New York ISO
Independent System Operator

2023 Preliminary 10-Year Peak Forecast

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Demand Forecasting & Analysis

LFTF/ESPWG

March 14, 2023

Revised 3/13

Agenda

- Preliminary Summer Peak Forecast
- Preliminary Winter Peak Forecast
- Forecast Assumptions
- Additional Forecast Tables

Note: The forecast values and graphs throughout this presentation reflect a minor update to the Zone D forecast.

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Preliminary Summer Peak Forecast

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

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

Coincident Summer Peak Demand by Zone - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	2,687	1,993	2,694	690	1,386	2,408	2,150	621	1,397	11,023	4,999	32,048
2024	2,701	2,137	2,731	692	1,426	2,412	2,137	620	1,397	11,060	4,967	32,280
2025	2,688	2,140	2,881	690	1,420	2,415	2,114	616	1,396	11,080	4,950	32,390
2026	2,678	2,140	3,026	686	1,406	2,422	2,103	613	1,384	11,040	4,942	32,440
2027	2,669	2,139	3,051	724	1,386	2,429	2,105	612	1,377	10,980	4,938	32,410
2028	2,660	2,138	3,040	751	1,366	2,434	2,110	611	1,370	10,880	4,950	32,310
2029	2,651	2,144	3,022	779	1,364	2,448	2,125	613	1,363	10,830	4,961	32,300
2030	2,652	2,156	3,087	780	1,370	2,465	2,152	619	1,367	10,860	4,982	32,490
2031	2,657	2,174	3,110	781	1,381	2,485	2,183	626	1,381	10,970	5,002	32,750
2032	2,688	2,198	3,133	782	1,395	2,508	2,220	638	1,400	11,120	5,028	33,110
2033	2,718	2,220	3,157	783	1,407	2,530	2,258	650	1,424	11,310	5,063	33,520

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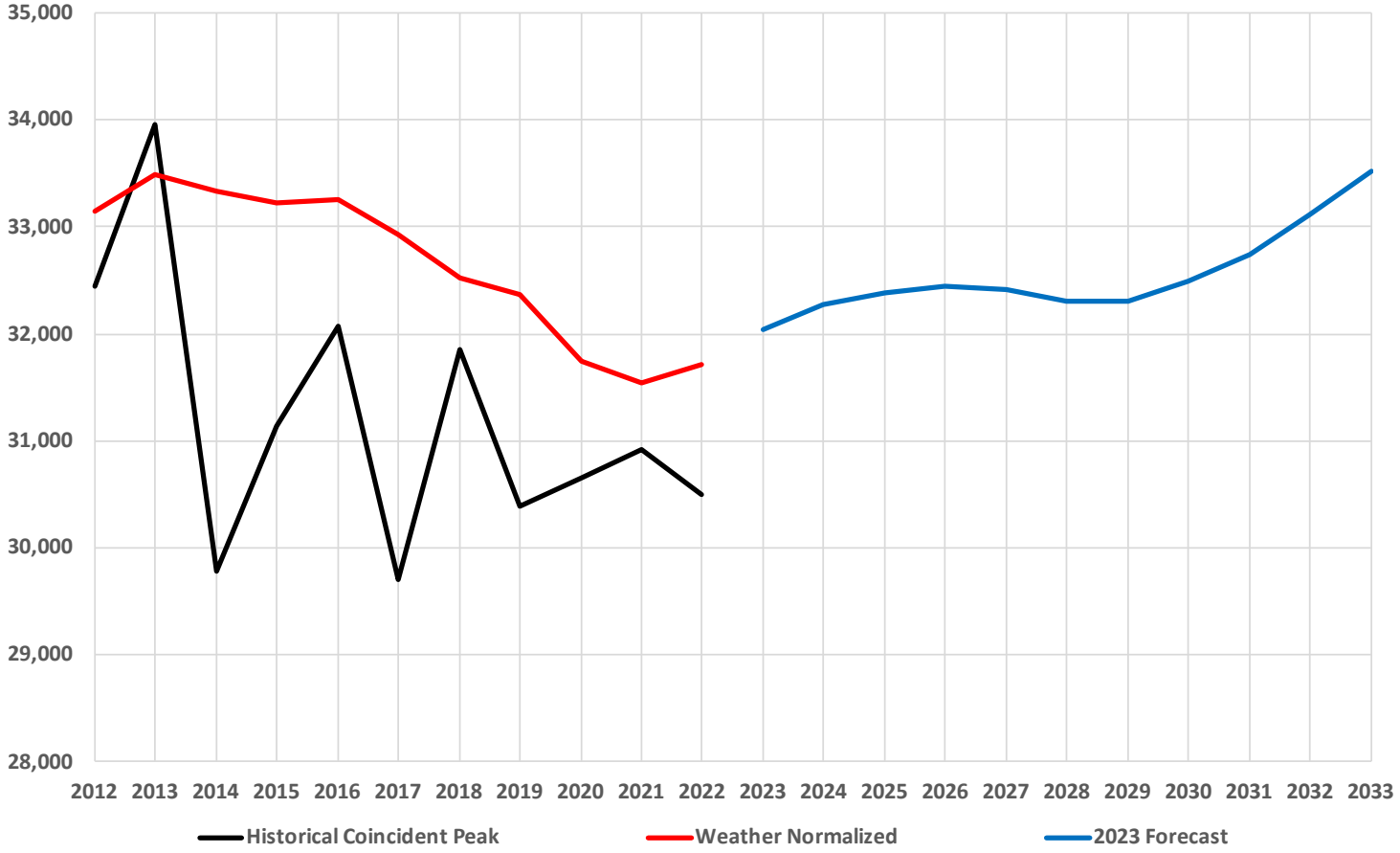
NYCA Summer Coincident Peak - MW



- Actual historical values reflect metered load.
- Weather normalized values from ICAP forecast process include demand response added back onto the load and reflect the adjusted load at design weather conditions. The NYCA aggregate design condition is the 57th percentile.
- Forecast values assume no reductions due to demand response and assume trended weather.

