New York ISO
Independent System Operator

2023 Gold Book Forecast Graphs

April 2023

2023 Gold Book Forecast Graphs

1. **Load Shape Projections**

   Projected load shapes on high load January and July days in future years

2. **Load Modifying Impacts**

   Energy efficiency and codes & standards, BTM solar PV, energy storage, electric vehicles, building electrification, and electrolysis impacts

3. **NYCA Forecast Scenarios**

   NYCA scenario summary, NYCA forecast graphs, and baseline and policy scenario forecast impacts

4. **Area Forecast Summaries**

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Load Shape Projections

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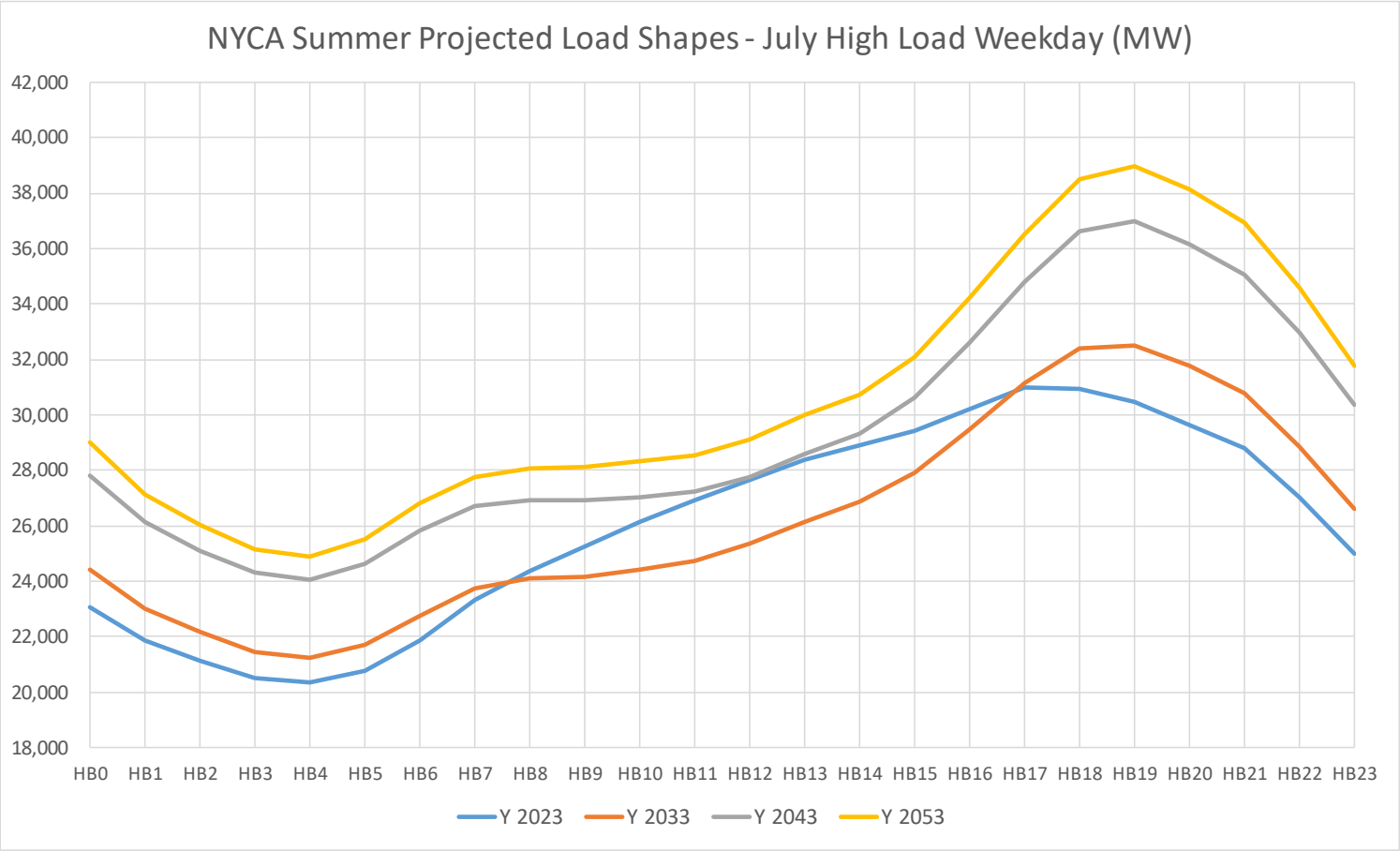
Projected Summer Load Shapes



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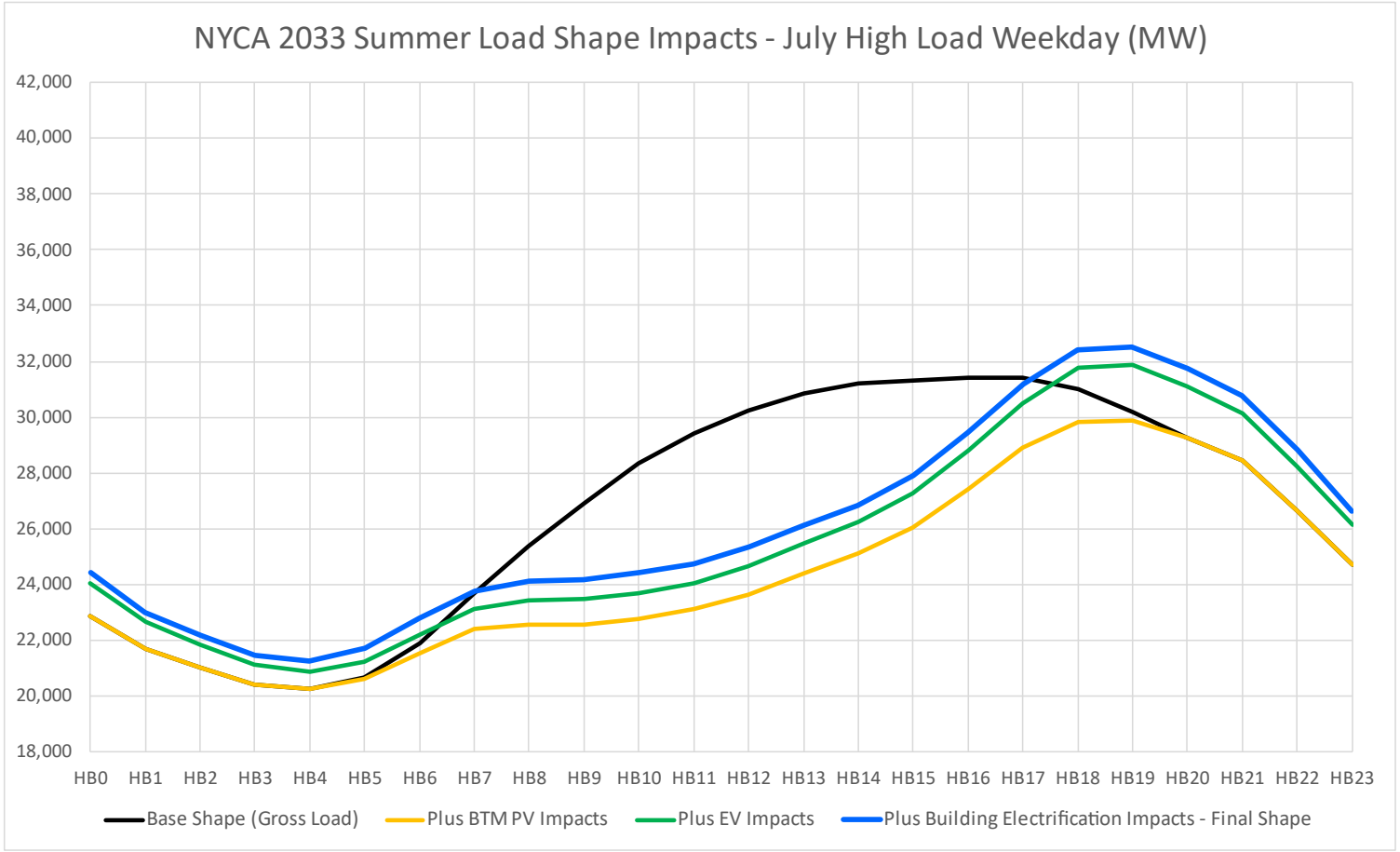
2033 Summer Load Shape Impacts



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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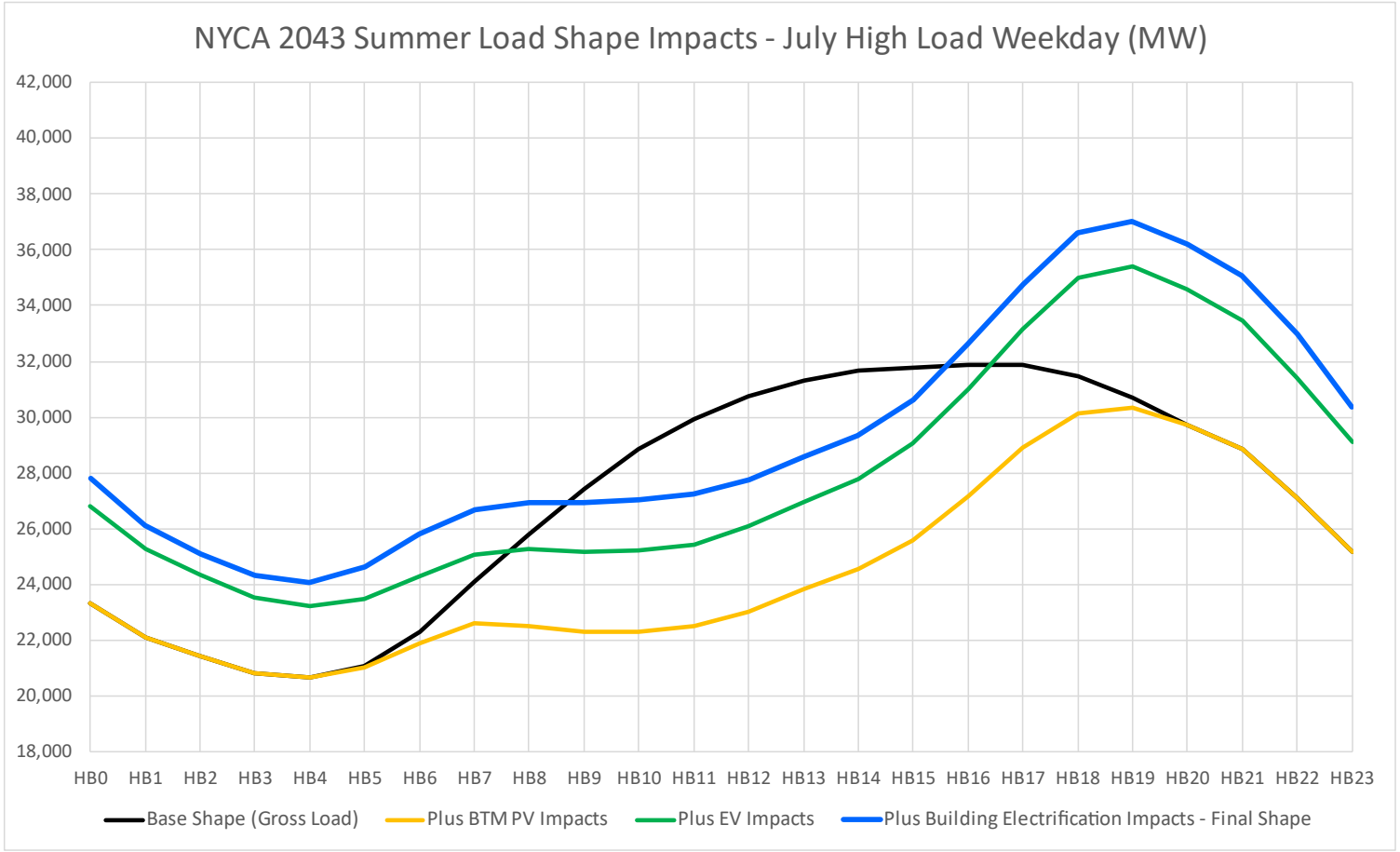
2043 Summer Load Shape Impacts



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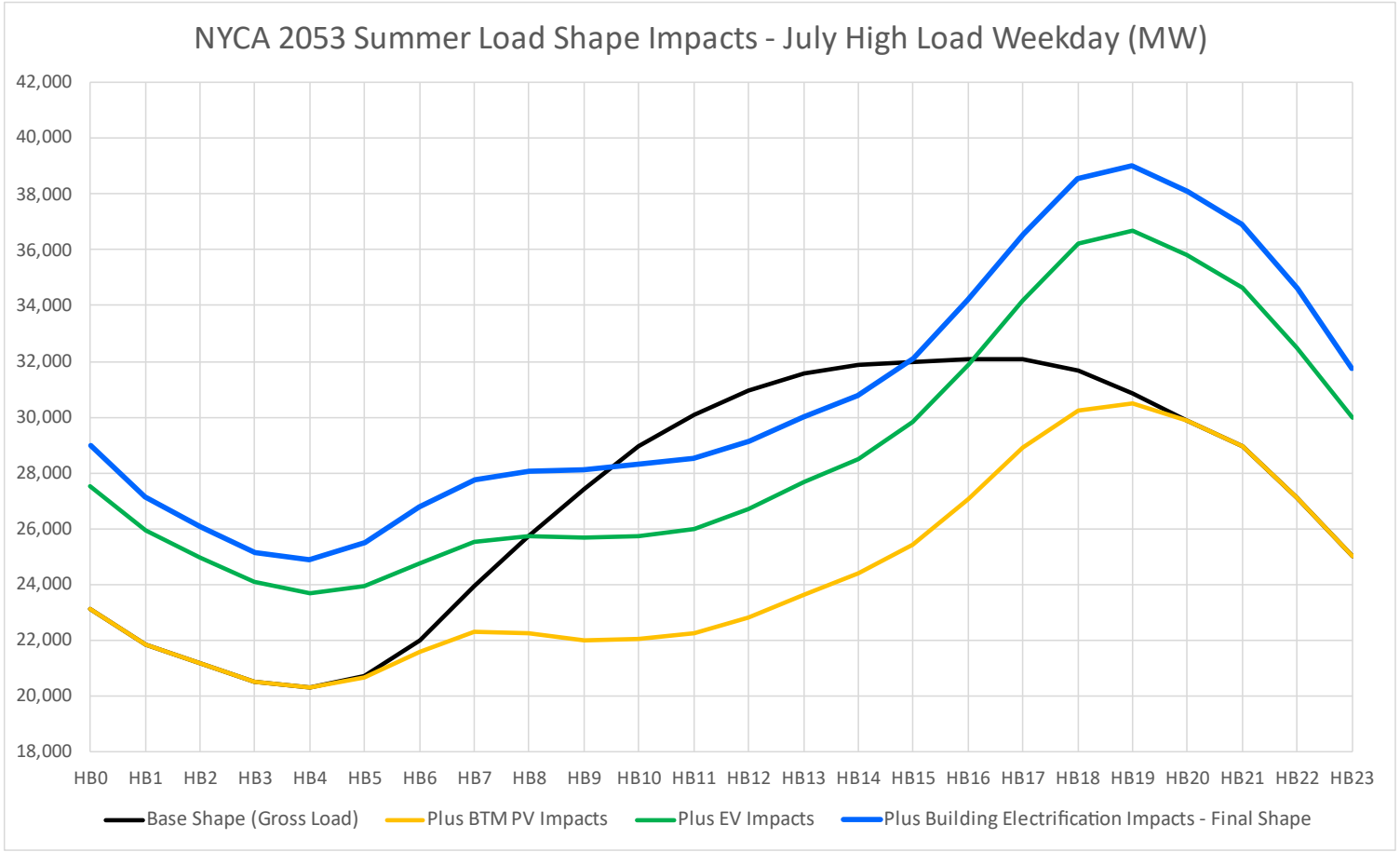
2053 Summer Load Shape Impacts



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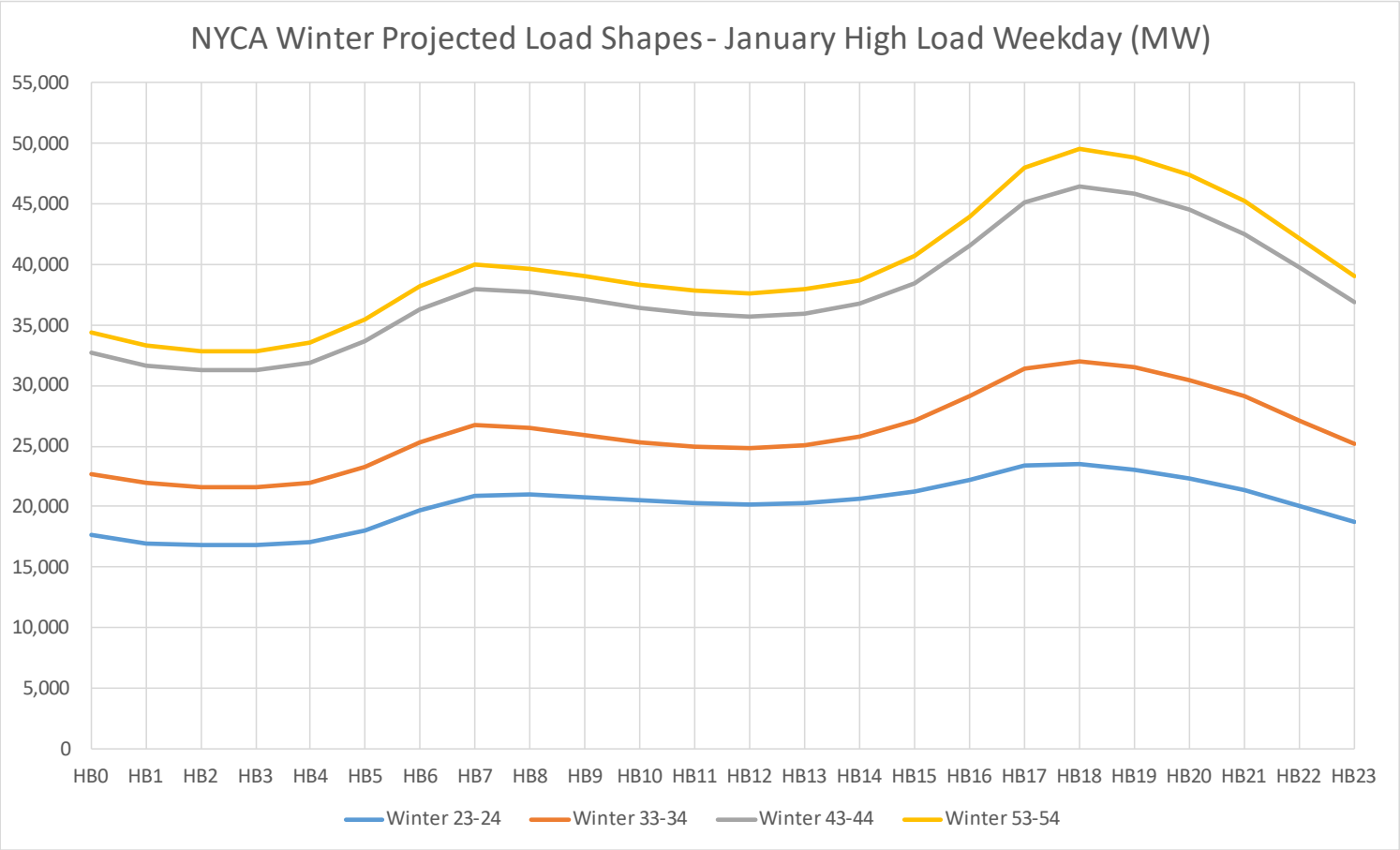
Projected Winter Load Shapes



