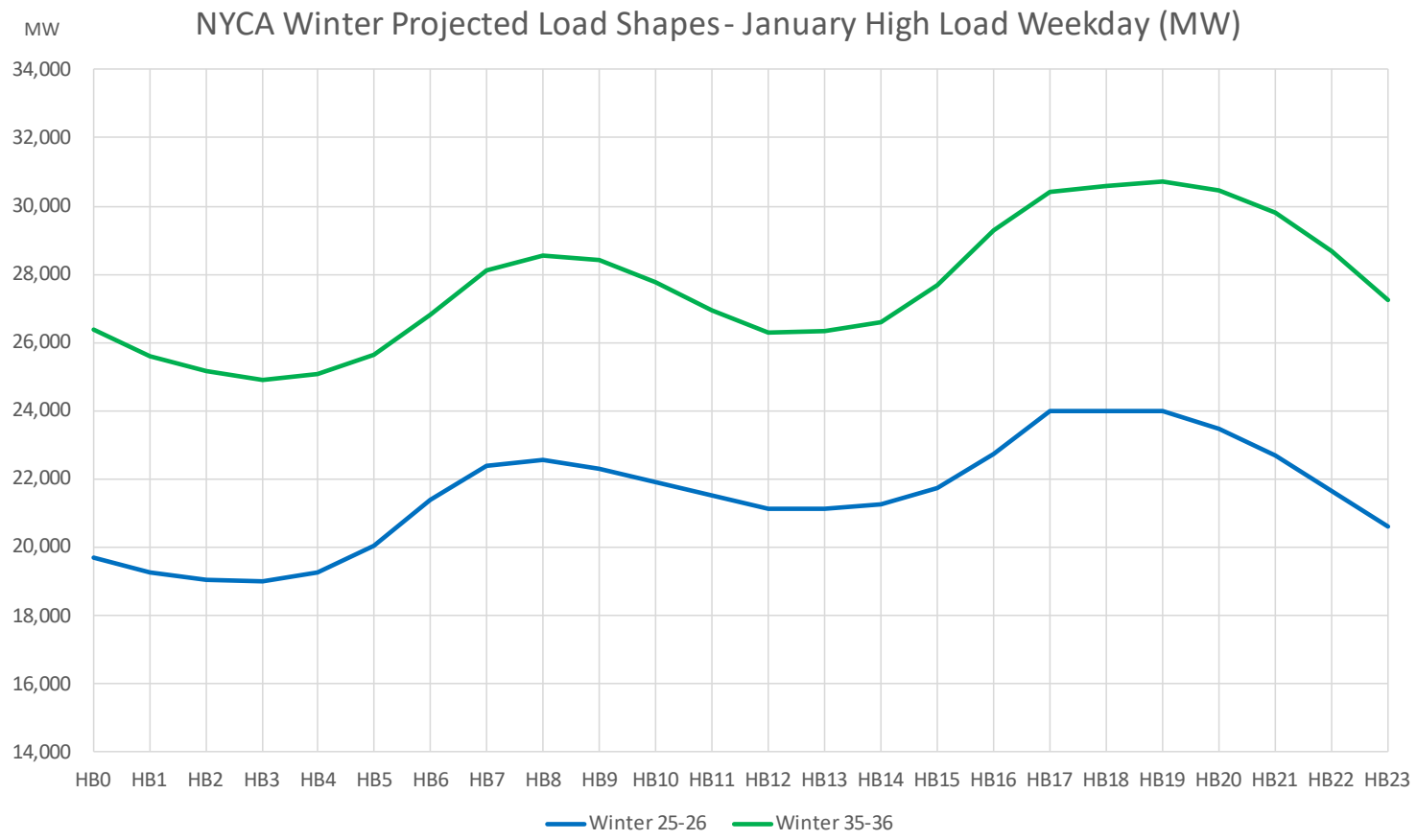
Projected Winter Load Shapes



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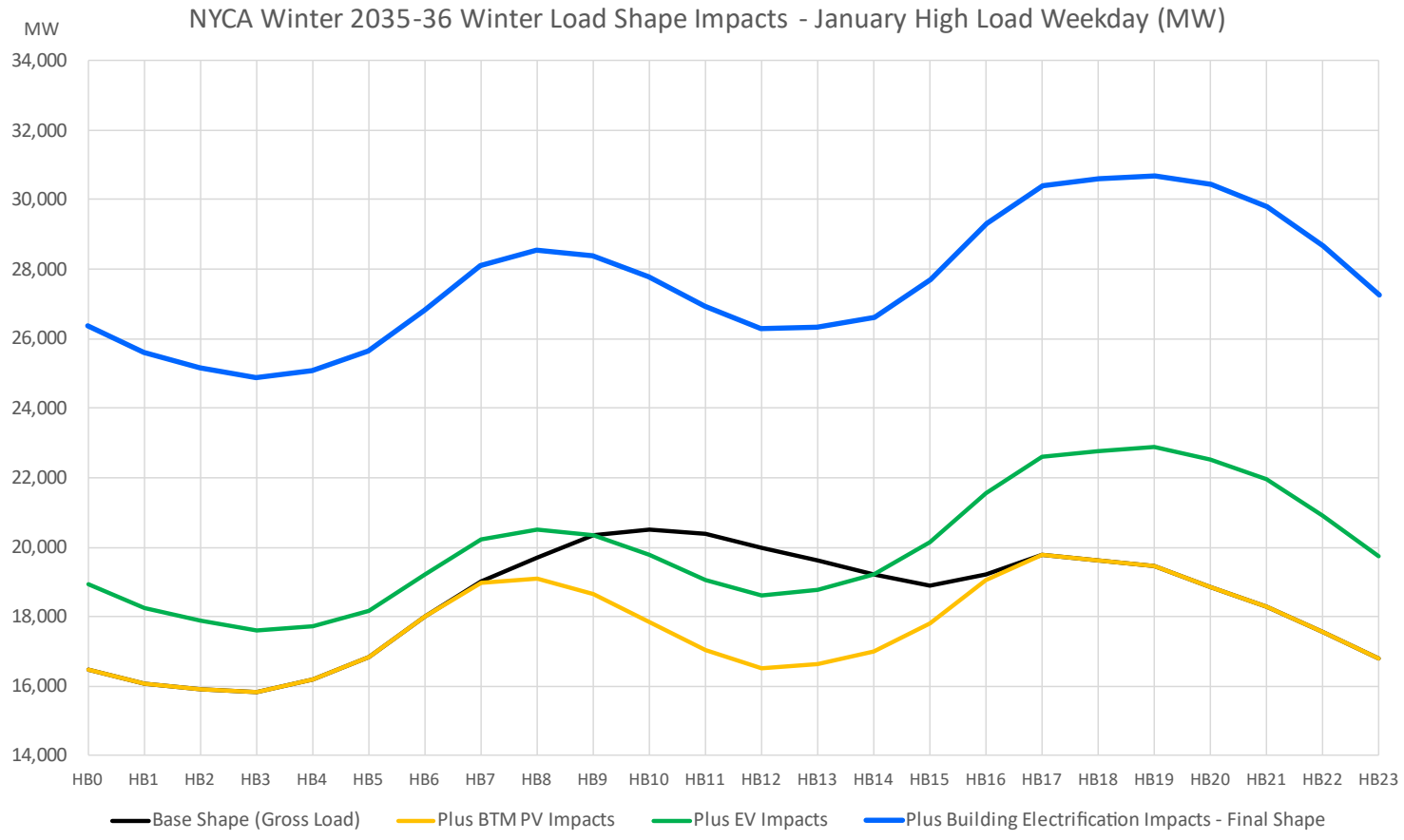
2035-36 Winter Load Shape Impacts



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Questions?