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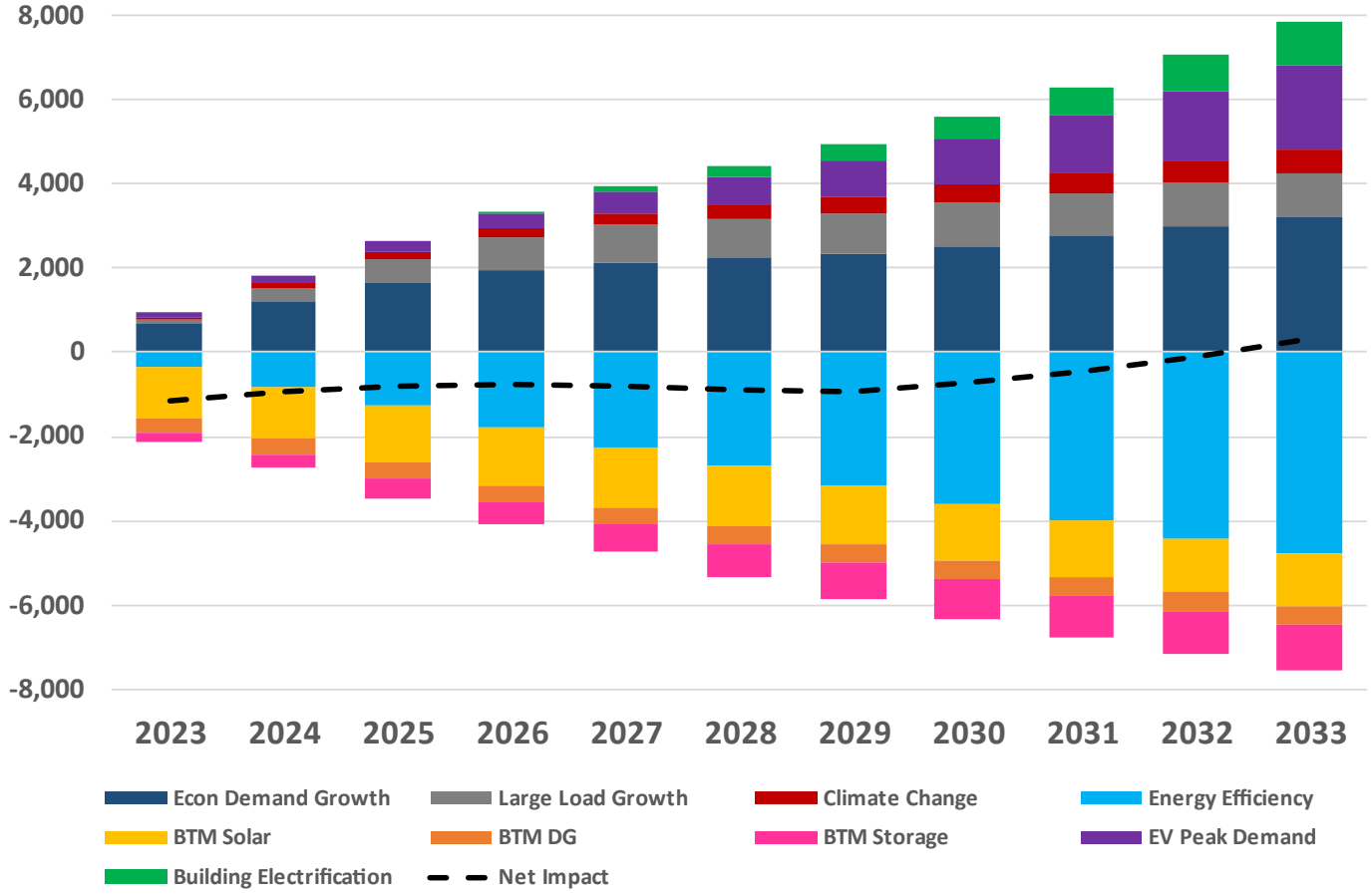
NYCA Summer Peak Forecast Impacts, MW



- Behind-the-Meter Solar, BTM Storage, and other BTM Distributed Generation values reflect total cumulative peak reductions.
- All other values reflect impacts relative to 2022.
- The majority of economic demand growth and energy efficiency impacts are endogenous to the forecast models.

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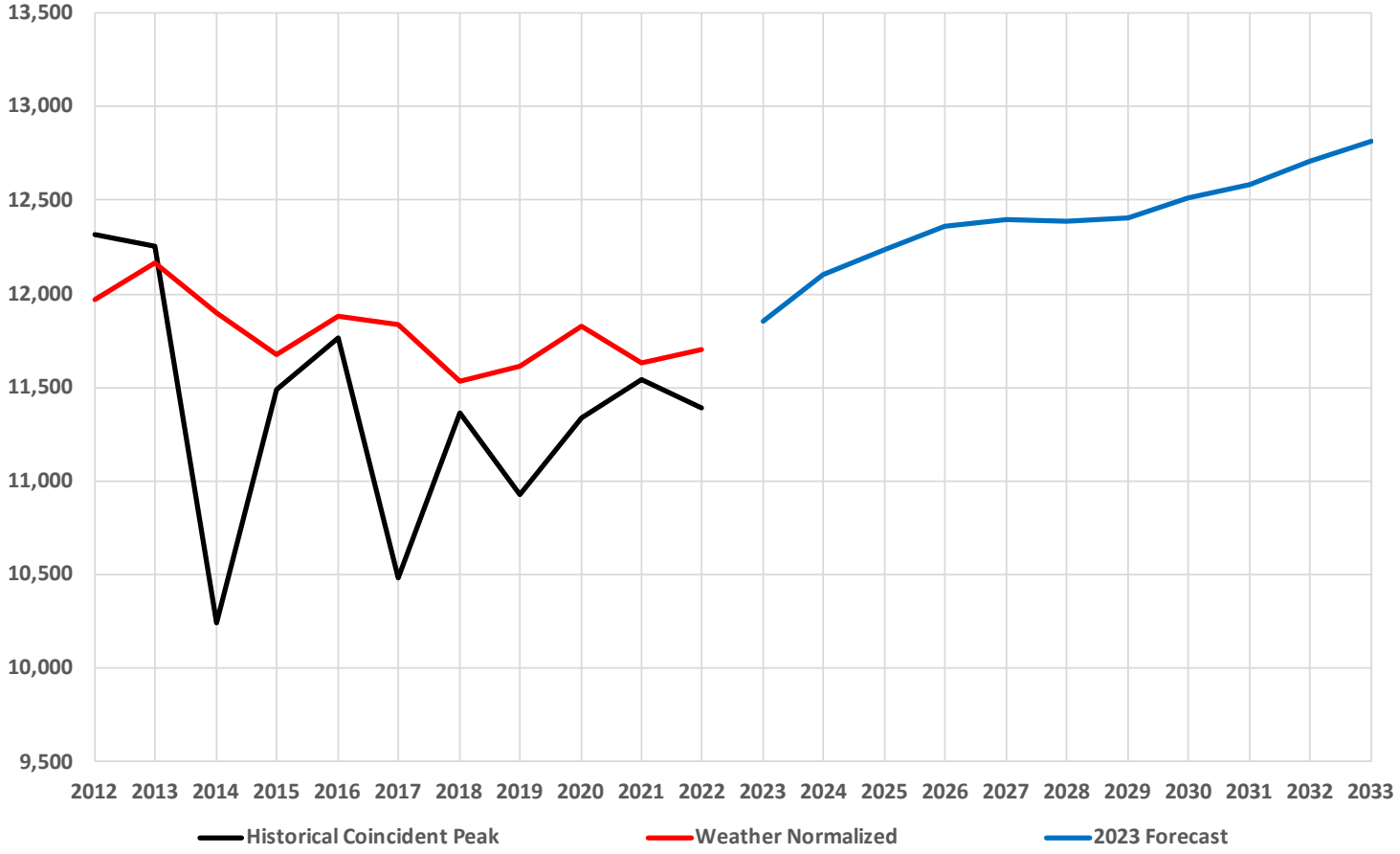
A to F Summer Coincident Peak - MW



- Actual historical values reflect metered load.
- Weather normalized values from ICAP forecast process include demand response added back onto the load and reflect the adjusted load at design weather conditions. The Zones A to F design condition is the 50th percentile.
- Forecast values assume no reductions due to demand response and assume trended weather.