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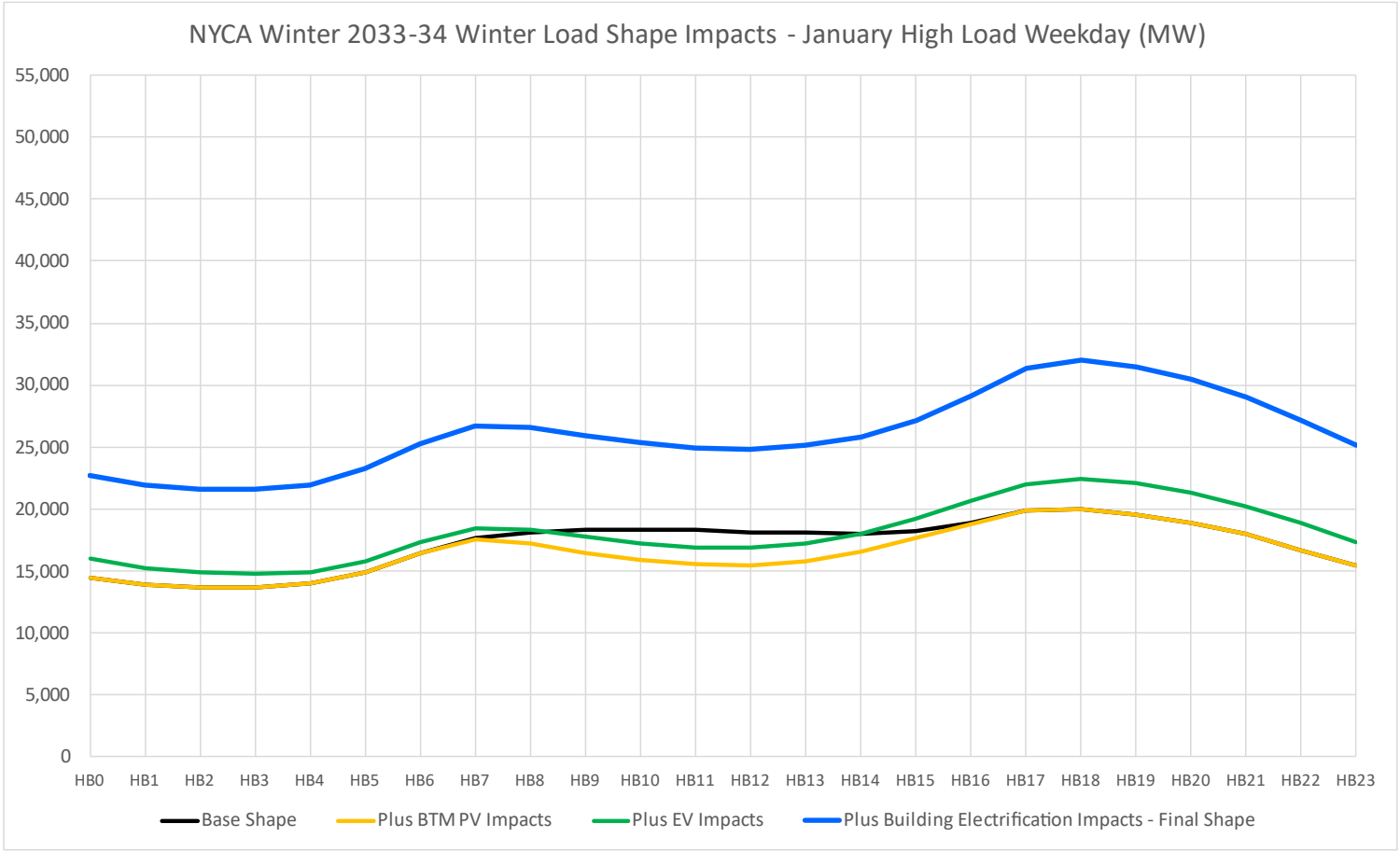
2033-34 Winter Load Shape Impacts



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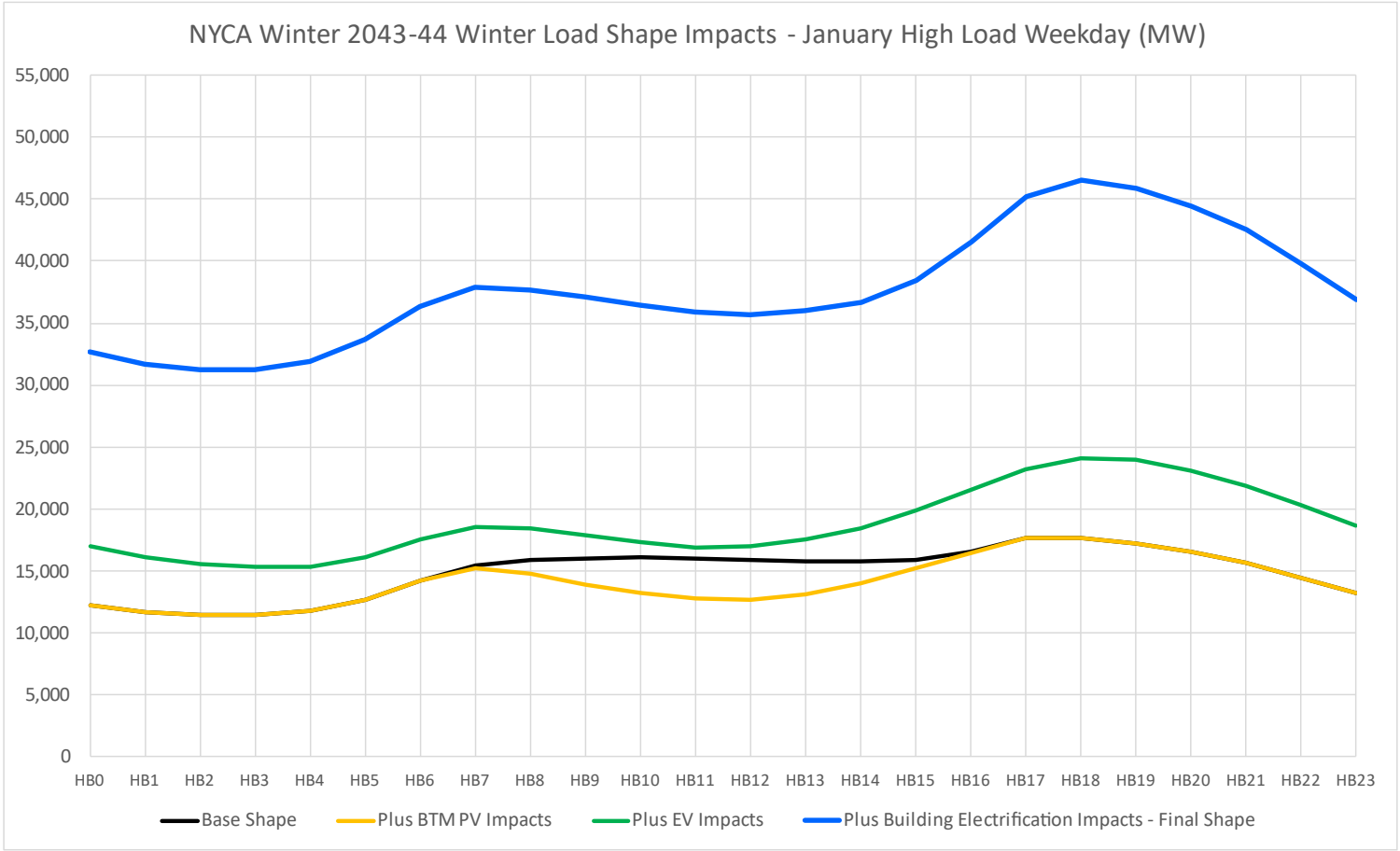
2043-44 Winter Load Shape Impacts



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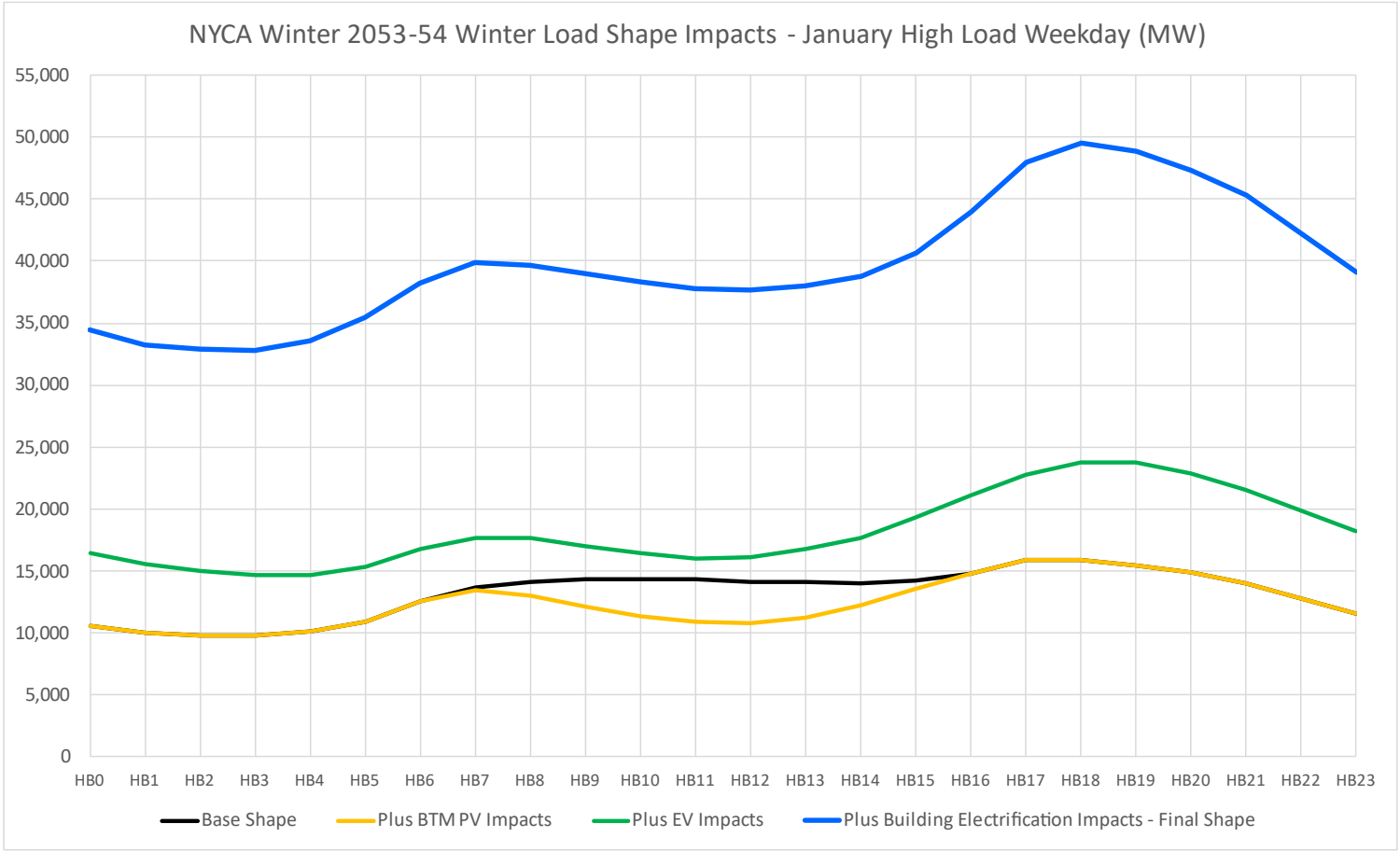
2053-54 Winter Load Shape Impacts



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2023 Gold Book
Load Modifying Impacts

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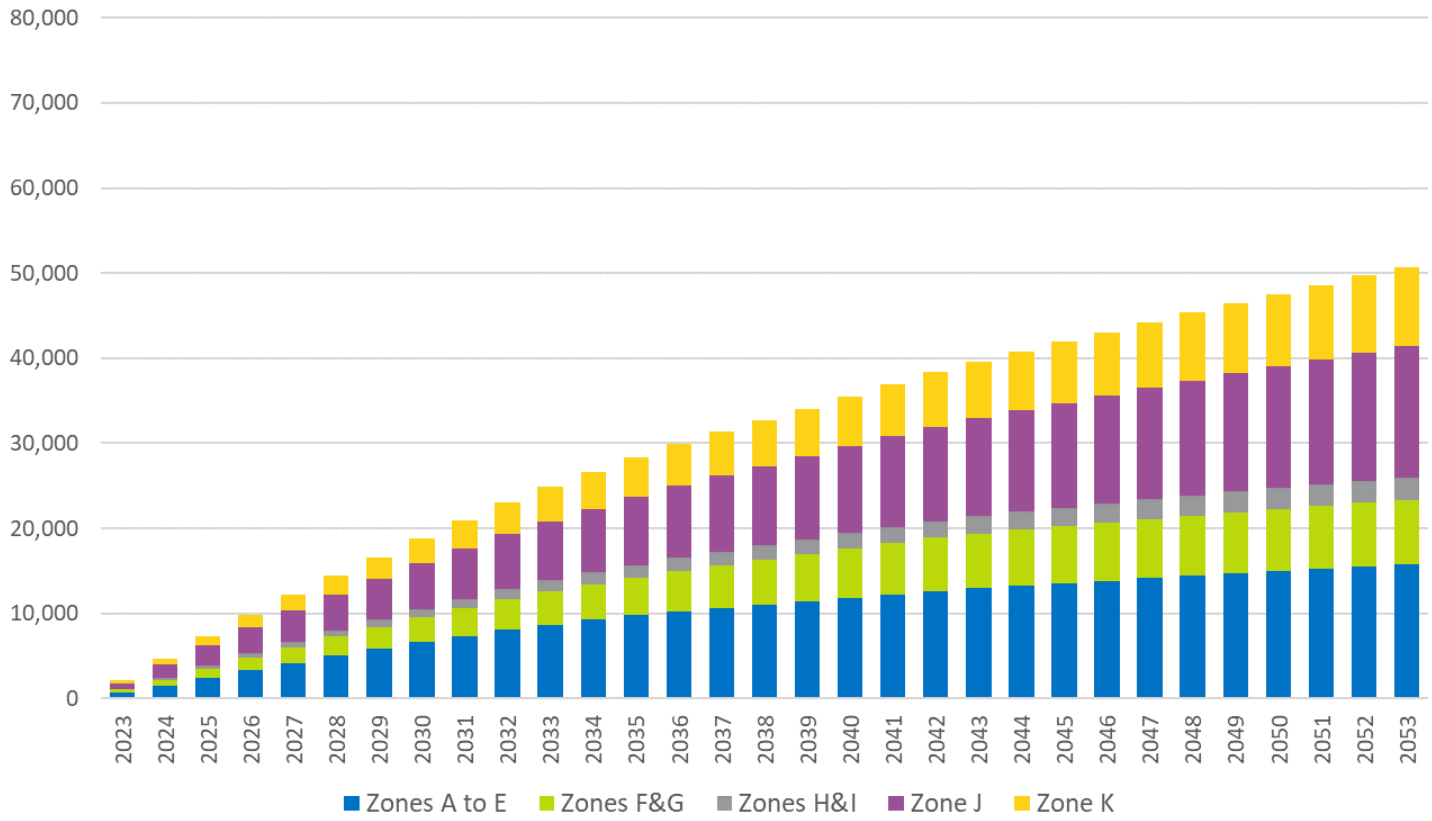
Energy Efficiency and Codes & Standards Annual Energy Reductions
Baseline Forecast - GWh



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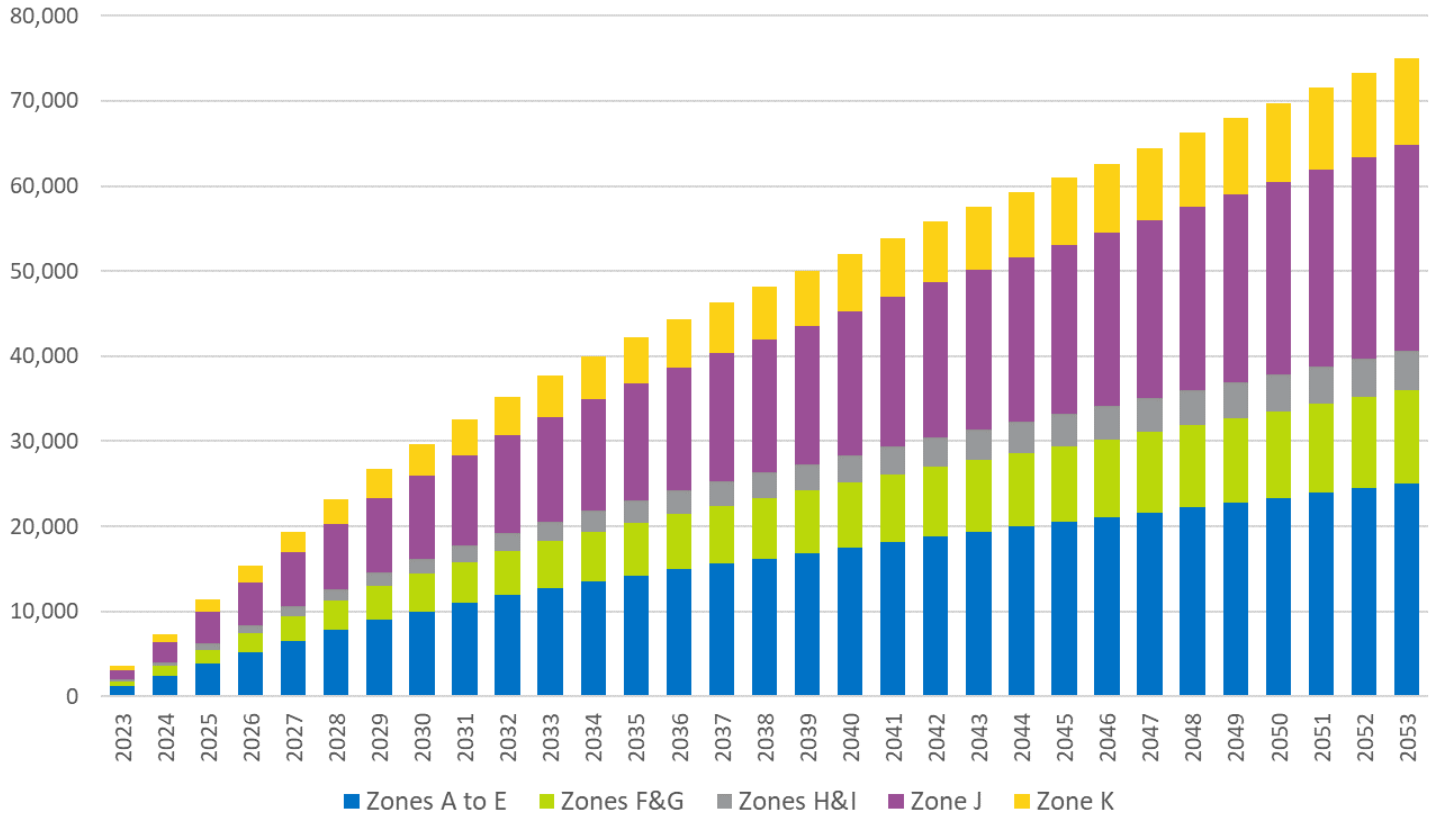
Energy Efficiency and Codes & Standards Annual Energy Reductions
Lower Demand Policy Scenario - GWh