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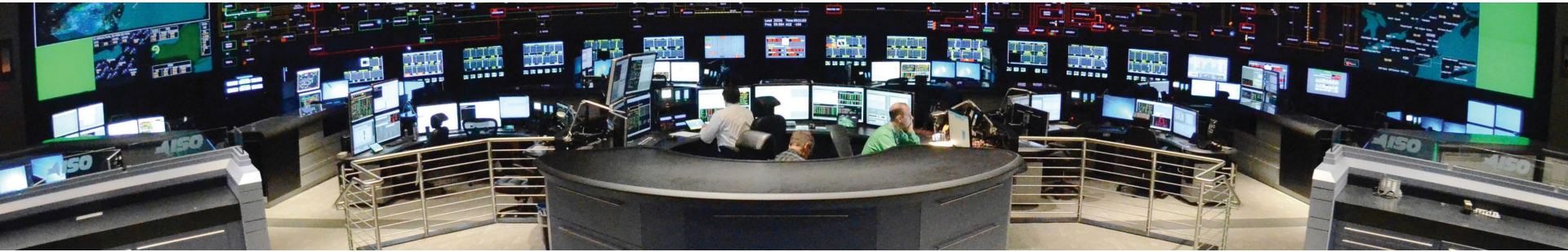
Our Mission and Vision

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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