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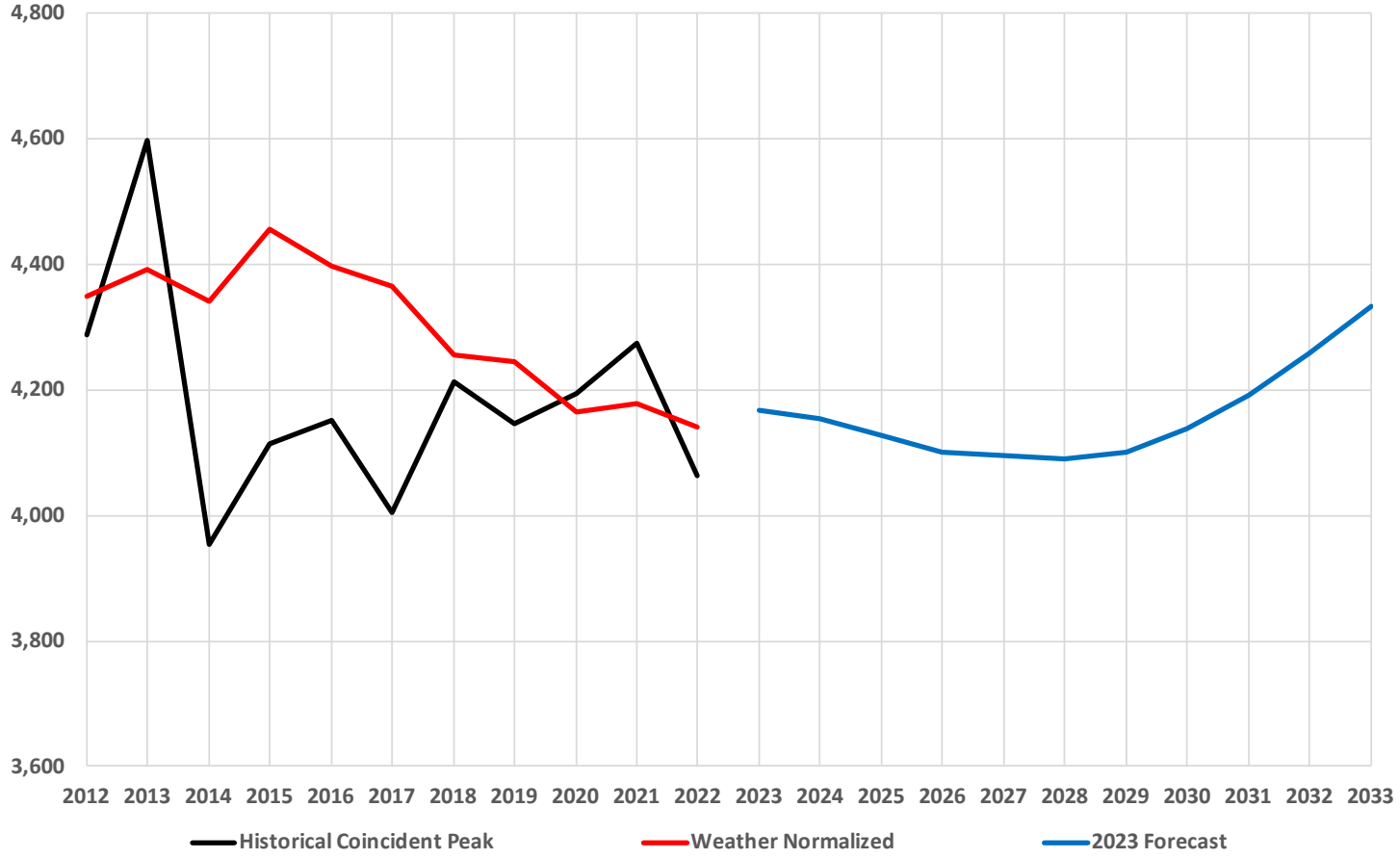
Zones GHI Summer Coincident Peak - MW



- Actual historical values reflect metered load.
- Weather normalized values from ICAP forecast process include demand response added back onto the load and reflect the adjusted load at design weather conditions. The Zones G to I design conditions range from the 50th to 67th percentiles.
- Forecast values assume no reductions due to demand response and assume trended weather.

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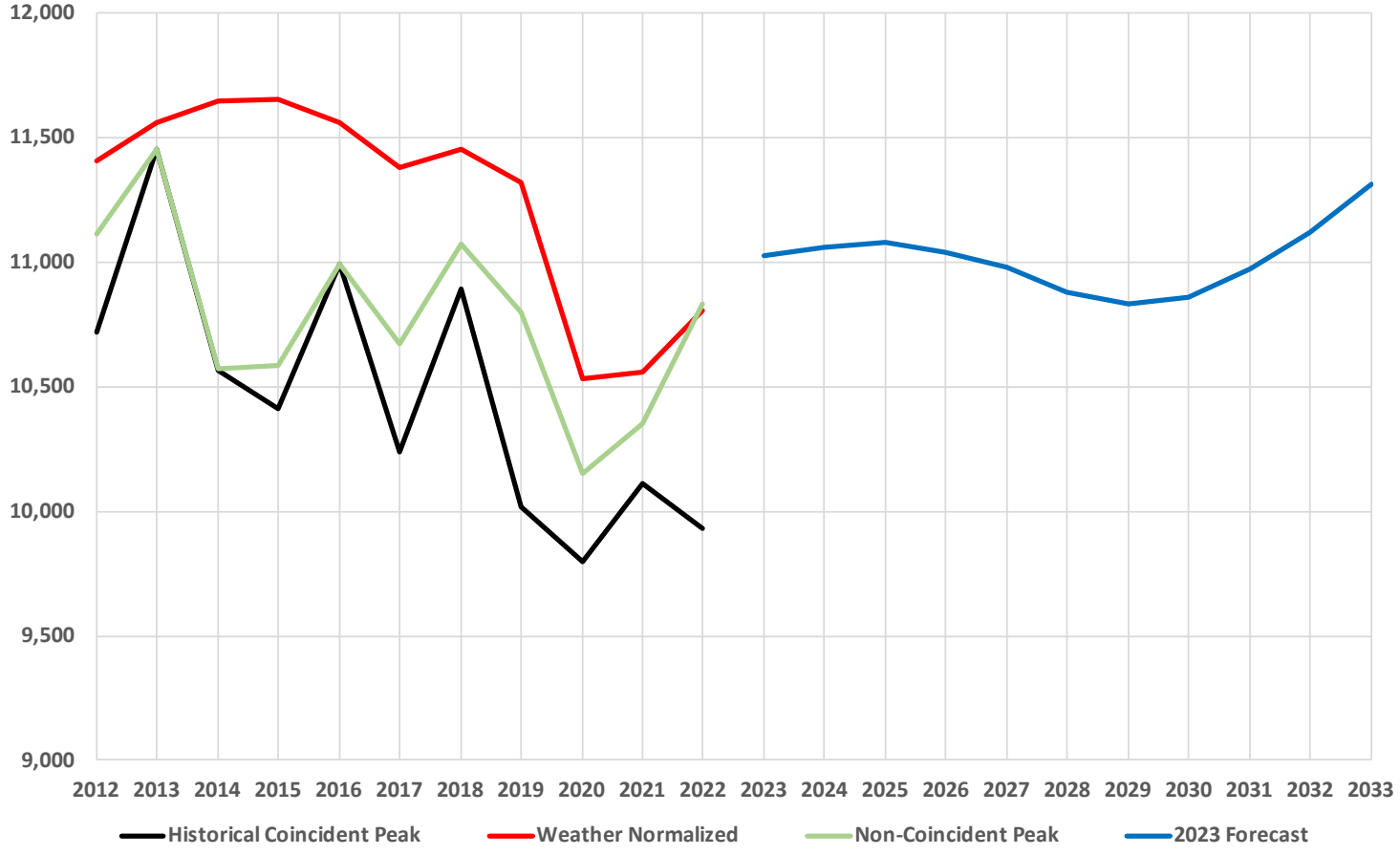
Zone J Summer Coincident Peak - MW



- Actual historical values reflect metered load.
- Weather normalized values from ICAP forecast process include demand response added back onto the load and reflect the adjusted load at design weather conditions. The Zone J (Con Edison) design condition is the 67th percentile.
- Forecast values assume no reductions due to demand response and assume trended weather.