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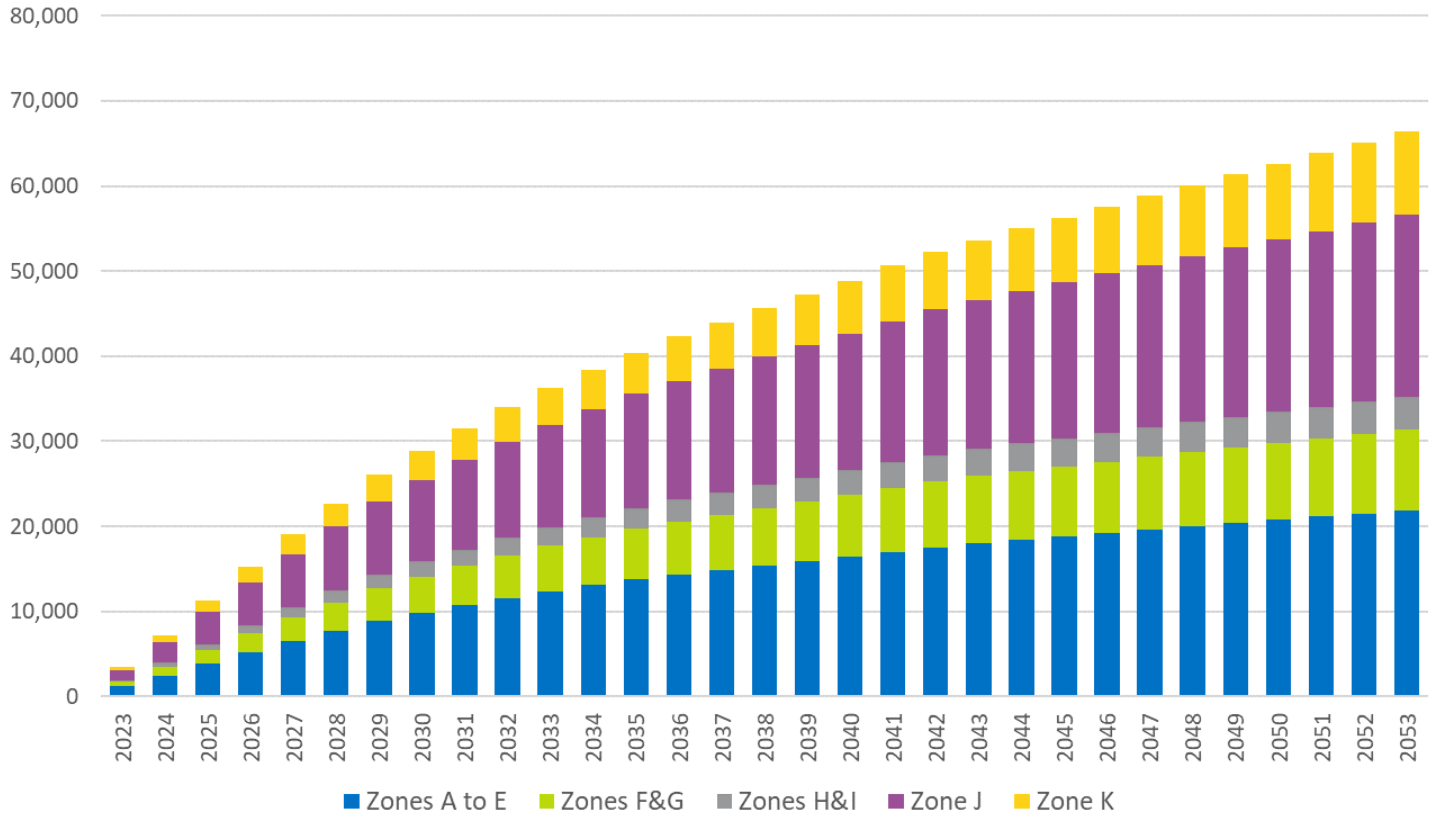
Energy Efficiency and Codes & Standards Annual Energy Reductions
Higher Demand Policy Scenario - GWh



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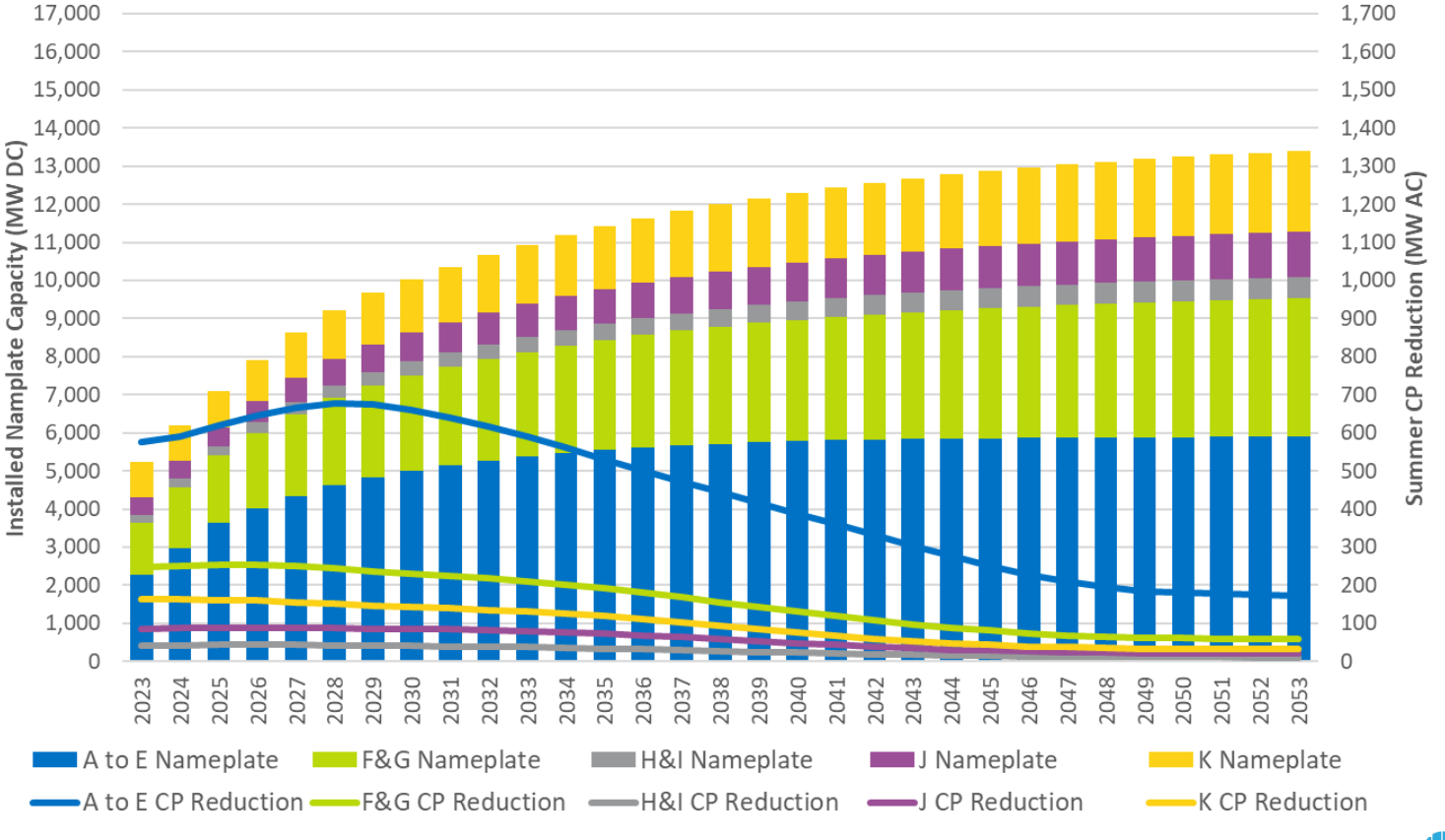
Baseline Forecast Behind-the-Meter Solar PV
Nameplate Capacity (MW DC) and Summer Coincident Peak Reduction (MW AC)



Note: The higher demand policy scenario BTM solar forecast matches the baseline.

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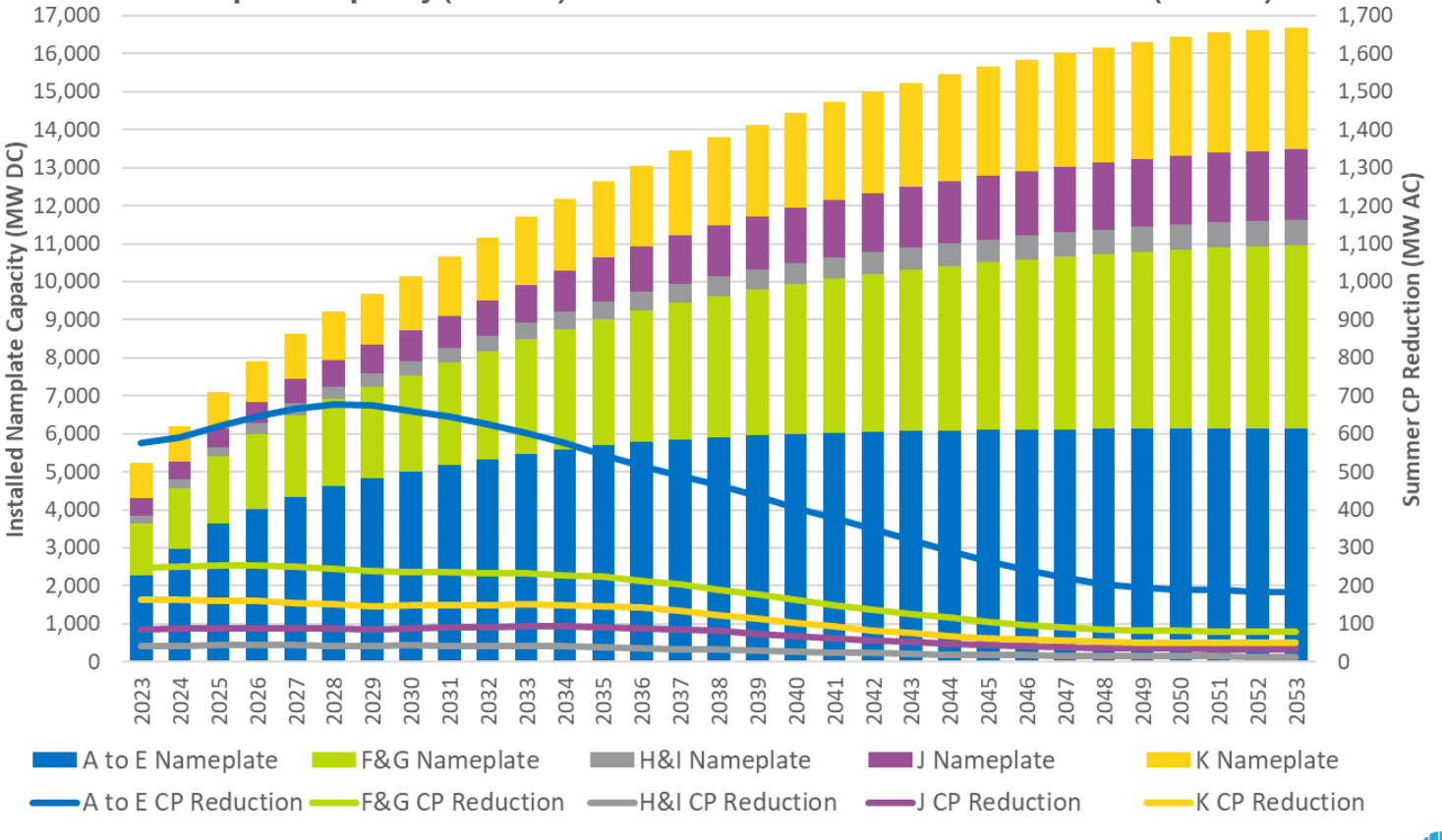
Lower Demand Scenario Behind-the-Meter Solar PV
Nameplate Capacity (MW DC) and Summer Coincident Peak Reduction (MW AC)



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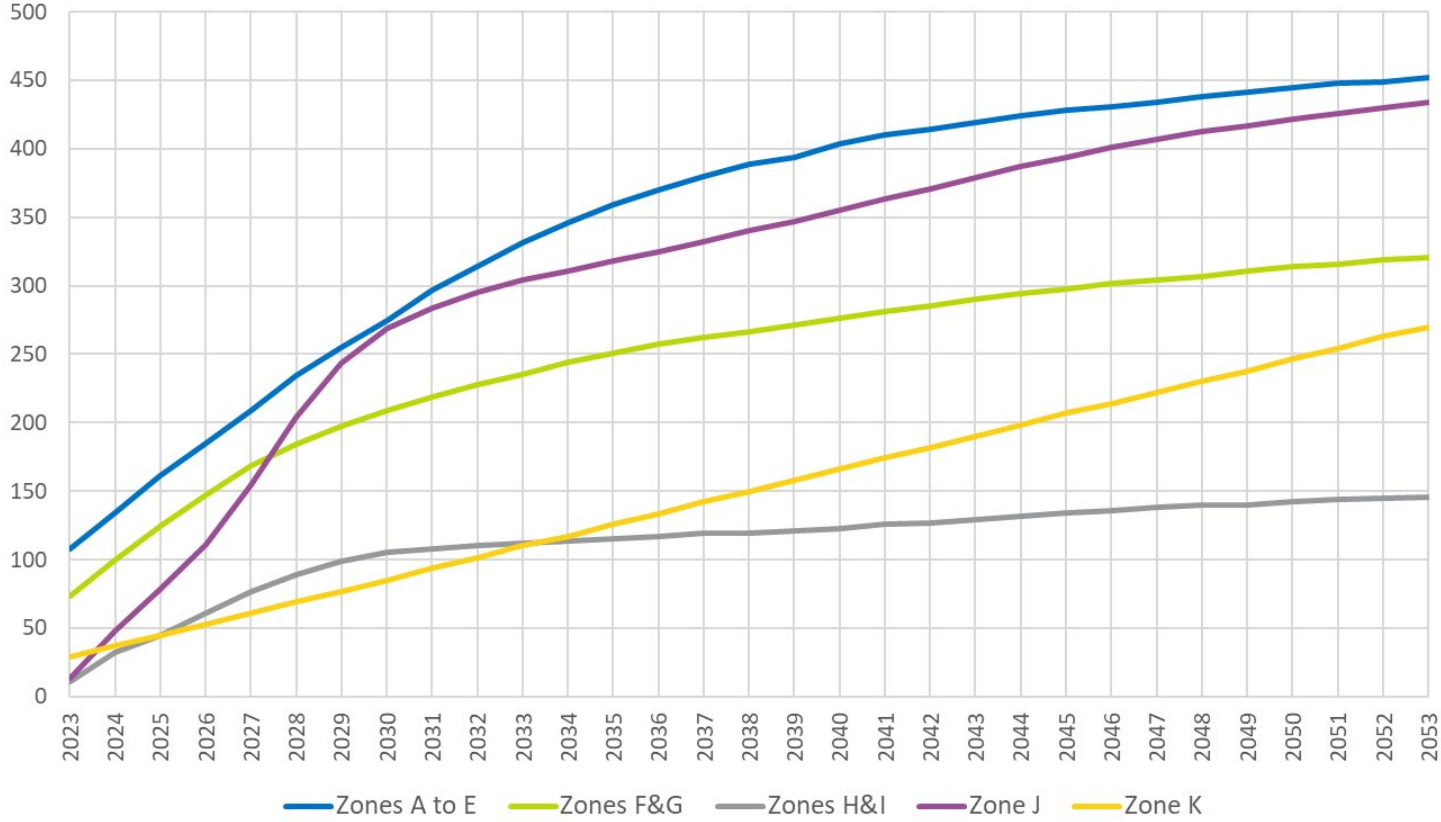
Behind-the-Meter Energy Storage Coincident Peak Reductions
Baseline and Policy Scenario Forecasts - MW



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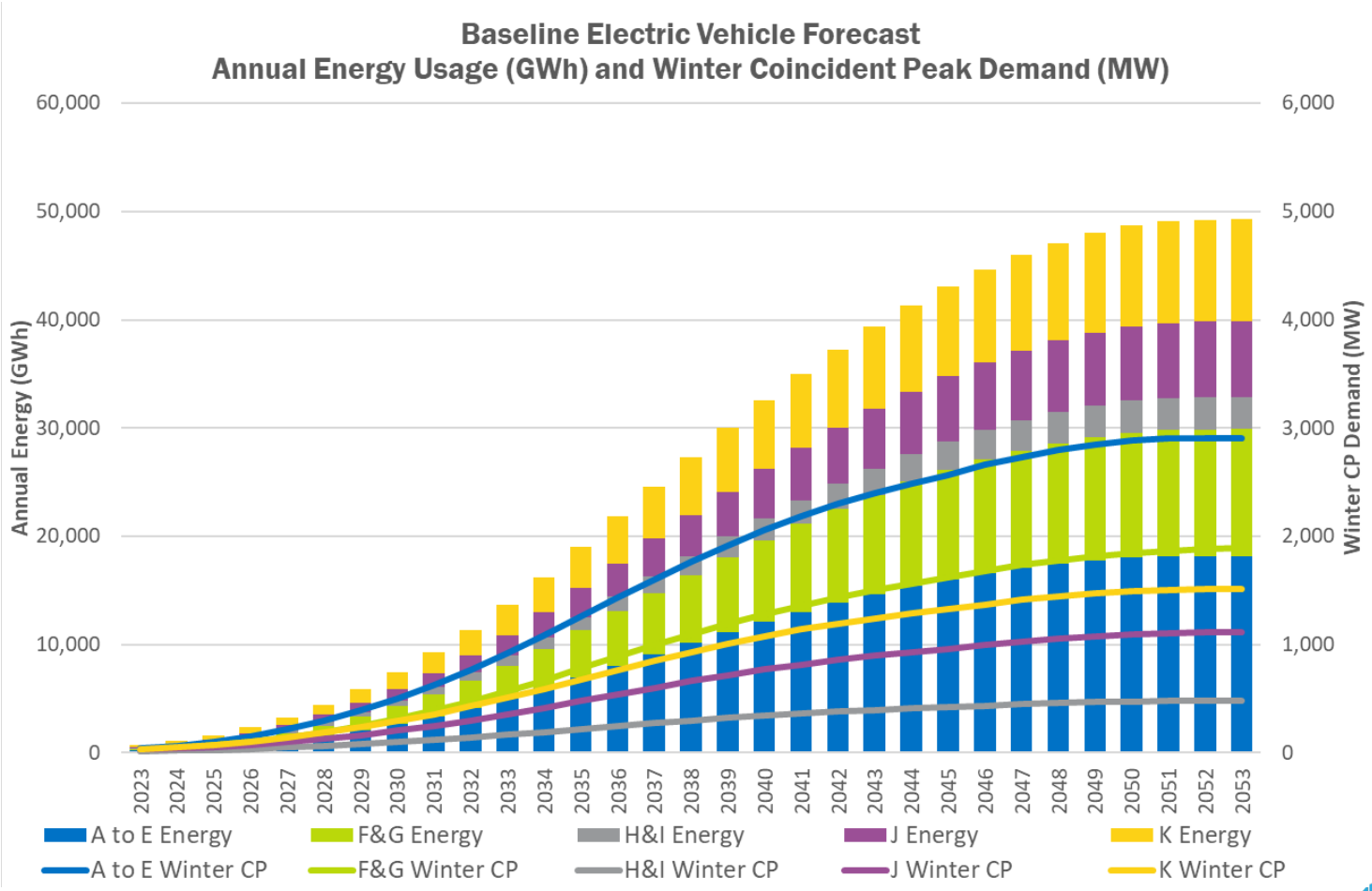