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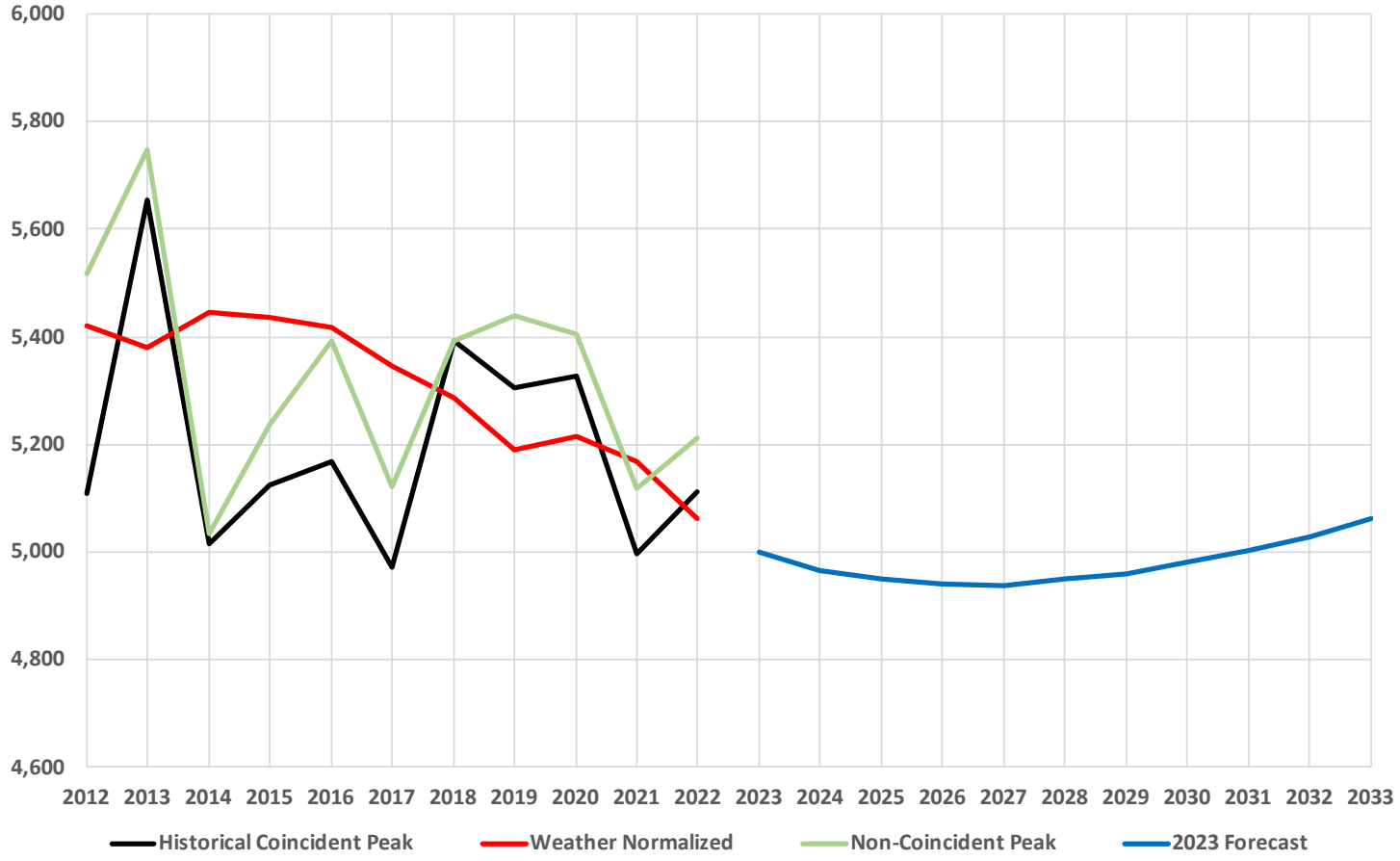
Zone K Summer Coincident Peak - MW



- Actual historical values reflect metered load.
- Weather normalized values from ICAP forecast process include demand response added back onto the load and reflect the adjusted load at design weather conditions. The Zone K (LIPA) design condition is the 50th percentile.
- Forecast values assume no reductions due to demand response and assume trended weather.

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Preliminary Winter Peak Forecast

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Table I-3b: Baseline Winter Coincident Peak Demand Forecast

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

Coincident Winter Peak Demand by Zone - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023-24	2,129	1,676	2,663	887	1,308	1,885	1,539	500	881	7,510	3,242	24,220
2024-25	2,148	1,695	2,755	891	1,326	1,914	1,534	500	886	7,580	3,301	24,530
2025-26	2,187	1,765	2,958	893	1,349	1,964	1,531	501	894	7,670	3,388	25,100
2026-27	2,236	1,803	3,101	896	1,366	2,024	1,575	506	908	7,790	3,495	25,700
2027-28	2,281	1,852	3,164	941	1,390	2,094	1,612	514	923	7,920	3,609	26,300
2028-29	2,341	1,910	3,213	976	1,418	2,168	1,674	524	942	8,080	3,744	26,990
2029-30	2,408	1,983	3,309	1,015	1,460	2,269	1,748	541	969	8,310	3,908	27,920
2030-31	2,485	2,068	3,419	1,024	1,511	2,384	1,831	562	1,003	8,590	4,093	28,970
2031-32	2,573	2,166	3,520	1,036	1,571	2,511	1,926	585	1,042	8,930	4,300	30,160
2032-33	2,691	2,277	3,633	1,048	1,638	2,652	2,035	612	1,088	9,320	4,536	31,530
2033-34	2,820	2,395	3,749	1,063	1,709	2,802	2,150	642	1,137	9,730	4,783	32,980

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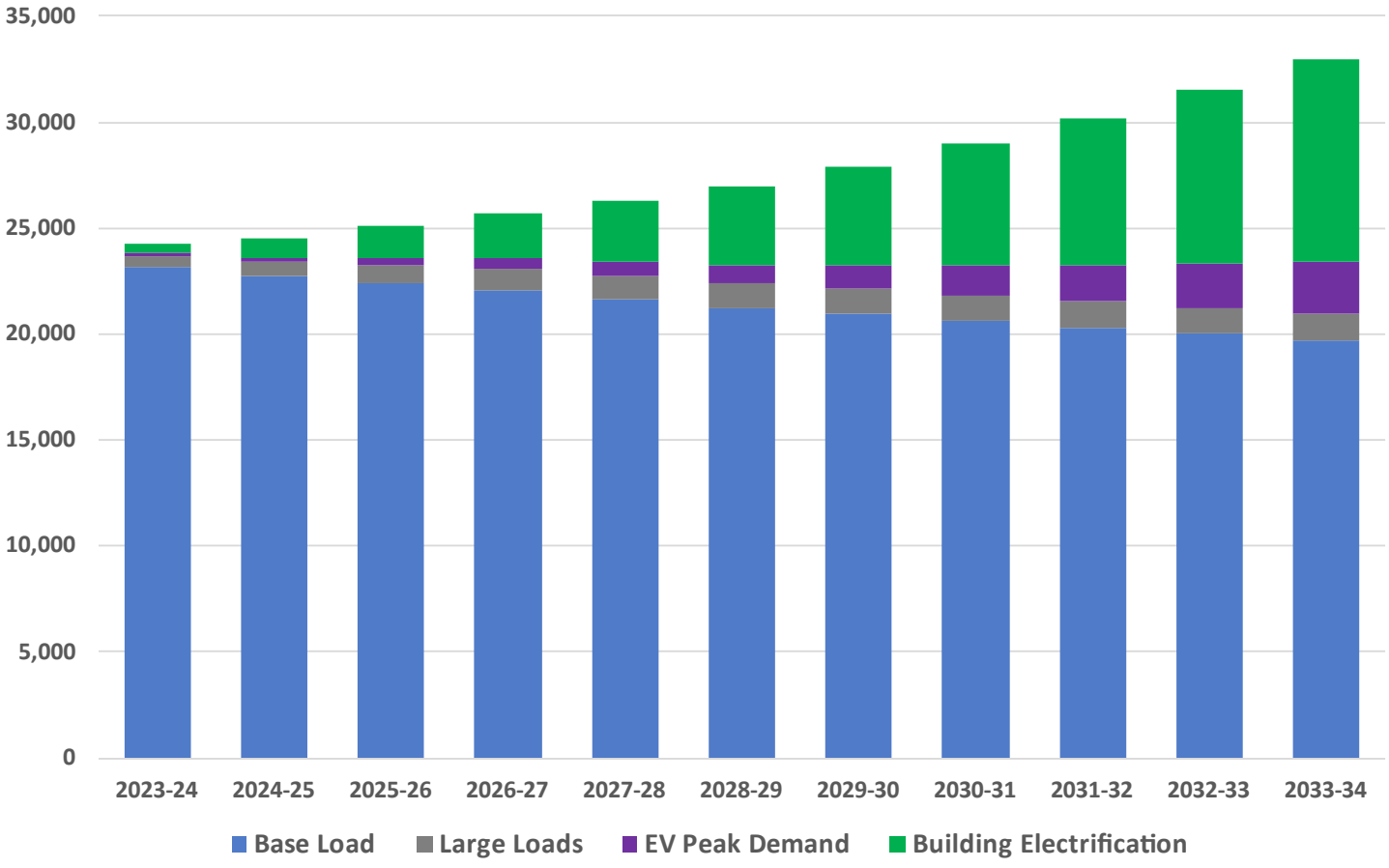
NYCA Winter Peak Demand Forecast Components (MW)



- Base load growth includes reductions due to BTM distributed generation, BTM energy storage, energy efficiency, and temperature trends.

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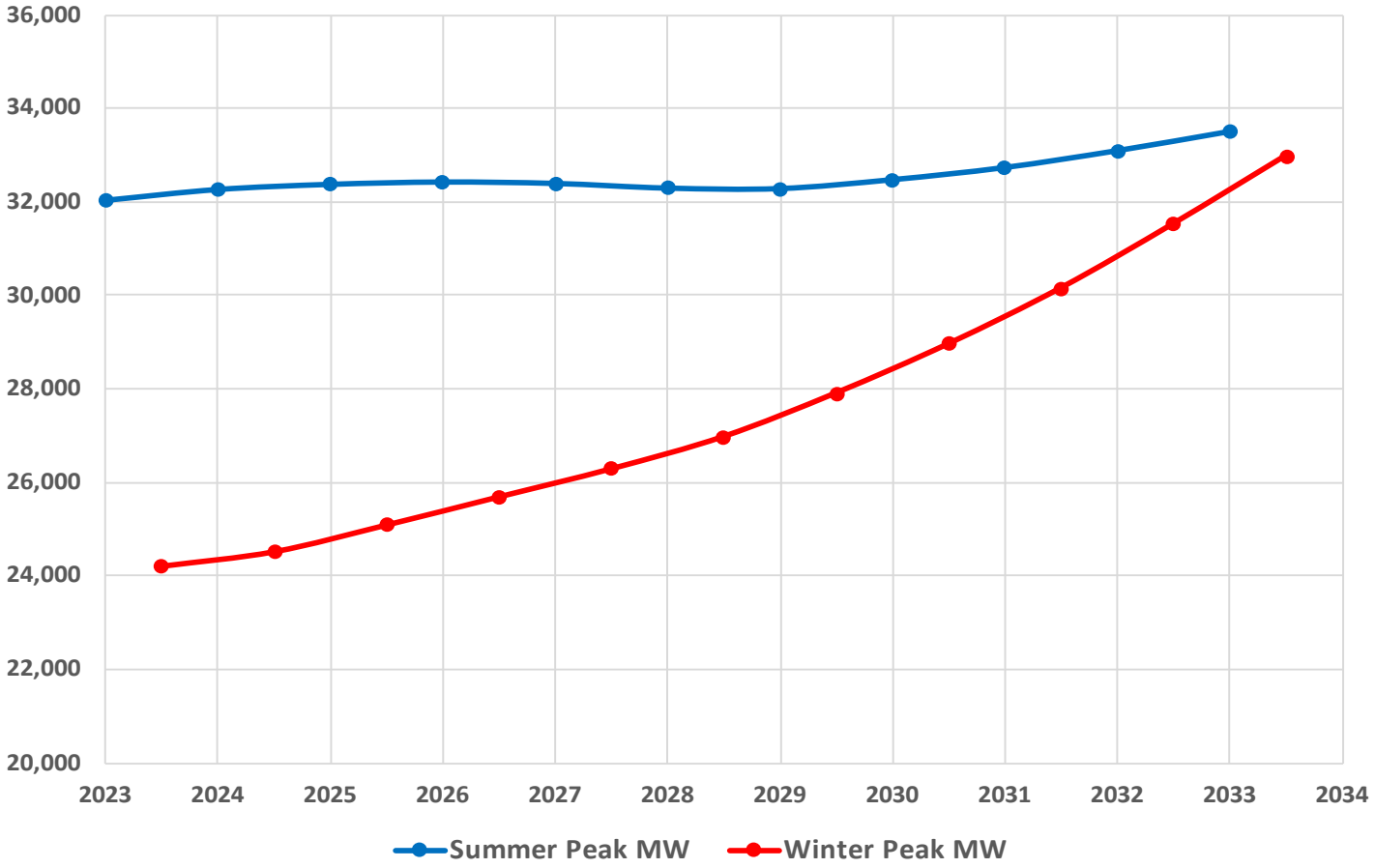
Preliminary NYCA Summer and Winter Peak Forecasts



- The New York Control Area is expected to become winter-peaking in the mid-2030s

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Forecast Assumptions

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Forecast Assumptions

- **Electric Vehicle and Building Electrification forecast assumptions were reviewed during the February 24th LFTF/ESPWG**
- **The Behind-the-Meter Solar forecast was also reviewed**
  - BTM capacity forecast reflects the 10 GW by 2030 target
  - The NYCA summer peak hour will likely shift into the evening as additional BTM solar is added to the system. BTM solar peak reductions decrease over the forecast horizon relative to installed capacity
  - The forecast of BTM solar reductions to winter peak is zero because the system typically peaks after sunset
- **Additional information on the energy efficiency and energy storage forecasts are shown on the following slides**

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Energy Efficiency and Codes & Standards Impacts

- **Primary data sources for historical energy savings estimates:**
  - Utility ETIP and Clean Energy Dashboard scorecards
  - DPS Energy Efficiency and Building Electrification Report (Dec 2022)
  - EIA annual energy efficiency reporting data

- **Primary forecast considerations:**
  - Programmatic energy savings driven by State energy efficiency policy targets
  - Building codes and appliance efficiency standards
  - Future heating and cooling load reductions from building shell improvements

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Energy Efficiency and Codes & Standards Impacts

- **Forecast components**
  - Appliance and technology efficiency improvements – endogenous to the end-use forecast models
  - Building shell improvements – endogenous to the end-use forecast models
  - Additional energy efficiency savings exogenous to the models

- **Energy Efficiency summer and winter coincident peak reductions – informed by:**
  - Reported peak impacts from clean energy dashboard and EIA energy efficiency reports
  - Analysis of end-use load shapes
  - Transmission Owner forecasts

Seasonal Coincident Peak Reductions* - MW

Year	Summer Peak	Winter Peak
2025	1,300	1,100
2030	3,600	2,900
2035	5,500	4,600
2040	6,900	6,300
2045	8,000	8,000
2050	8,800	9,600