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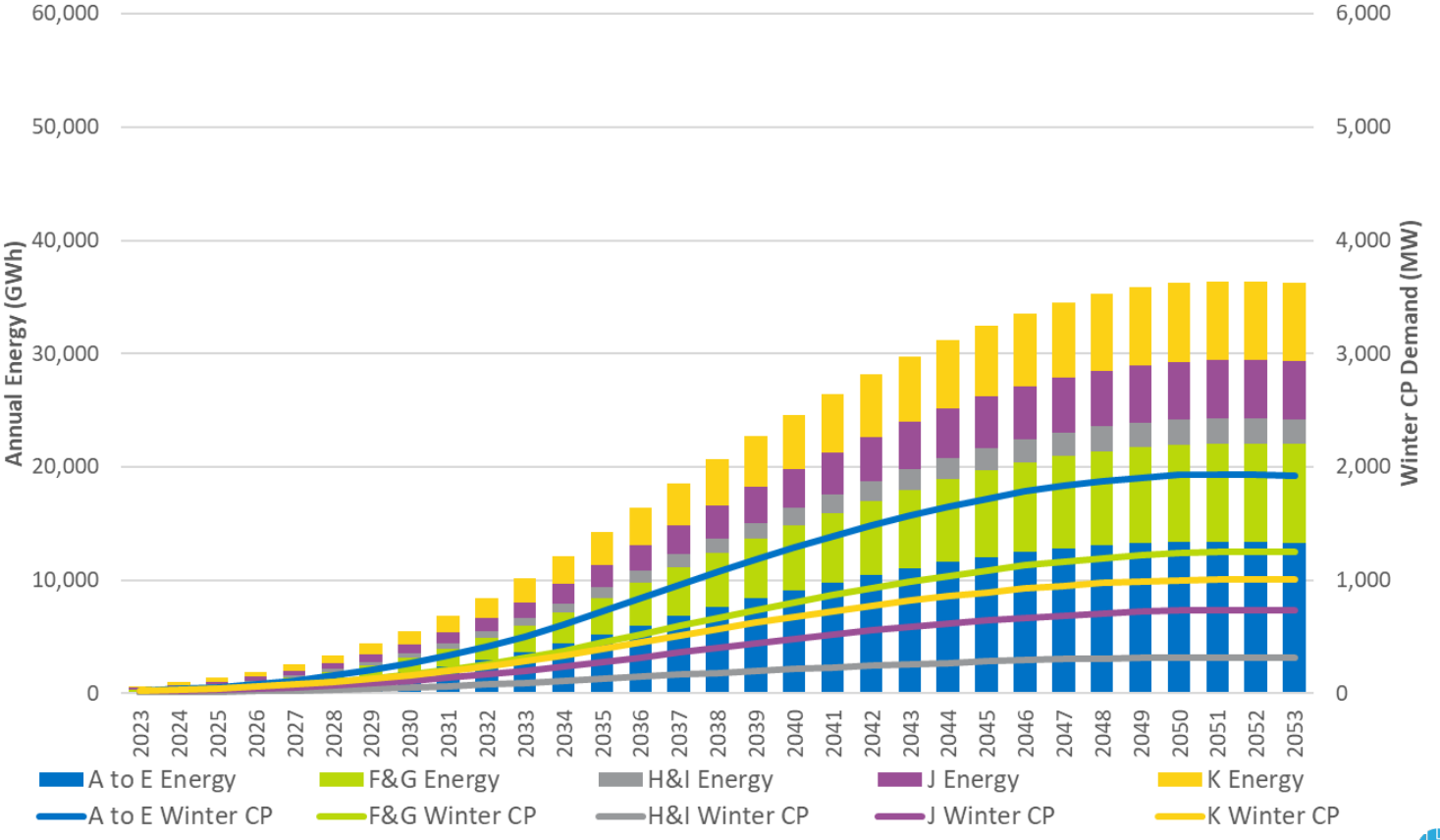
Lower Demand Policy Scenario Electric Vehicle Forecast
Annual Energy Usage (GWh) and Winter Coincident Peak Demand (MW)



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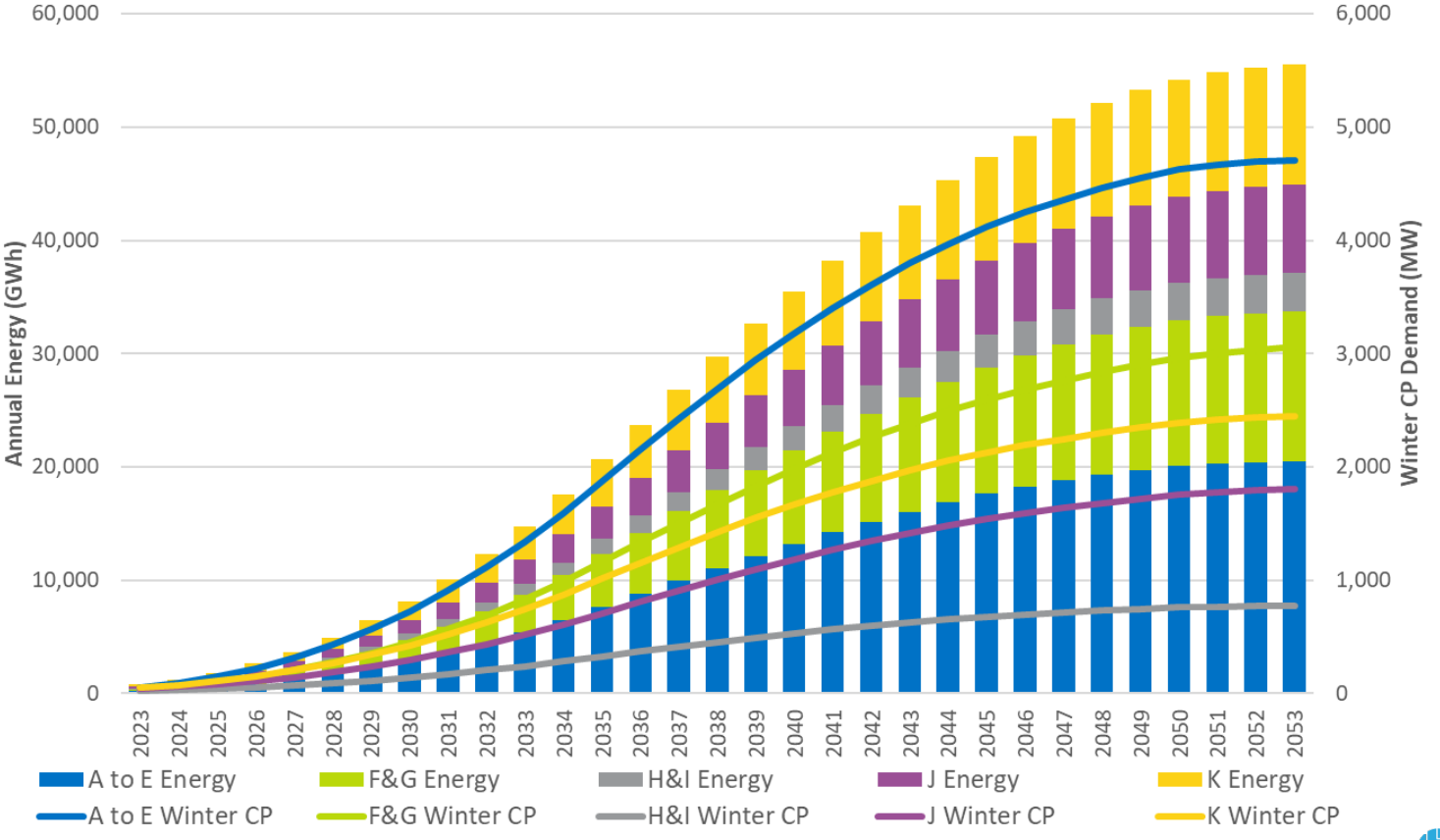
Higher Demand Policy Scenario Electric Vehicle Forecast
Annual Energy Usage (GWh) and Winter Coincident Peak Demand (MW)



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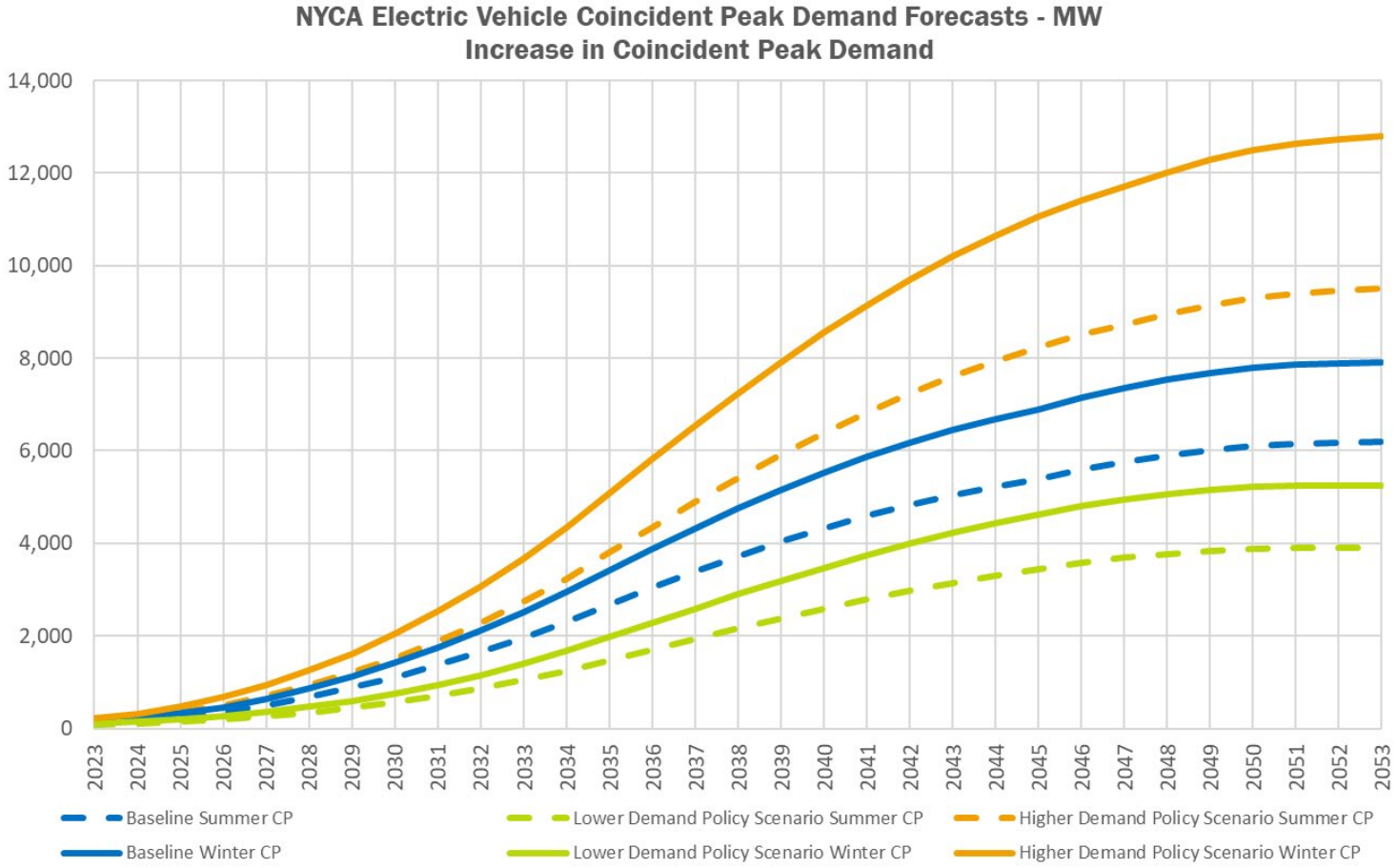

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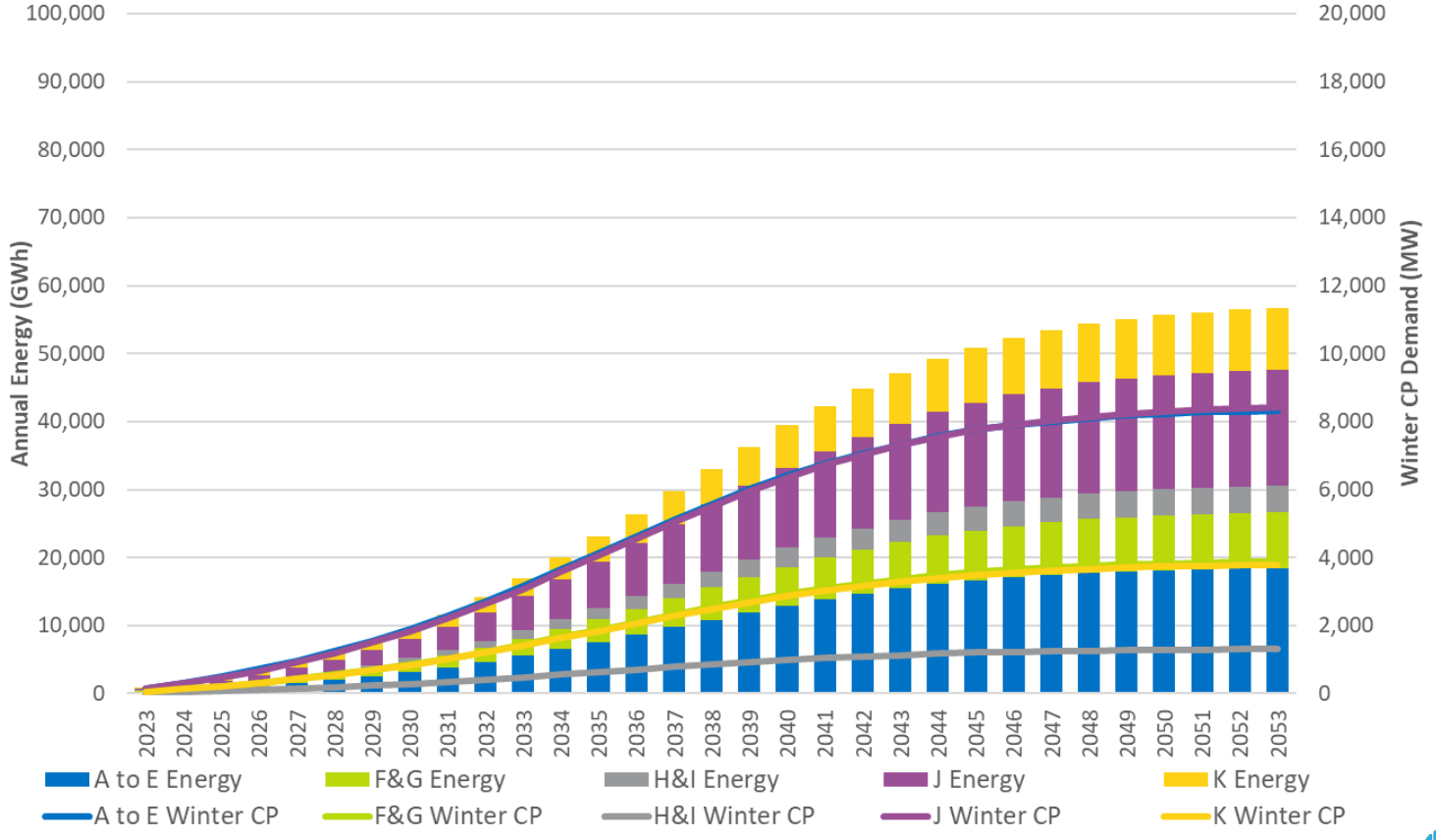
Baseline Building Electrification Forecast
Annual Energy Usage (GWh) and Winter Coincident Peak Demand (MW)



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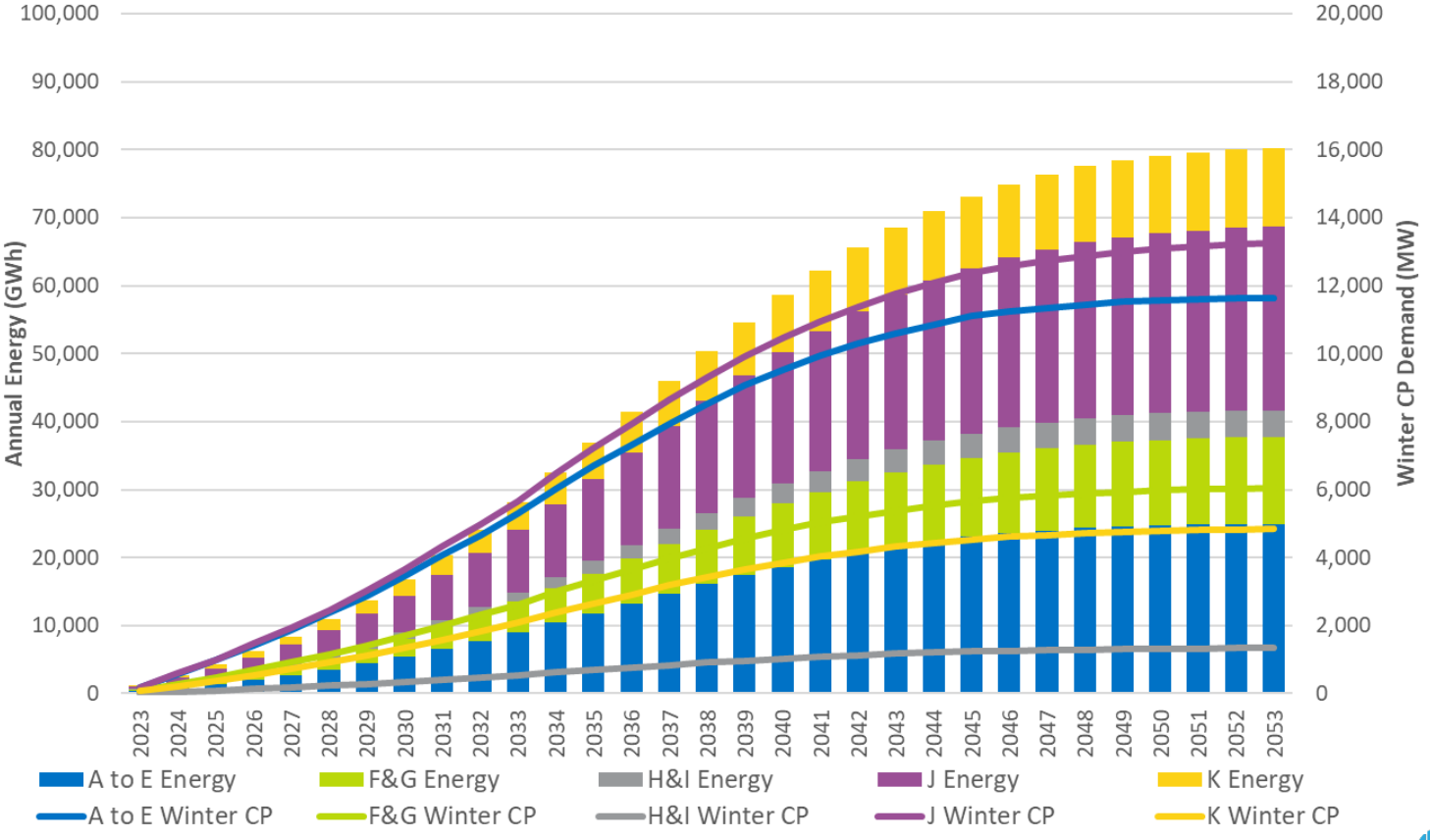
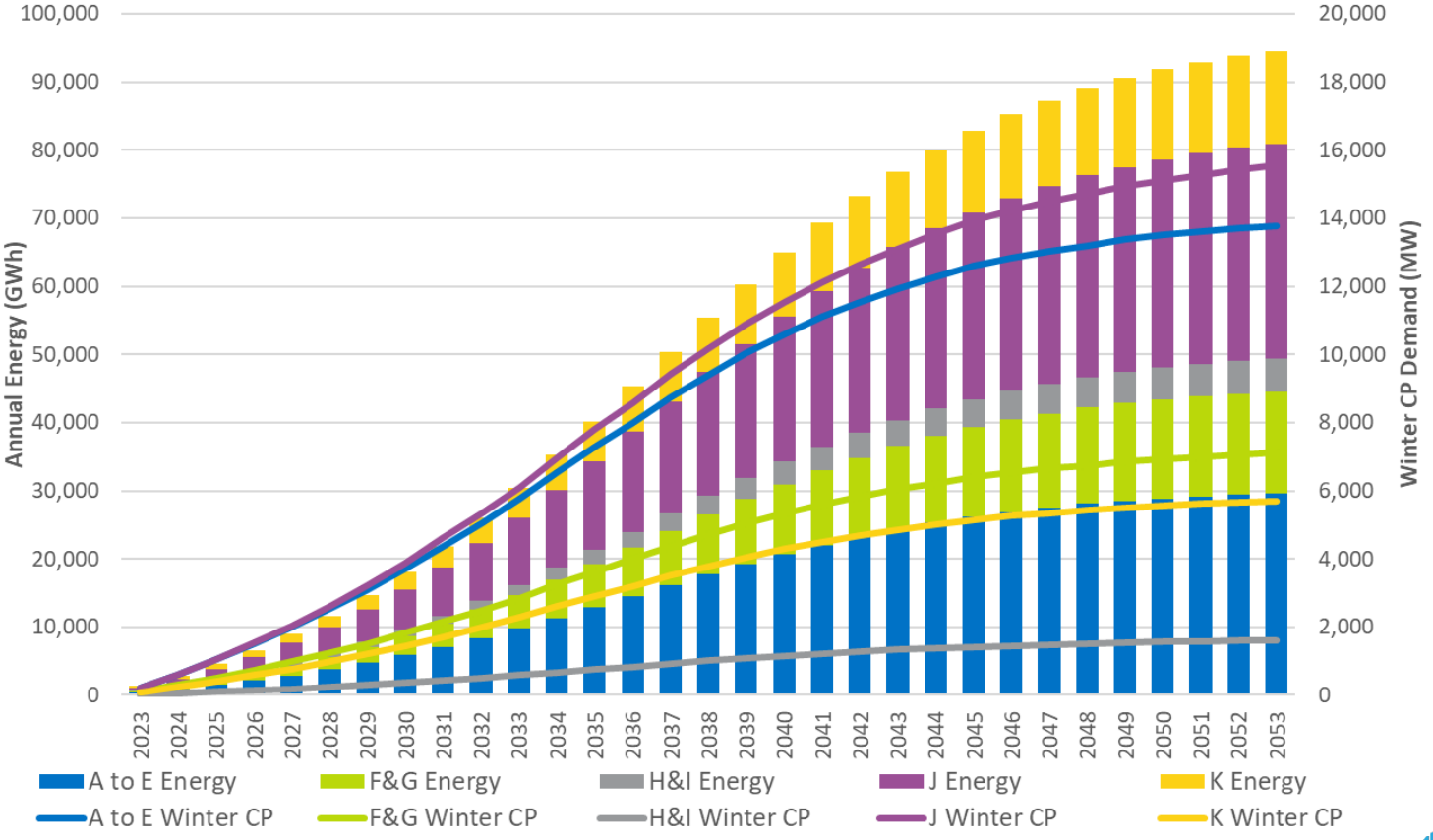
Lower Demand Policy Scenario Building Electrification Forecast
Annual Energy Usage (GWh) and Winter Coincident Peak Demand (MW)