* Relative to 2022 - Preliminary Forecast

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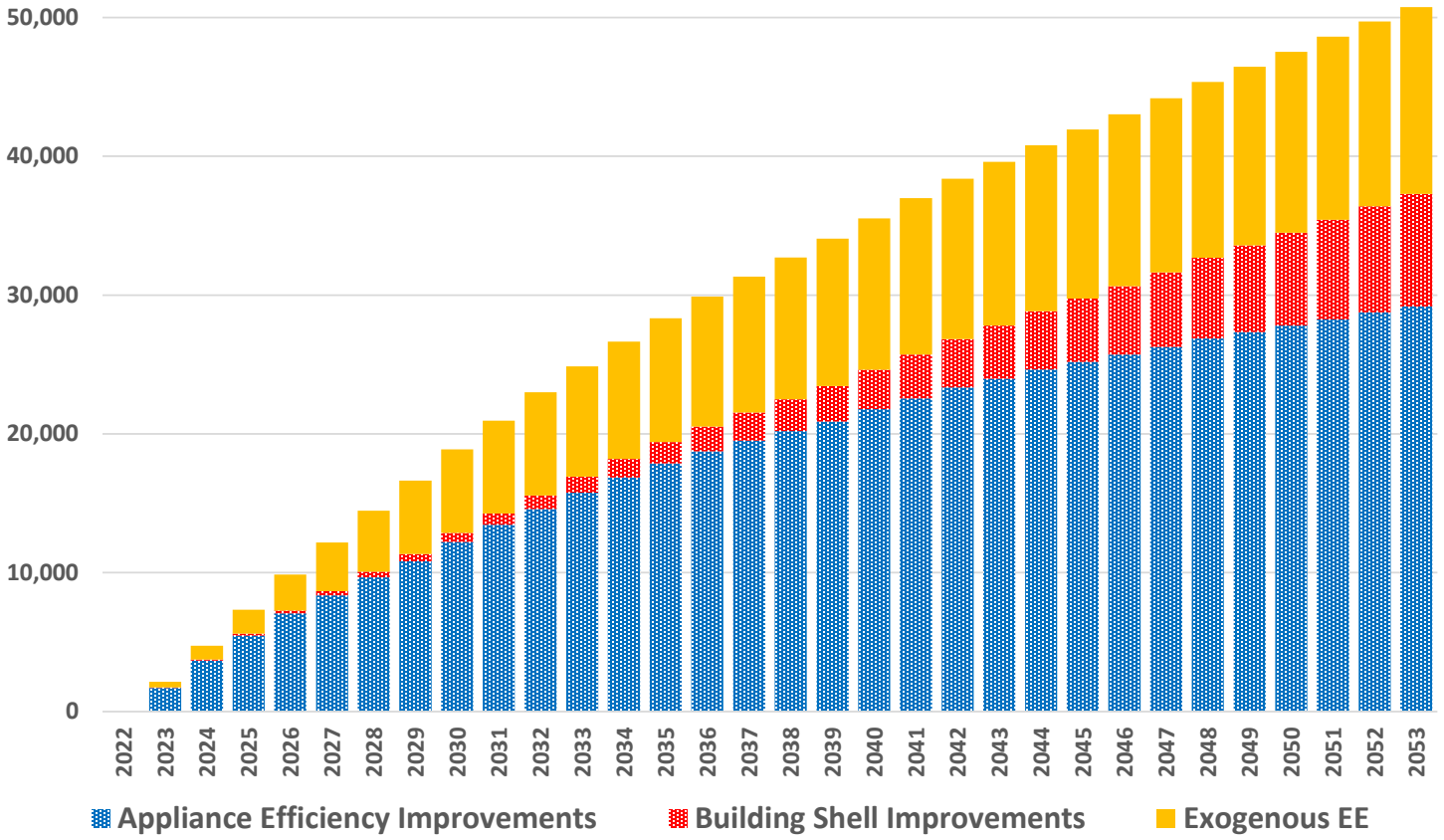
Annual Energy Reductions Relative to 2022 - GWh



- Savings from appliance efficiency improvements (blue bars) and building shell improvements (red bars) are endogenous to the end-use forecast models, and are not separately deducted from the forecast
- Technology improvements embedded in the building electrification forecast are not separately deducted from the forecast
- Additional energy efficiency savings exogenous to the models (yellow bars) are deducted from the forecast

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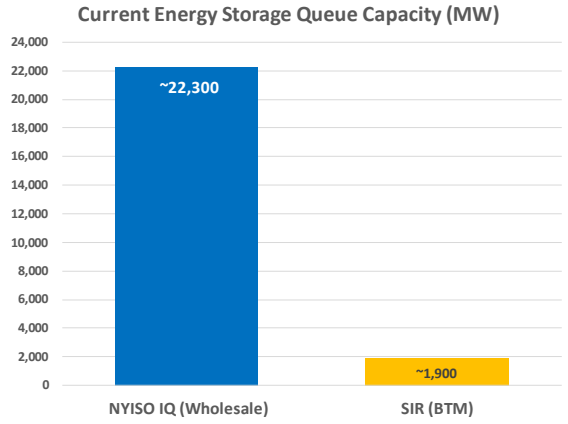
Energy Storage Forecast

- Storage capacity forecast includes only behind-the-meter (BTM) storage
- BTM storage forecast considers pipeline storage resources listed in the Standardized Interconnection Requirements (SIR) database and information from Transmission Owners
- A portion of installed BTM storage is expected to reduce system peak demand by injecting energy into the grid during the summer and winter peak hours
- The storage forecast does not include wholesale energy storage projects. Wholesale storage capacity listed in the NYISO Interconnection Queue greatly exceeds the capacity listed in the SIR queue



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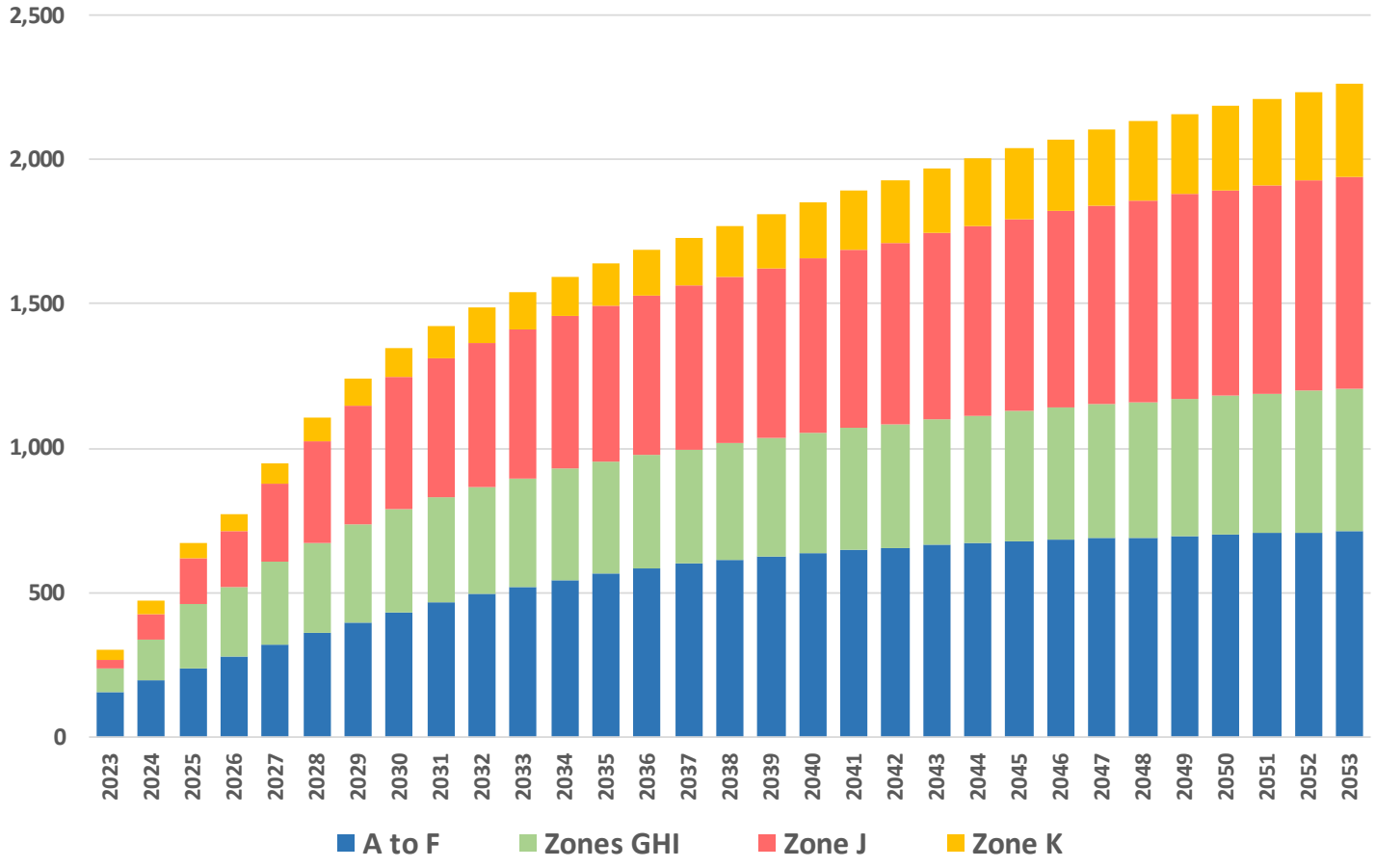
Behind-the-Meter Energy Storage Capacity Forecast - MW



BTM Storage Peak Reductions

Year	MW
2025	500
2030	900
2035	1,200
2040	1,300
2045	1,400
2050	1,500

*Preliminary Forecast

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Additional Forecast Tables

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

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

Non-Coincident Summer Peak Demand by Zone - MW

Year	A	B	C	D	E	F	G	H	I	J	K
2023	2,774	2,037	2,762	709	1,425	2,449	2,193	633	1,424	11,239	5,082
2024	2,791	2,184	2,799	712	1,466	2,453	2,180	632	1,424	11,280	5,049
2025	2,778	2,187	2,953	710	1,460	2,456	2,156	628	1,423	11,300	5,032
2026	2,768	2,187	3,101	706	1,445	2,463	2,145	625	1,411	11,260	5,024
2027	2,758	2,186	3,127	745	1,425	2,470	2,147	624	1,404	11,200	5,020
2028	2,749	2,185	3,116	773	1,404	2,475	2,152	623	1,397	11,090	5,032
2029	2,740	2,191	3,097	802	1,402	2,490	2,168	625	1,390	11,040	5,043
2030	2,741	2,203	3,164	803	1,408	2,507	2,195	631	1,394	11,070	5,065
2031	2,746	2,222	3,187	804	1,420	2,527	2,227	638	1,408	11,190	5,085
2032	2,778	2,246	3,211	805	1,434	2,551	2,265	651	1,427	11,340	5,111
2033	2,809	2,269	3,236	806	1,446	2,573	2,303	663	1,452	11,530	5,147

NCP/CP ratios from 2023 ICAP forecast

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Table I-4b: Baseline Winter Non-Coincident Peak Demand Forecast

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

Non-Coincident Winter Peak Demand by Zone - MW

Year	A	B	C	D	E	F	G	H	I	J	K
2023-24	2,152	1,689	2,668	906	1,332	1,896	1,550	511	891	7,580	3,255
2024-25	2,172	1,709	2,761	910	1,350	1,925	1,545	511	896	7,650	3,314
2025-26	2,211	1,779	2,964	912	1,373	1,976	1,542	512	904	7,740	3,401
2026-27	2,261	1,817	3,108	915	1,391	2,036	1,586	517	918	7,860	3,509
2027-28	2,306	1,867	3,170	961	1,415	2,107	1,623	525	933	7,990	3,623
2028-29	2,367	1,925	3,220	996	1,444	2,181	1,686	535	952	8,150	3,759
2029-30	2,434	1,999	3,315	1,036	1,486	2,283	1,760	552	980	8,380	3,924
2030-31	2,512	2,085	3,426	1,046	1,538	2,398	1,844	574	1,014	8,670	4,110
2031-32	2,601	2,183	3,527	1,058	1,599	2,526	1,939	597	1,053	9,010	4,317
2032-33	2,721	2,295	3,641	1,070	1,667	2,668	2,049	625	1,100	9,400	4,554
2033-34	2,851	2,414	3,756	1,085	1,740	2,819	2,165	655	1,150	9,820	4,802

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Table I-5: Forecast of Baseline Peak Demand in G-to-J Locality

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

G-to-J Locality Summer Peak Demand by Zone - MW

Year	G	H	I	J	G-J
2023	2,178	629	1,416	11,170	15,393
2024	2,165	628	1,416	11,207	15,416
2025	2,142	624	1,415	11,227	15,408
2026	2,131	621	1,402	11,187	15,341
2027	2,133	620	1,395	11,126	15,274
2028	2,138	619	1,388	11,025	15,170
2029	2,153	621	1,381	10,974	15,129
2030	2,181	627	1,385	11,004	15,197
2031	2,212	634	1,399	11,116	15,361
2032	2,250	646	1,419	11,268	15,583
2033	2,288	659	1,443	11,460	15,850

G-to-J Locality Winter Peak Demand by Zone - MW

Year	G	H	I	J	G-J
2023-24	1,536	498	881	7,555	10,470
2024-25	1,531	498	886	7,625	10,540
2025-26	1,528	499	894	7,716	10,637
2026-27	1,572	504	908	7,837	10,821
2027-28	1,609	512	923	7,968	11,012
2028-29	1,671	522	942	8,128	11,263
2029-30	1,745	539	969	8,360	11,613
2030-31	1,827	560	1,003	8,642	12,032
2031-32	1,922	583	1,042	8,984	12,531
2032-33	2,031	610	1,088	9,376	13,105
2033-34	2,146	639	1,137	9,788	13,710

Summer NCP/CP ratio from 2023 ICAP forecast

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Table I-7a: 90th Percentile Forecast of Baseline Summer Coincident Peak Demand due to Weather

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

90th Percentile of Summer Coincident Peak Demand due to Weather - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	2,870	2,129	2,877	737	1,480	2,553	2,279	653	1,468	11,434	5,403	33,883
2024	2,885	2,282	2,917	739	1,523	2,557	2,266	652	1,468	11,473	5,369	34,131
2025	2,871	2,286	3,077	737	1,517	2,560	2,241	648	1,467	11,494	5,350	34,248
2026	2,860	2,286	3,232	733	1,502	2,568	2,230	644	1,455	11,452	5,342	34,304
2027	2,851	2,285	3,259	773	1,480	2,575	2,232	643	1,447	11,390	5,338	34,273
2028	2,841	2,283	3,247	802	1,459	2,580	2,237	642	1,440	11,286	5,350	34,167
2029	2,831	2,290	3,228	832	1,457	2,595	2,253	644	1,433	11,234	5,362	34,159
2030	2,832	2,303	3,297	833	1,463	2,613	2,281	651	1,437	11,265	5,385	34,360
2031	2,838	2,322	3,322	834	1,475	2,635	2,314	658	1,452	11,379	5,407	34,636
2032	2,871	2,348	3,346	835	1,490	2,659	2,354	671	1,472	11,535	5,435	35,016
2033	2,903	2,371	3,372	836	1,503	2,682	2,394	683	1,497	11,732	5,473	35,446

Ratios based on Load Forecast Uncertainty distributions reviewed by LFTF and NYSRC ICS in spring 2022

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Table I-7b: 10th Percentile Forecast of Baseline Summer Coincident Peak Demand due to Weather