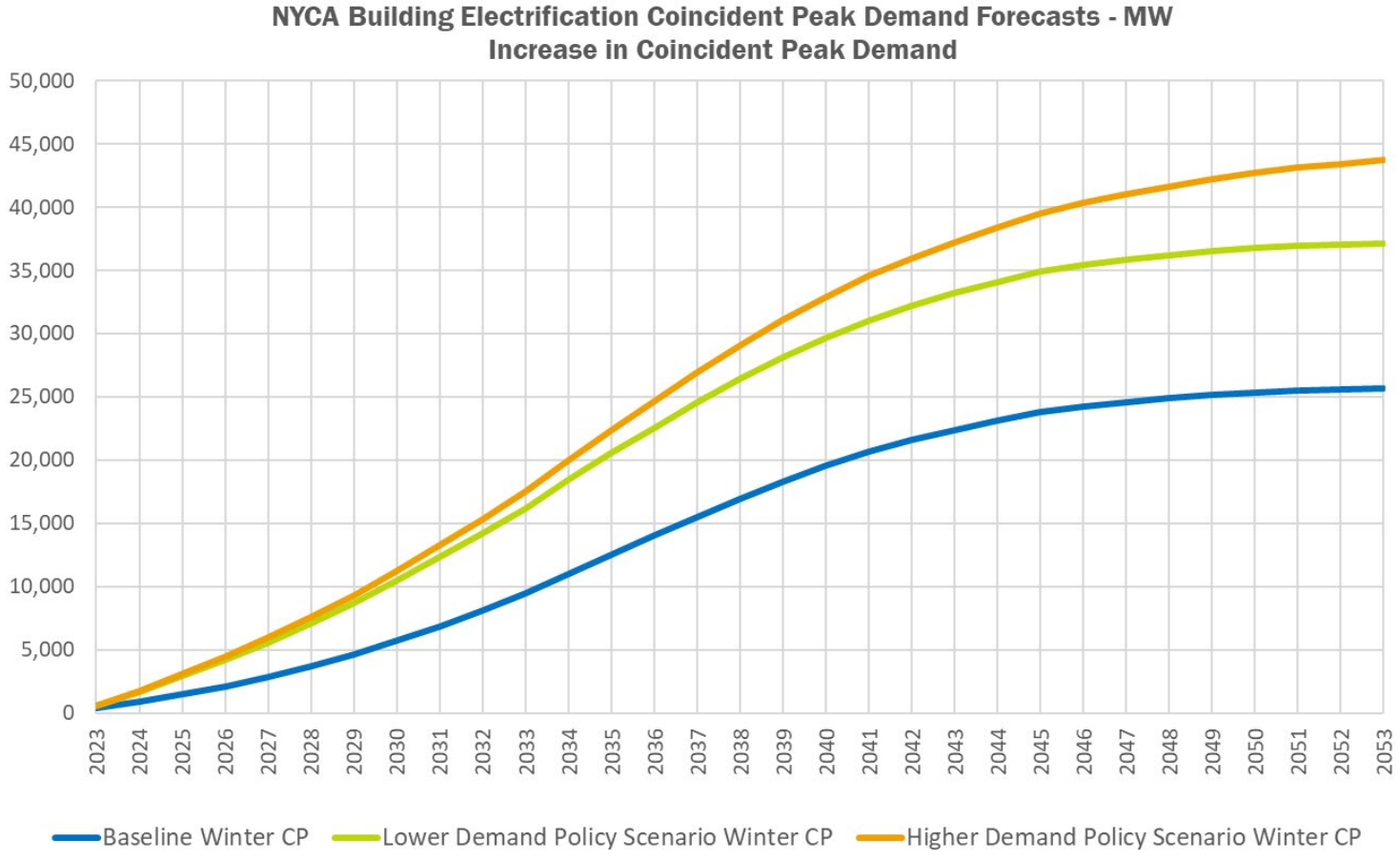


New York ISO

Higher Demand Policy Scenario Building Electrification Forecast
Annual Energy Usage (GWh) and Winter Coincident Peak Demand (MW)



New York ISO



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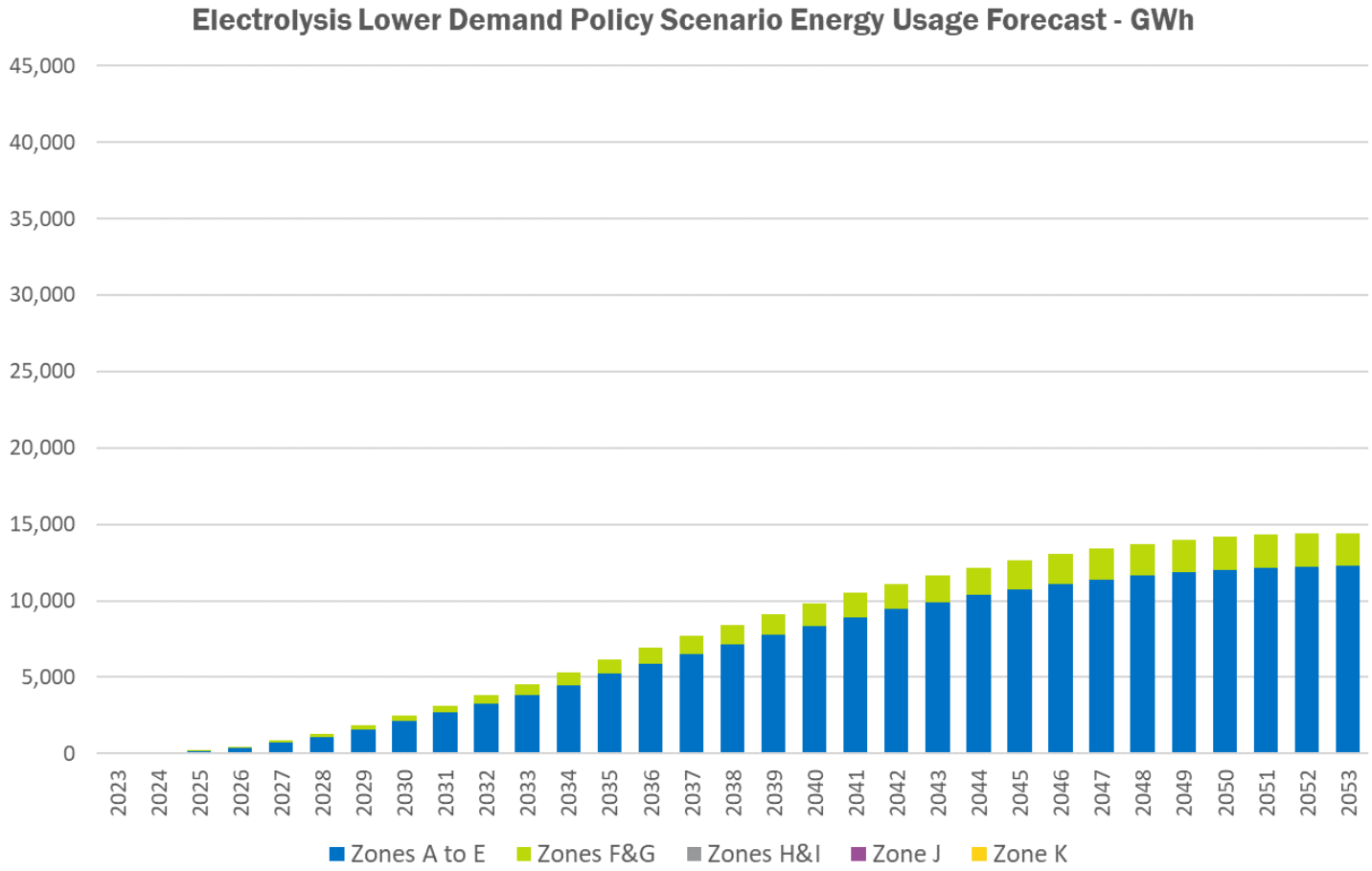

Note: There is no electrolysis in the baseline forecast.

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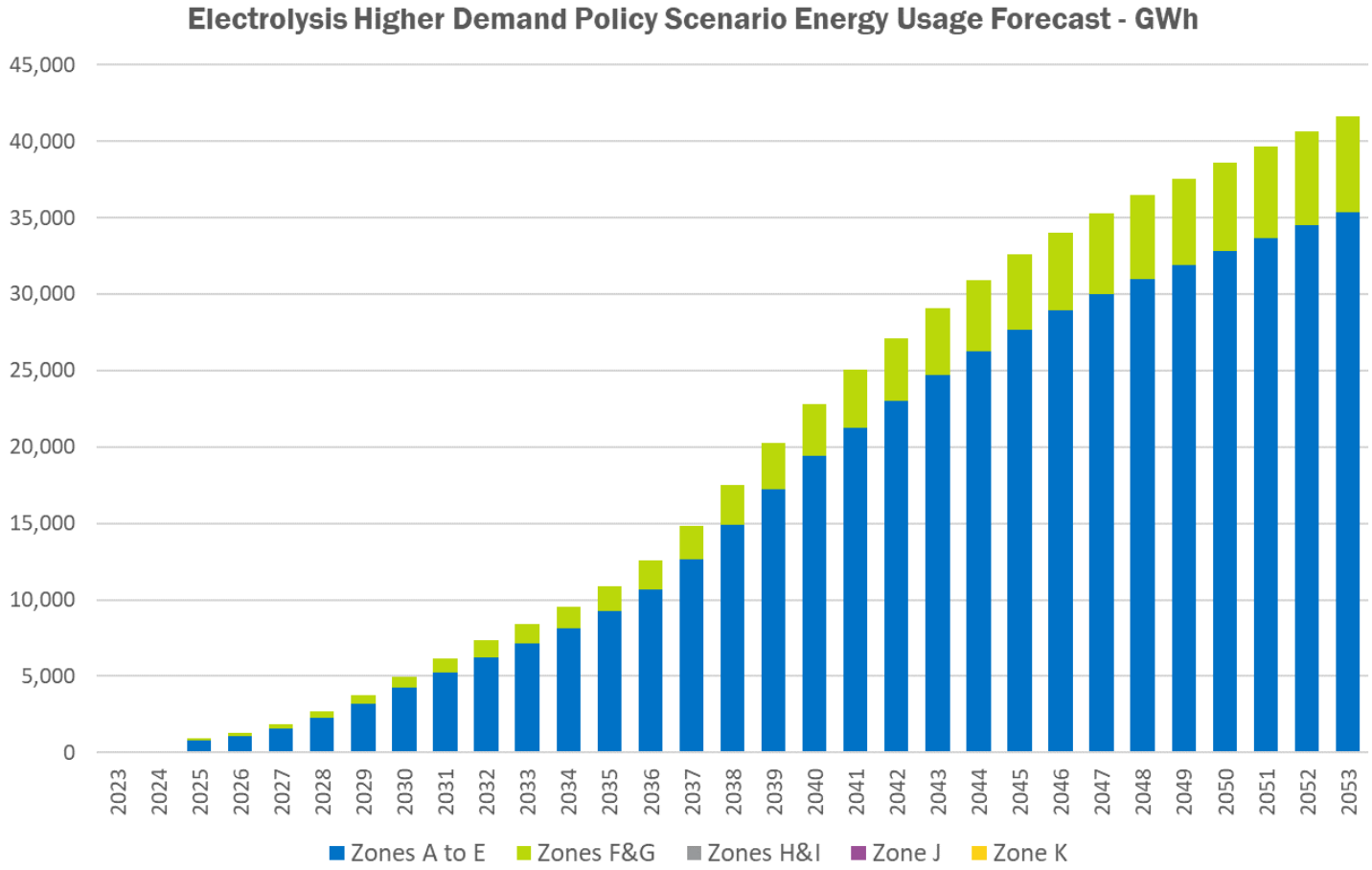

Note: There is no electrolysis in the baseline forecast.

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NYCA Forecast Scenarios

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Load Scenario Summary

Forecast Component	Baseline Forecast	Lower Demand Policy Scenario	Higher Demand Policy Scenario
Weather Trends	Trended weather from NYISO Climate Change Impact Study - average NYCA temperature gain of approximately 0.7 degrees Fahrenheit per decade	Same as Baseline Forecast	Same as Baseline Forecast
Economic Assumptions	Baseline economic forecast - expected economic growth in the long run. Declining population and households in later forecast years - statewide population of under 18 million in 2050	Same as Baseline Forecast	Increase in population and households over the forecast horizon - statewide population of over 20 million in 2050
Energy Efficiency (Table I-8)	Significant energy savings and peak reductions due to energy efficiency programs, codes & standards improvements, and building shell upgrades	Very significant energy savings and peak reductions due to energy efficiency programs, codes & standards improvements, and building shell upgrades, reflecting full achievement of State policy targets	Very significant energy savings and peak reductions due to energy efficiency programs, codes & standards improvements, and building shell upgrades, reflecting full achievement of State policy targets
BTM Solar PV (Table I-9)	Baseline BTM solar - 6,000 MW DC installed nameplate capacity by 2024, and 10,000 MW DC installed by 2030, and over 13,000 MW DC installed in 2050	Increased solar growth relative to baseline after 2030. Over 16,000 MW DC installed in 2050	Same as Baseline Forecast
BTM Non-Solar DG (Table I-10)	Total of more than 600 MW installed non-solar BTM DG nameplate capacity in 2040. No assumption of future entry of resources into the wholesale DER market	Same as Baseline Forecast	Same as Baseline Forecast

Forecast Component	Baseline Forecast	Lower Demand Policy Scenario	Higher Demand Policy Scenario
Electric Vehicles (Table I-11)	85% LDV EV sales saturation in 2035. Roughly 6 million EVs (passenger vehicles, trucks and buses) on the road in 2040. Increasing share of managed charging over time	85% LDV EV sales saturation in 2035. Roughly 6 million EVs on the road in 2040. Reduced peak load impact due to increased managed charging and improved battery efficiency trends	100% LDV EV sales saturation by 2035. Over 7 million EVs on the road in 2040. Decreased share of managed charging relative to the baseline forecast
BTM Energy Storage (Table I-12)	Over 1,000 MW installed BTM nameplate capacity by 2030, with over 2,000 MW installed by 2045. Does not include wholesale storage resources which are expected to contribute significantly to State policy targets	Same as Baseline Forecast	Same as Baseline Forecast
Building Electrification (Table I-13)	Significant electrification of space heating and other end uses. 60% saturation of primary residential electric heating by 2050, including air source and ground source heat pumps, and electric resistance heating: * 27% full capacity ASHP * 10% ASHP with supplemental electric heat * 10% ASHP with backup fossil heat * 8% primary electric resistance heat * 5% Ground Source Heat Pumps ("GSHP") * 40% primary fossil fuel heating	Very high saturation of electrific space heating and other end uses. 90% saturation of residential electric heating by 2050. Increased share of air source heat pumps relative to the baseline forecast: * 50% full capacity ASHP * 20% ASHP with supplemental electric heat * 5% ASHP with backup fossil heat * 10% primary electric resistance heat * 5% GSHP * 10% primary fossil fuel heating	Very high saturation of electric space heating and other end uses. 90% saturation of residential electric heating by 2050: * 40% full capacity ASHP * 25% ASHP with supplemental electric heat * 5% ASHP with backup fossil heat * 15% primary electric resistance heat * 5% GSHP * 10% primary fossil fuel heating
Large Loads (Table I-14)	Expected load growth from large load projects in the NYISO IQ, along with impacts from significant projects not in the queue	Same as Baseline Forecast	Additional load growth from large load projects beyond that included in the baseline forecast
Electrolysis (Hydrogen Production)	No electrolysis	Sufficient hydrogen production to meet demand for non-EV Zero Emission Vehicles (100% ZEV LDV by 2035). No peak load impact	Similar to Climate Action Council Integration Analysis Scenario 2 electrolysis forecast. Nearly 40,000 GWh annual energy impact in 2050. No peak load impact

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NYCA Annual Energy Forecasts

2050 Annual Energy Forecast (TWh)

Component	Baseline	Low*	High*
Econometric Energy	183.2	183.2	196.2
Energy Efficiency	(47.5)	(69.8)	(62.6)
BTM Solar	(16.4)	(20.3)	(16.4)
BTM DG	(3.0)	(3.0)	(3.0)
Storage	2.7	2.7	2.7
Electric Vehicles	48.7	36.2	54.2
Building Electrification	55.7	79.1	91.8
Large Loads	10.0	10.0	18.1
Electrolysis	0.0	14.2	38.6
Total Energy	**233.4**	**232.3**	**319.6**