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

10th Percentile of Summer Coincident Peak Demand due to Weather - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	2,490	1,847	2,497	640	1,285	2,212	1,975	553	1,243	10,094	4,540	29,376
2024	2,503	1,981	2,531	641	1,322	2,216	1,963	552	1,243	10,128	4,511	29,591
2025	2,491	1,983	2,670	640	1,316	2,218	1,942	548	1,242	10,146	4,496	29,692
2026	2,482	1,983	2,805	636	1,303	2,225	1,932	545	1,232	10,110	4,489	29,742
2027	2,474	1,983	2,828	671	1,285	2,231	1,934	545	1,225	10,055	4,485	29,716
2028	2,465	1,982	2,818	696	1,266	2,236	1,938	544	1,219	9,963	4,496	29,623
2029	2,457	1,987	2,801	722	1,264	2,249	1,952	545	1,213	9,917	4,506	29,613
2030	2,458	1,998	2,861	723	1,270	2,264	1,977	551	1,216	9,945	4,525	29,788
2031	2,463	2,015	2,883	724	1,280	2,283	2,005	557	1,229	10,046	4,543	30,028
2032	2,491	2,037	2,904	725	1,293	2,304	2,039	568	1,246	10,183	4,567	30,357
2033	2,519	2,058	2,926	726	1,304	2,324	2,074	578	1,267	10,357	4,599	30,732

Ratios based on Load Forecast Uncertainty distributions reviewed by LFTF and NYSRC ICS in spring 2022

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Table I-7c: 90th Percentile Forecast of Baseline Winter Coincident Peak Demand due to Weather

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

90th Percentile of Winter Coincident Peak Demand due to Weather - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023-24	2,218	1,746	2,775	924	1,363	1,964	1,604	521	918	7,825	3,378	25,236
2024-25	2,238	1,766	2,871	928	1,382	1,994	1,598	521	923	7,898	3,439	25,558
2025-26	2,279	1,839	3,082	930	1,406	2,046	1,595	522	932	7,992	3,530	26,153
2026-27	2,330	1,879	3,231	934	1,423	2,109	1,641	527	946	8,117	3,641	26,778
2027-28	2,377	1,930	3,297	980	1,448	2,182	1,680	536	962	8,252	3,760	27,404
2028-29	2,439	1,990	3,348	1,017	1,477	2,259	1,744	546	982	8,419	3,901	28,122
2029-30	2,509	2,066	3,447	1,058	1,521	2,364	1,821	564	1,010	8,659	4,072	29,091
2030-31	2,589	2,155	3,562	1,067	1,574	2,484	1,908	586	1,045	8,950	4,265	30,185
2031-32	2,681	2,257	3,667	1,079	1,637	2,616	2,007	610	1,086	9,305	4,481	31,426
2032-33	2,804	2,373	3,786	1,092	1,707	2,763	2,120	638	1,134	9,711	4,726	32,854
2033-34	2,938	2,495	3,906	1,108	1,781	2,920	2,240	669	1,185	10,138	4,984	34,364

Ratios based on Load Forecast Uncertainty distributions reviewed by LFTF and NYSRC ICS in spring 2022

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Table I-7d: 10th Percentile Forecast of Baseline Winter Coincident Peak Demand due to Weather

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

10th Percentile of Winter Coincident Peak Demand due to Weather - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023-24	2,023	1,593	2,531	843	1,243	1,792	1,463	475	837	7,138	3,081	23,019
2024-25	2,042	1,611	2,618	847	1,260	1,819	1,458	475	842	7,204	3,137	23,313
2025-26	2,079	1,677	2,811	849	1,282	1,867	1,455	476	850	7,290	3,220	23,856
2026-27	2,125	1,714	2,948	852	1,298	1,924	1,497	481	863	7,404	3,321	24,427
2027-28	2,168	1,760	3,007	894	1,321	1,990	1,532	489	877	7,527	3,430	24,995
2028-29	2,225	1,815	3,054	928	1,348	2,061	1,591	498	895	7,679	3,558	25,652
2029-30	2,289	1,885	3,145	965	1,388	2,157	1,661	514	921	7,898	3,715	26,538
2030-31	2,362	1,965	3,249	973	1,436	2,266	1,740	534	953	8,164	3,890	27,532
2031-32	2,445	2,059	3,345	985	1,493	2,387	1,831	556	990	8,487	4,087	28,665
2032-33	2,558	2,164	3,453	996	1,557	2,521	1,934	582	1,034	8,858	4,311	29,968
2033-34	2,680	2,276	3,563	1,010	1,624	2,663	2,043	610	1,081	9,248	4,546	31,344

Ratios based on Load Forecast Uncertainty distributions reviewed by LFTF and NYSRC ICS in spring 2022

New York ISO

Table I-7e: 99th Percentile Forecast of Baseline Summer Coincident Peak Demand due to Weather

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

99th Percentile of Summer Coincident Peak Demand due to Weather - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023	2,998	2,224	3,006	770	1,546	2,653	2,369	679	1,528	11,876	5,733	35,382
2024	3,014	2,384	3,047	772	1,591	2,657	2,354	678	1,528	11,916	5,696	35,637
2025	2,999	2,388	3,214	770	1,584	2,660	2,329	674	1,527	11,937	5,677	35,759
2026	2,988	2,388	3,376	765	1,569	2,668	2,317	670	1,514	11,894	5,668	35,817
2027	2,978	2,387	3,404	808	1,546	2,676	2,319	669	1,506	11,829	5,663	35,785
2028	2,968	2,385	3,392	838	1,524	2,681	2,324	668	1,498	11,722	5,677	35,677
2029	2,958	2,392	3,372	869	1,522	2,697	2,341	670	1,491	11,668	5,690	35,670
2030	2,959	2,406	3,444	870	1,529	2,716	2,371	677	1,495	11,700	5,714	35,881
2031	2,965	2,426	3,470	871	1,541	2,738	2,405	685	1,510	11,819	5,737	36,167
2032	2,999	2,452	3,496	873	1,556	2,763	2,446	698	1,531	11,980	5,766	36,560
2033	3,033	2,477	3,522	874	1,570	2,787	2,488	711	1,557	12,185	5,807	37,011

Ratios based on Load Forecast Uncertainty distributions reviewed by LFTF and NYSRC ICS in spring 2022

New York ISO

Table I-7f: 99th Percentile Forecast of Baseline Winter Coincident Peak Demand due to Weather

Reflects Impacts of Energy Saving Programs & Behind-the-Meter Generation

99th Percentile of Winter Coincident Peak Demand due to Weather - MW

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
2023-24	2,375	1,870	2,971	990	1,459	2,103	1,717	558	983	8,379	3,617	27,022
2024-25	2,397	1,891	3,074	994	1,479	2,136	1,712	558	989	8,457	3,683	27,370
2025-26	2,440	1,969	3,301	996	1,505	2,191	1,708	559	997	8,558	3,780	28,004
2026-27	2,495	2,012	3,460	1,000	1,524	2,258	1,757	565	1,013	8,692	3,899	28,675
2027-28	2,545	2,066	3,530	1,050	1,551	2,336	1,799	573	1,030	8,837	4,027	29,344
2028-29	2,612	2,131	3,585	1,089	1,582	2,419	1,868	585	1,051	9,015	4,177	30,114
2029-30	2,687	2,213	3,692	1,132	1,629	2,532	1,950	604	1,081	9,272	4,361	31,153
2030-31	2,773	2,307	3,814	1,143	1,686	2,660	2,043	627	1,119	9,584	4,567	32,323
2031-32	2,871	2,417	3,927	1,156	1,753	2,802	2,149	653	1,163	9,964	4,798	33,653
2032-33	3,002	2,541	4,054	1,169	1,828	2,959	2,271	683	1,214	10,399	5,061	35,181
2033-34	3,146	2,672	4,183	1,186	1,907	3,126	2,399	716	1,269	10,856	5,337	36,797

Ratios based on Load Forecast Uncertainty distributions reviewed by LFTF and NYSRC ICS in spring 2022

New York ISO

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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