**Lower and Higher Demand Policy Scenarios*

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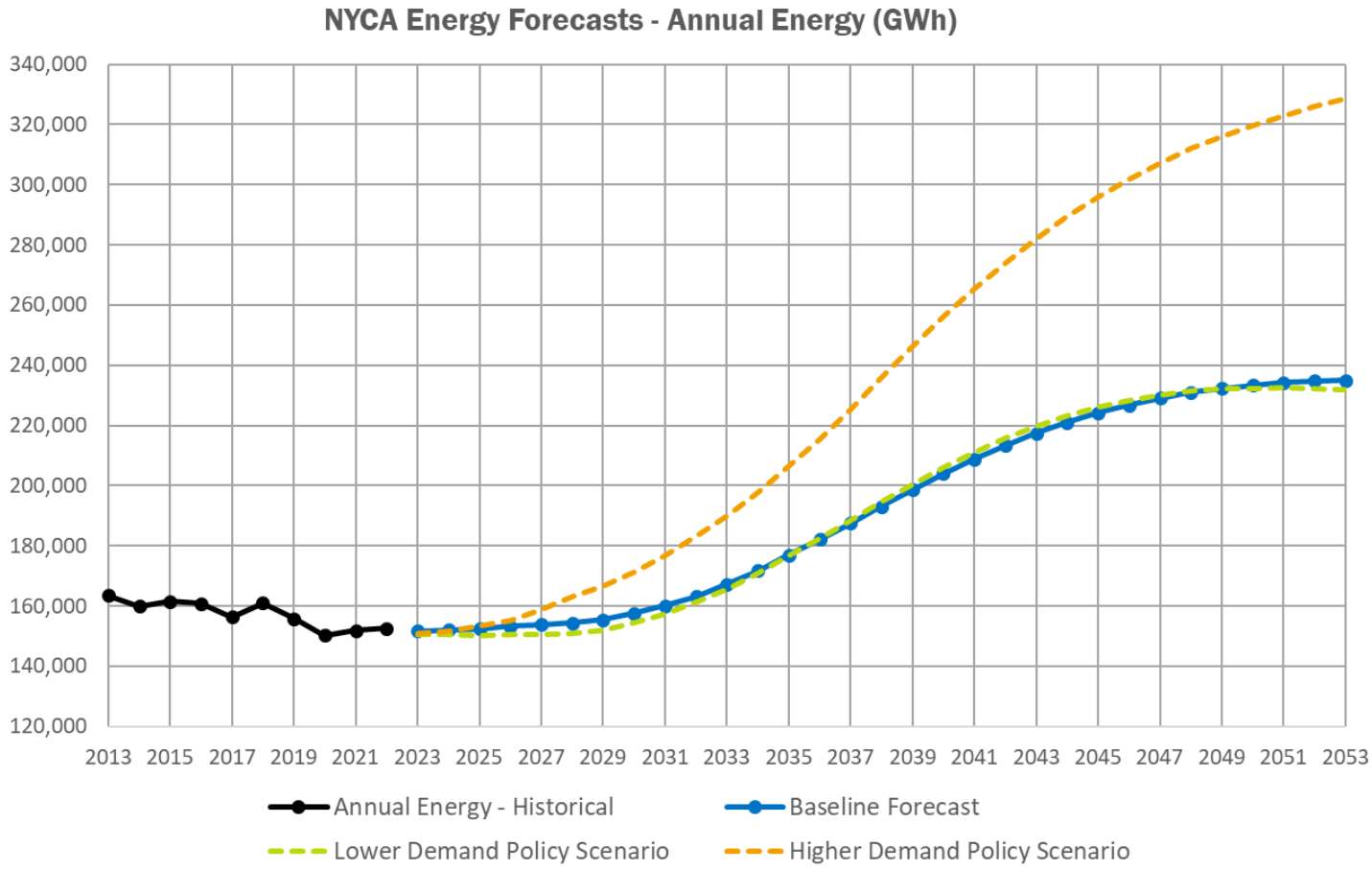

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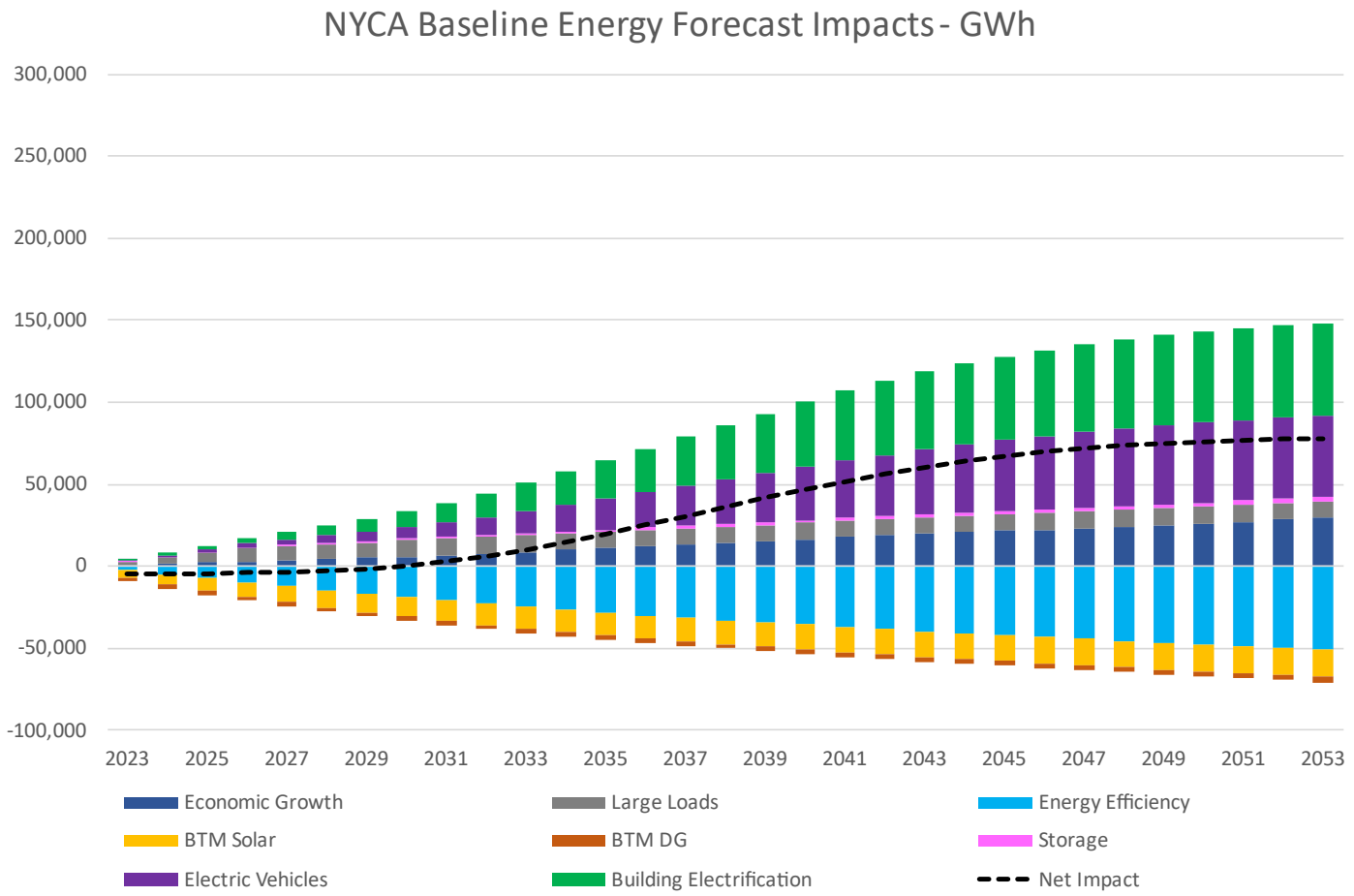

Note: Economic growth is endogenous to the end-use models and includes impacts due to economic variables, end-use saturations, and projected weather trends.

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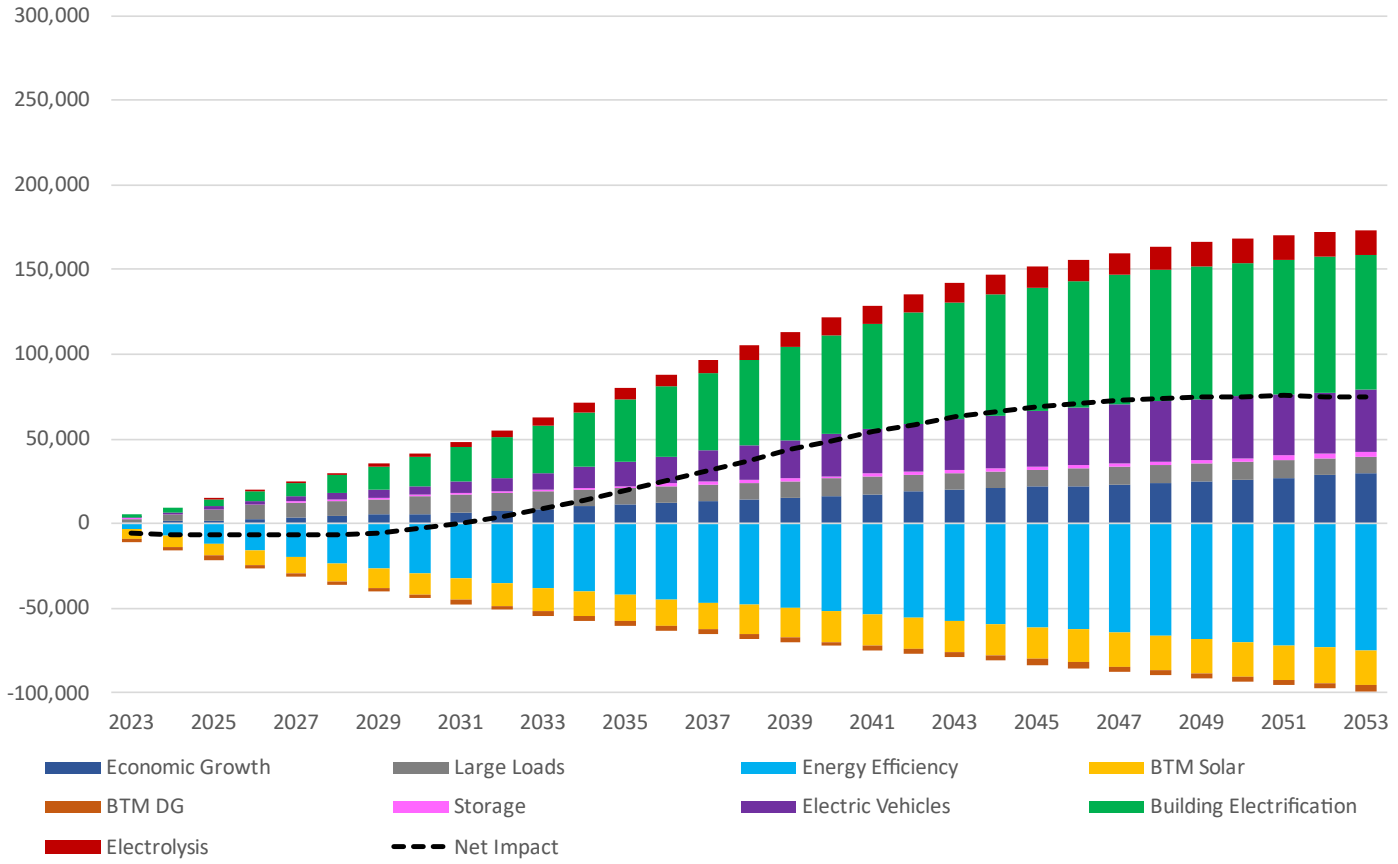
NYCA Lower Demand Policy Scenario Energy Forecast Impacts- GWh



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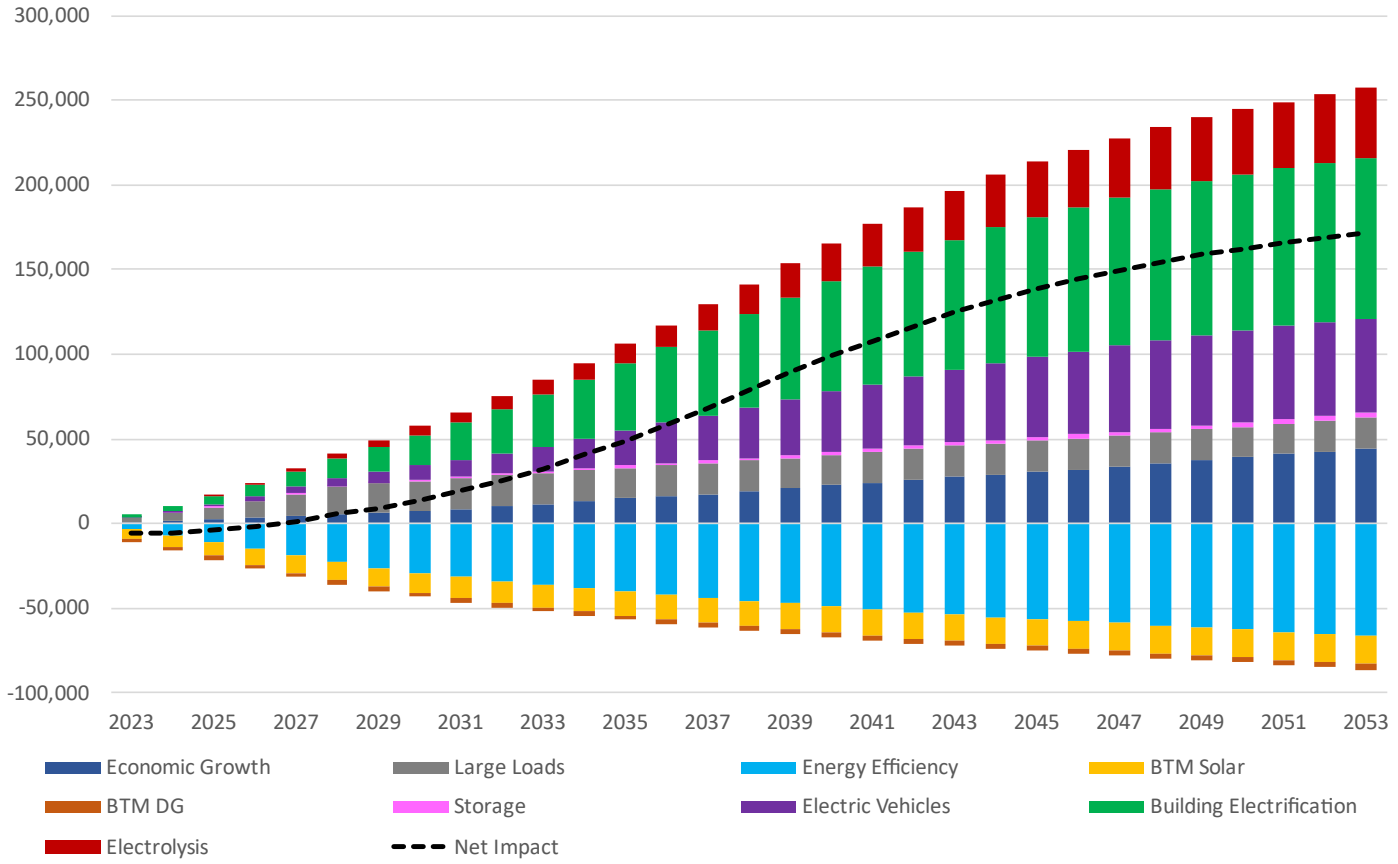
NYCA Higher Demand Policy Scenario Energy Forecast Impacts- GWh



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NYCA Summer Peak Forecasts

2050 Summer Peak Forecast (GW)

Component	Baseline	Low*	High*
Econometric Peak	41.8	41.8	46.6
Energy Efficiency	(8.9)	(13.6)	(11.7)
BTM Solar	(0.3)	(0.4)	(0.3)
BTM DG	(0.5)	(0.5)	(0.5)
Storage	(1.6)	(1.6)	(1.6)
Electric Vehicles	6.1	3.9	9.3
Building Electrification	2.2	2.2	2.5
Large Loads	1.2	1.2	2.2
Electrolysis	--	--	--
Total Summer Peak	**40.0**	**33.0**	**46.5**

**Lower and Higher Demand Policy Scenarios*

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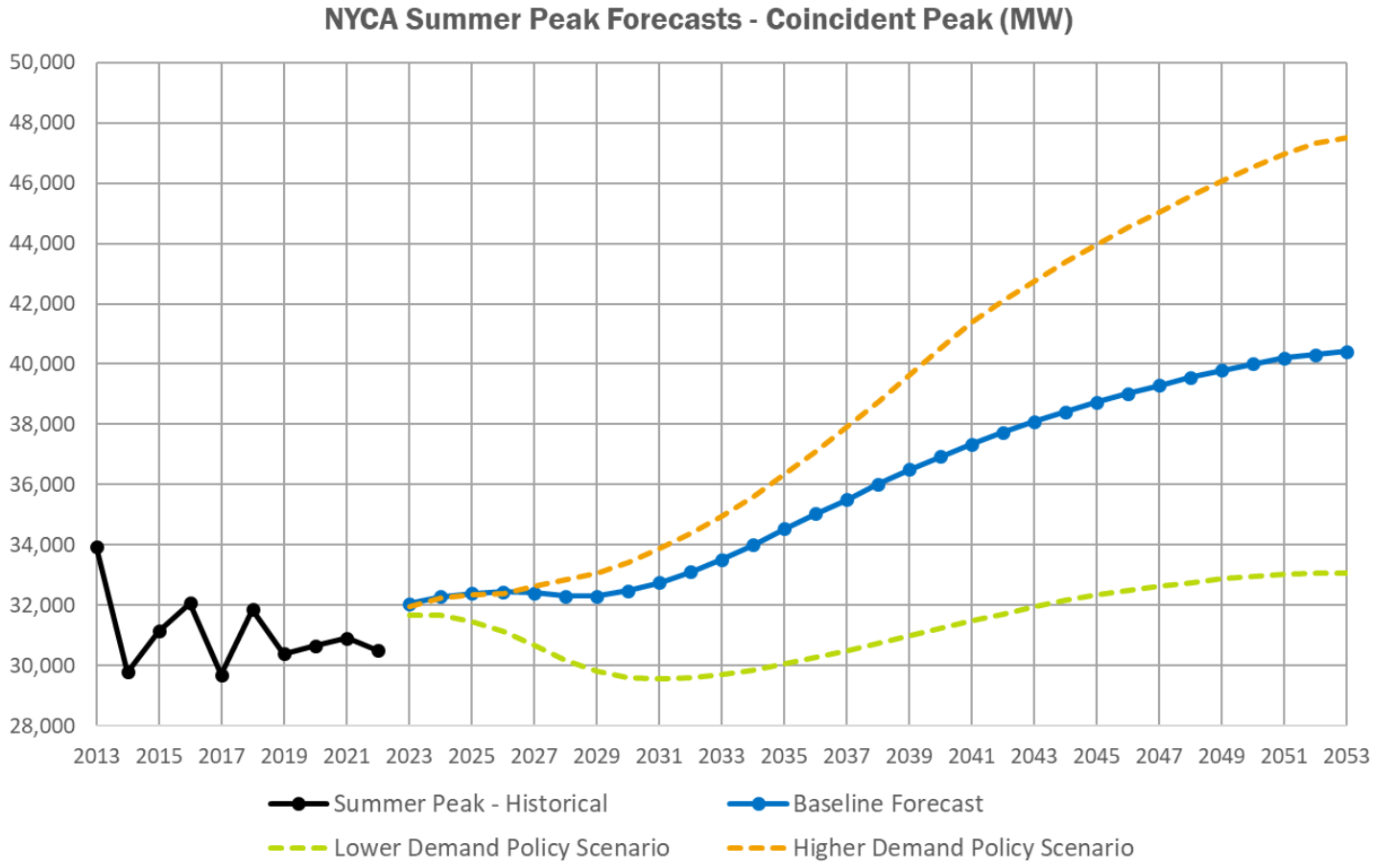

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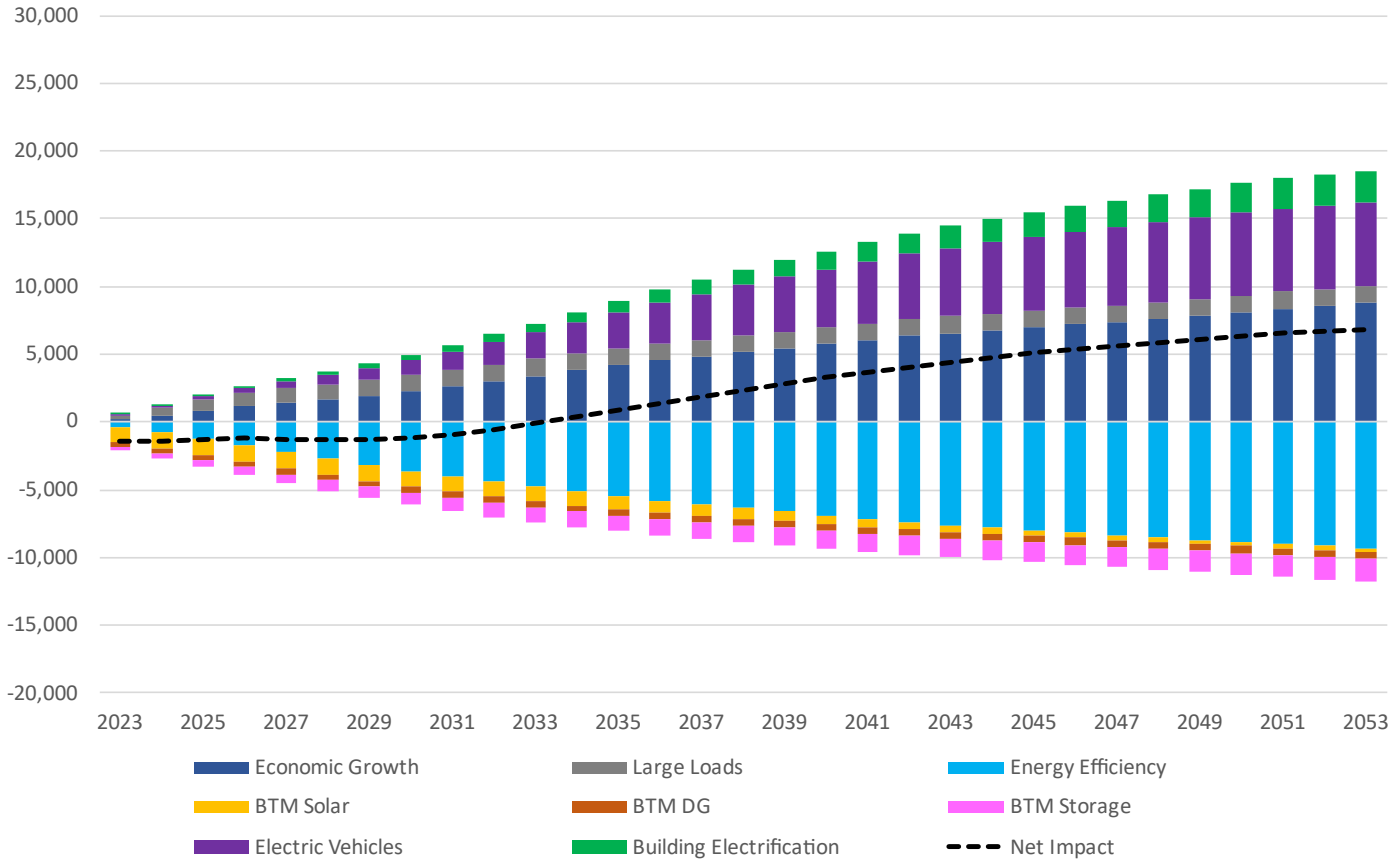
NYCA Baseline Summer Peak Forecast Impacts - MW



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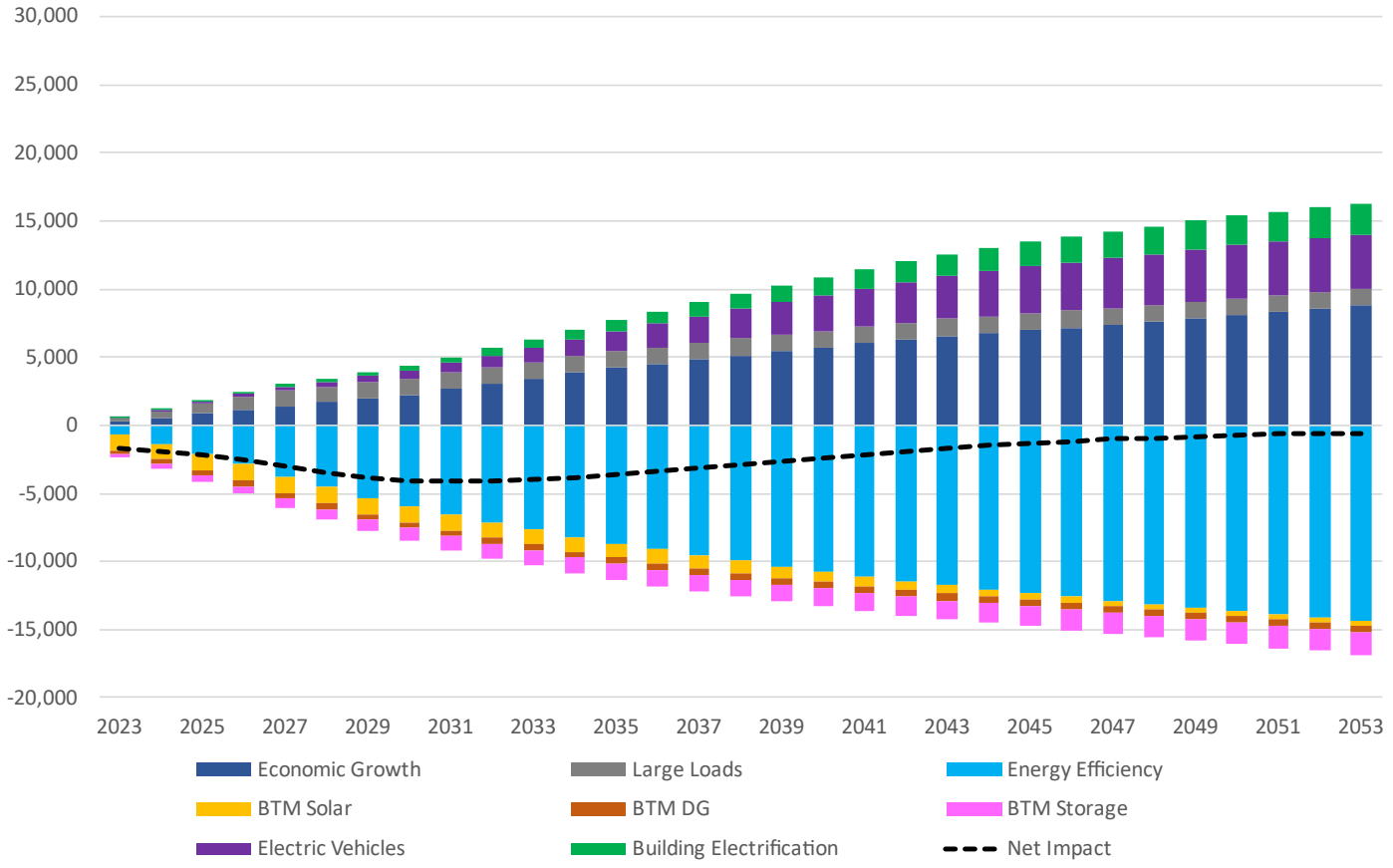
NYCA Lower Demand Policy Scenario Summer Peak Forecast Impacts - MW



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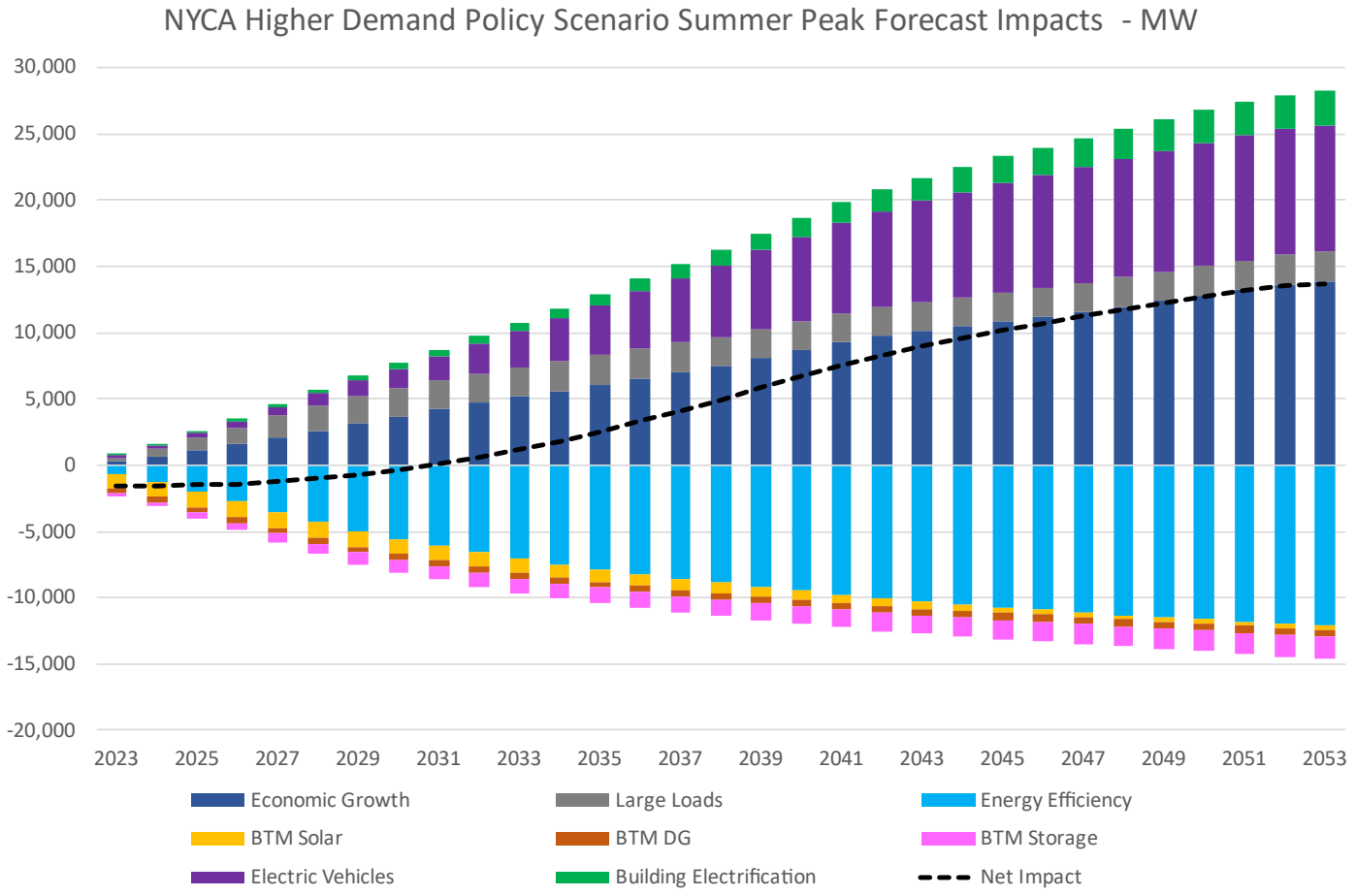

Note: Economic growth is endogenous to the end-use models and includes impacts due to economic variables, end-use saturations, and projected weather trends.

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NYCA Winter Peak Forecasts

2049-50 Winter Peak Forecast (GW)

Component	Baseline	Low*	High*
Econometric Peak	28.4	28.4	30.3
Energy Efficiency	(9.3)	(17.0)	(12.5)
BTM Solar	--	--	--
BTM DG	(0.5)	(0.5)	(0.5)
Storage	(1.6)	(1.6)	(1.6)
Electric Vehicles	7.7	5.2	12.3
Building Electrification	25.2	36.5	42.2
Large Loads	1.2	1.2	2.2
Electrolysis	--	--	--
Total Winter Peak	**51.1**	**52.2**	**72.4**

**Lower and Higher Demand Policy Scenarios*

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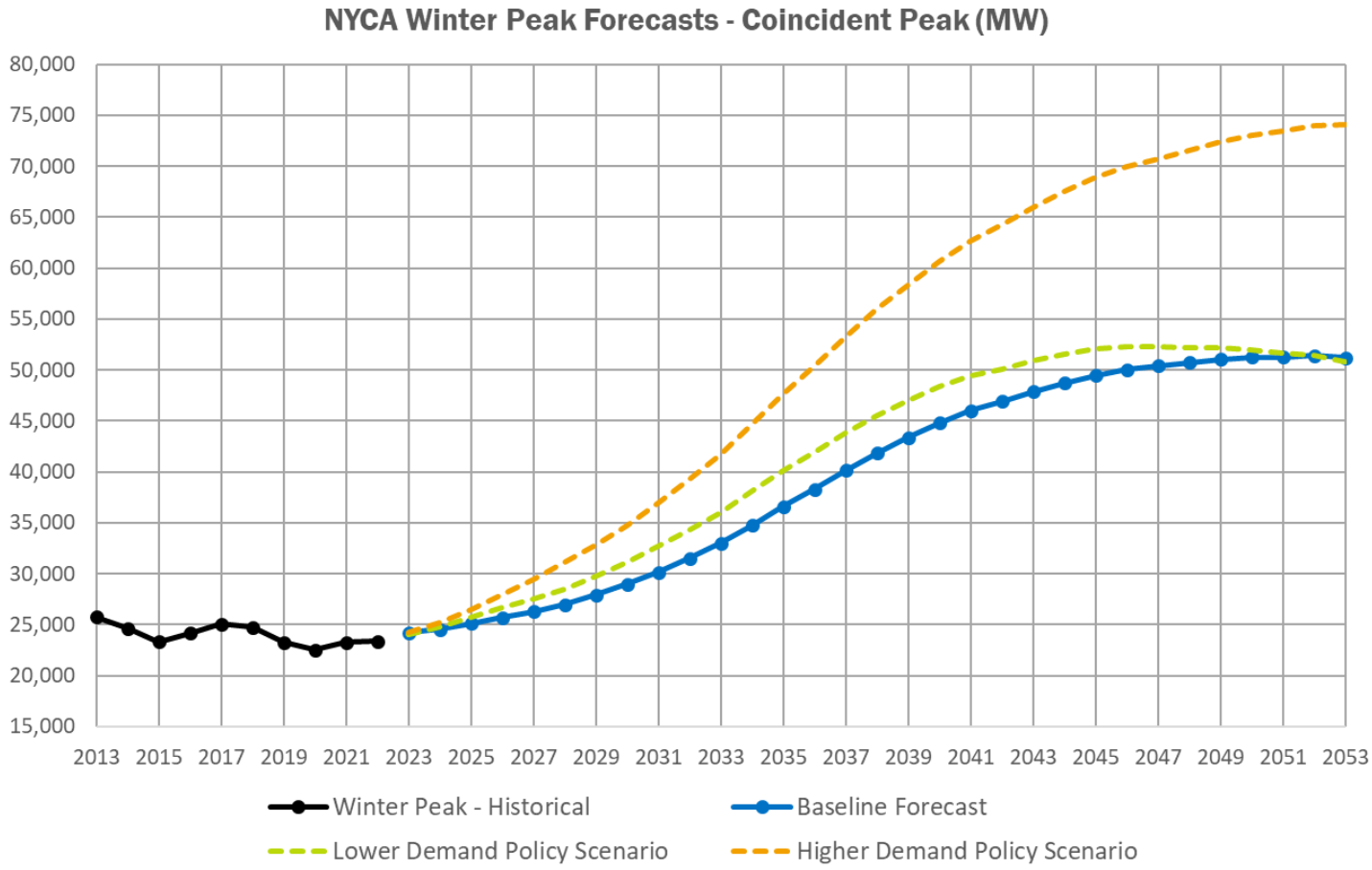

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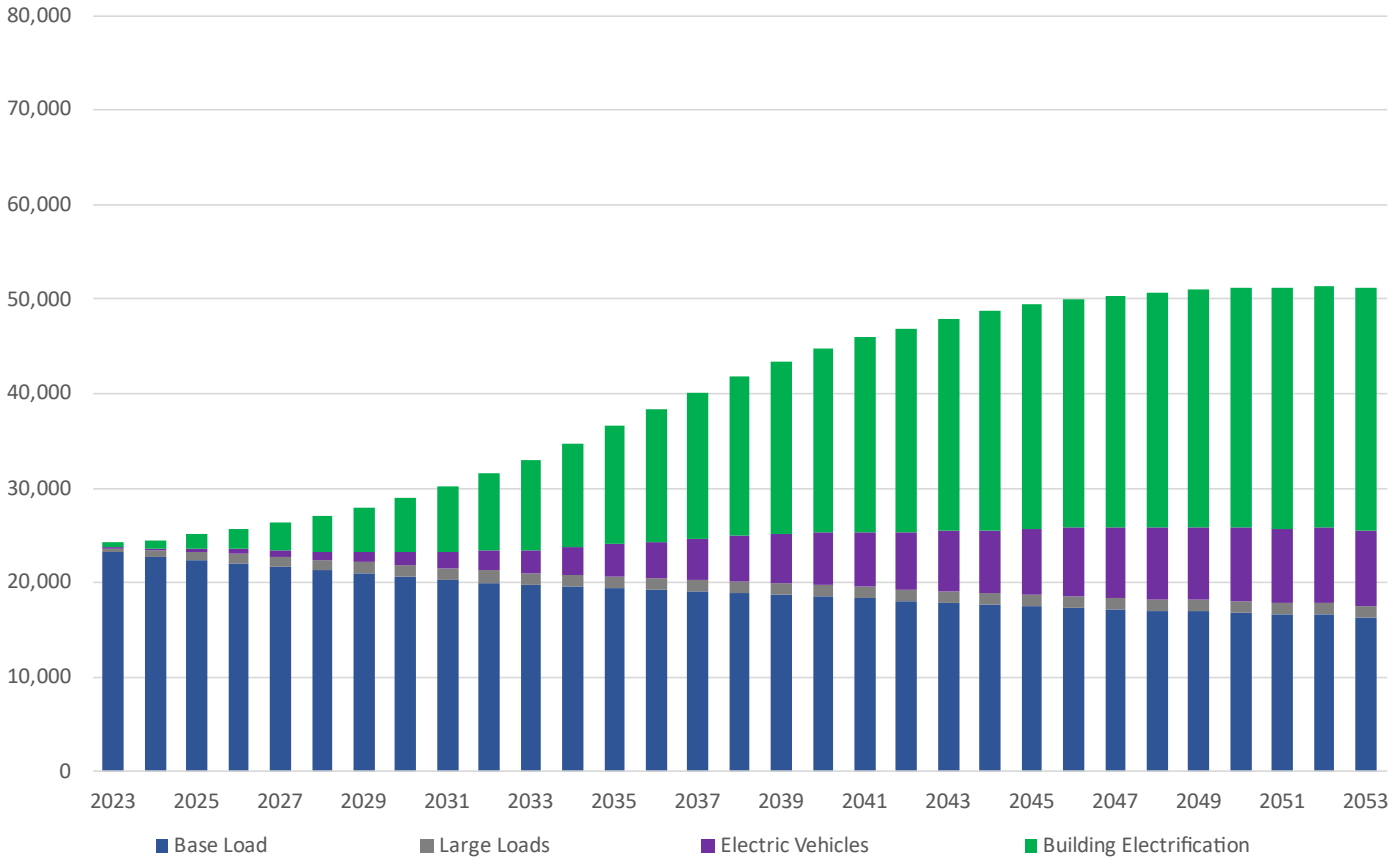
NYCA Baseline Winter Peak Forecast Components- MW



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

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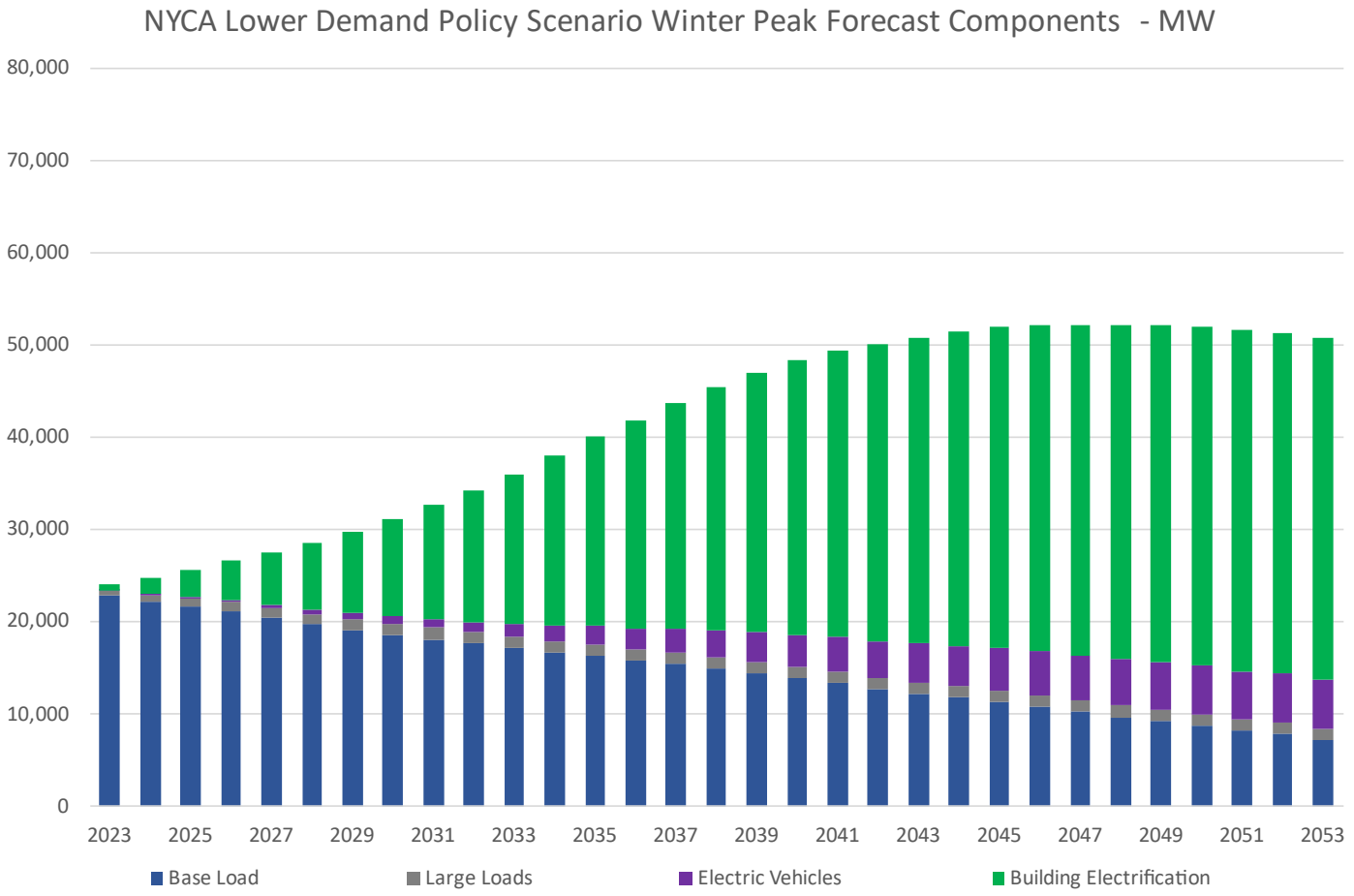

Note: Base load growth includes reductions due to BTM distributed generation, BTM energy storage, energy efficiency, and temperature trends.

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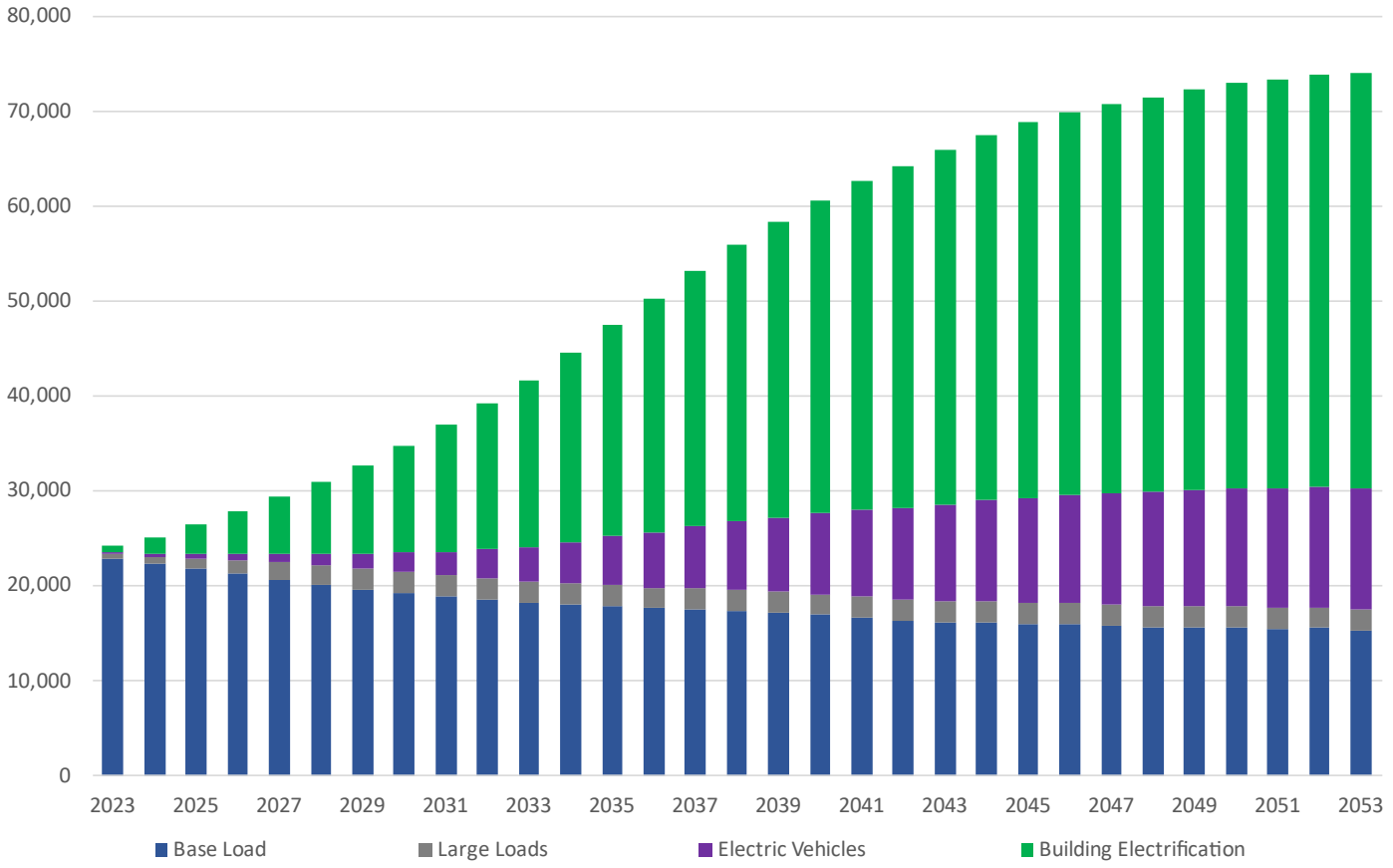
NYCA Higher Demand Policy Scenario Winter Peak Forecast Components - MW



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

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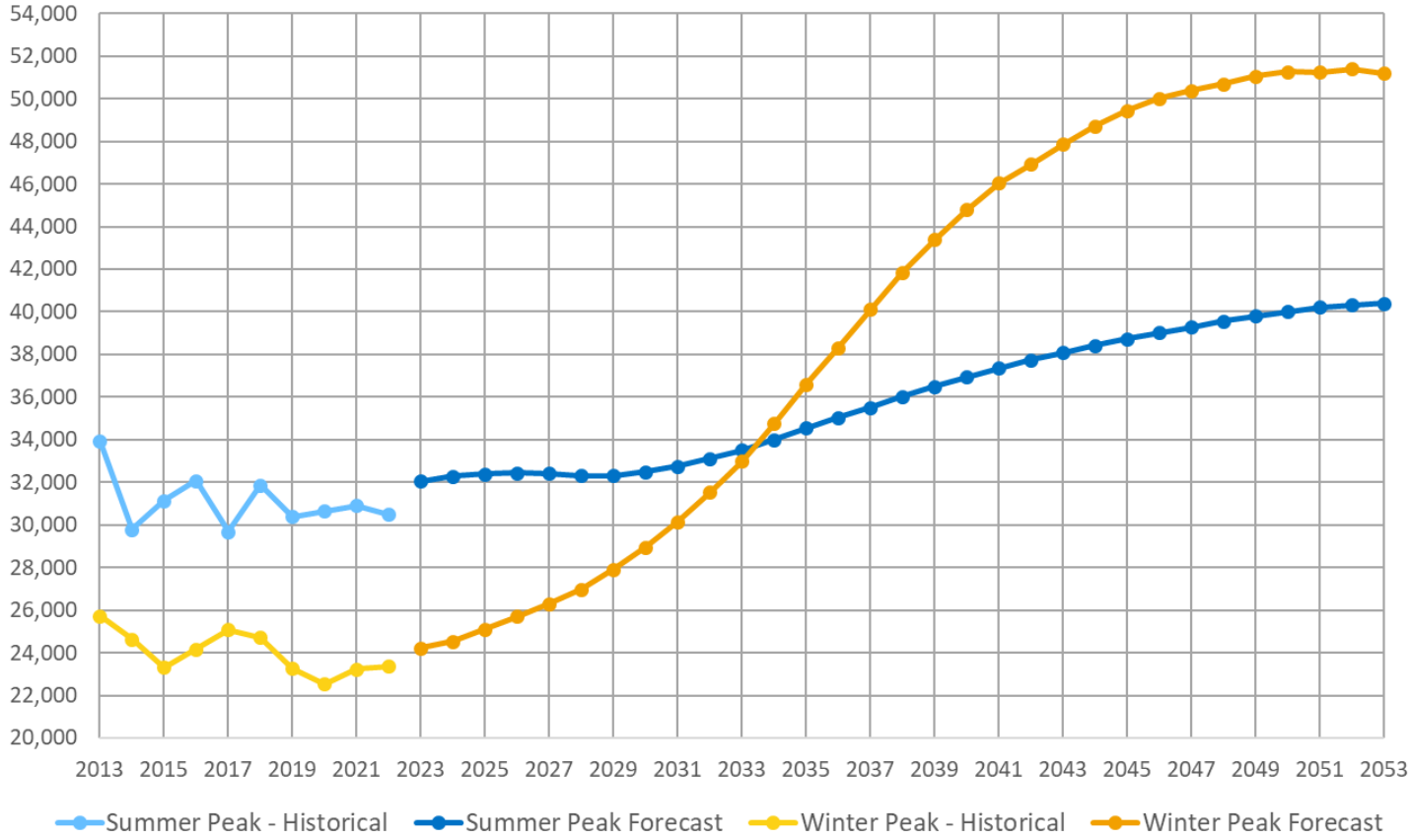
NYCA Baseline Peak Forecast Comparison - Coincident Peak (MW)



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2023 Gold Book
Area Forecast Summaries

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Notes for Area Forecast Summary Graphs

- Historical energy and peak values reflect actual experienced weather conditions, and are not weather normalized.
- Forecasted energy and peak values reflect expected trended weather conditions.
- Expected weather conditions include an increasing temperature trend from the NYISO *Climate Impact Study Phase I* report.
- Historical peak values include demand response reductions when called. Forecast peak values assume no demand response reductions.
- Con Edison and Orange & Rockland design their peak forecasts at the 67th percentile. Other Transmission Owners design their peak forecasts at the 50th percentile. As a result, the aggregate statewide peak forecast is designed at 57th percentile weather conditions.

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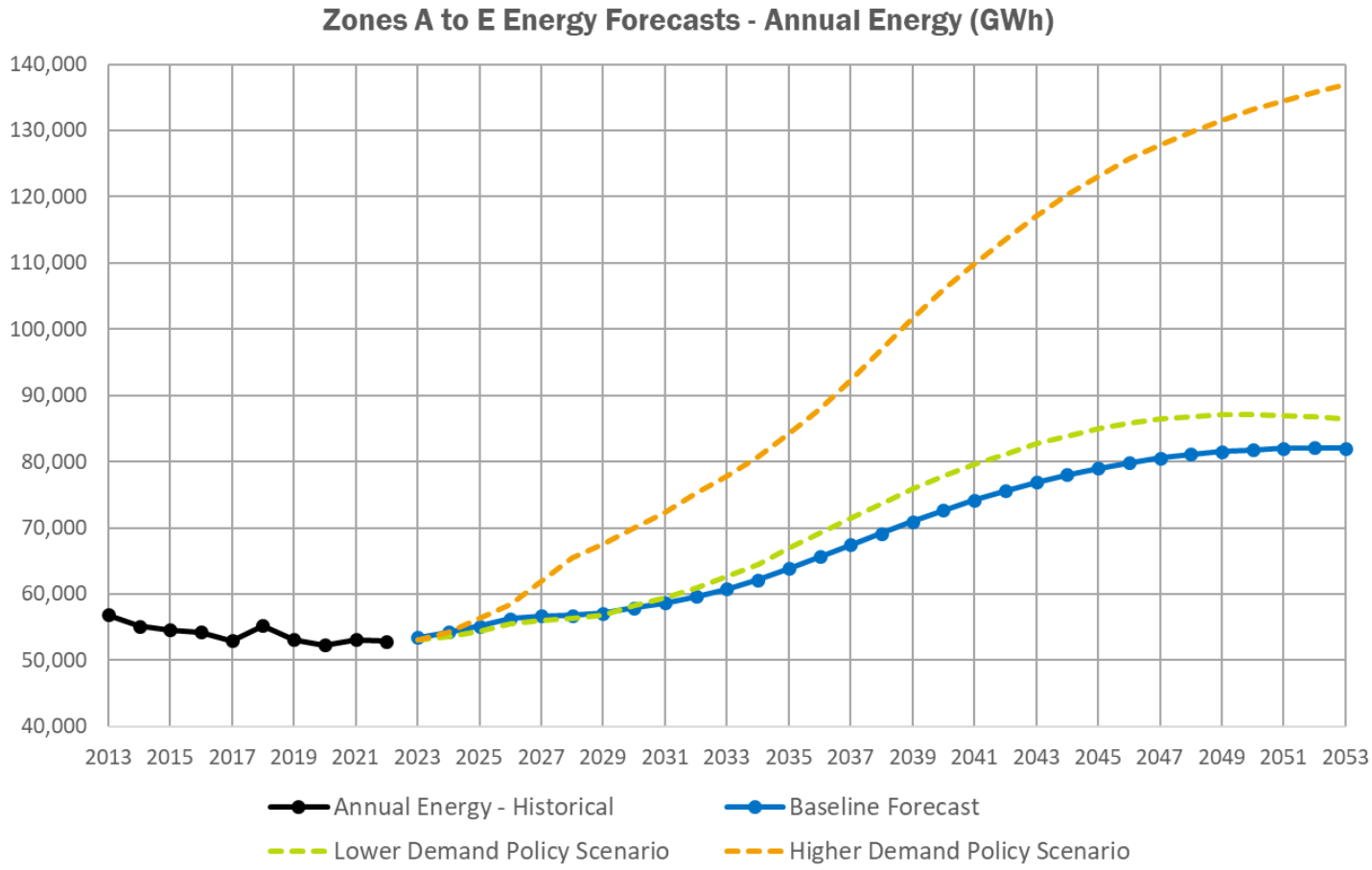

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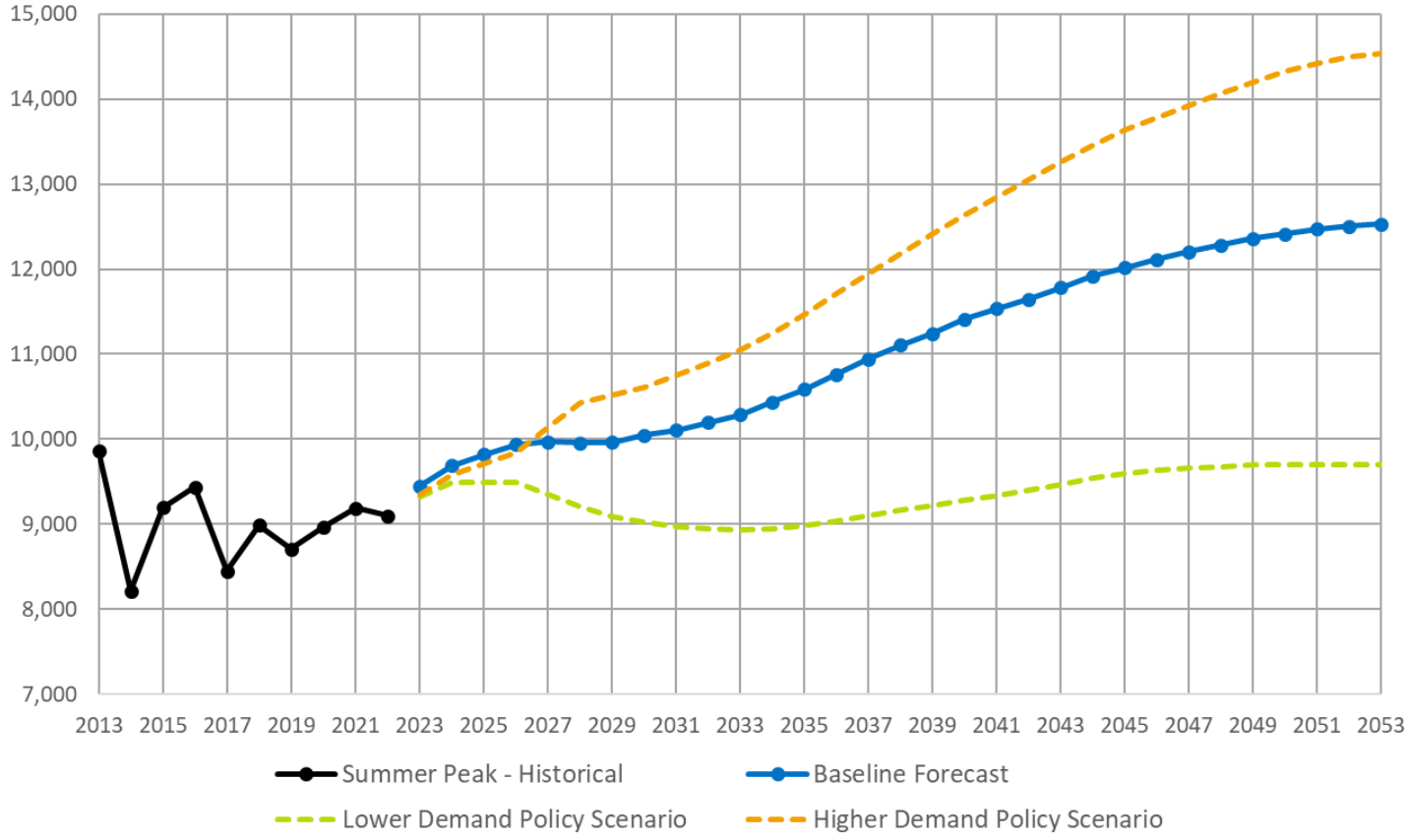
Zones A to E Summer Peak Forecasts - Coincident Peak (MW)



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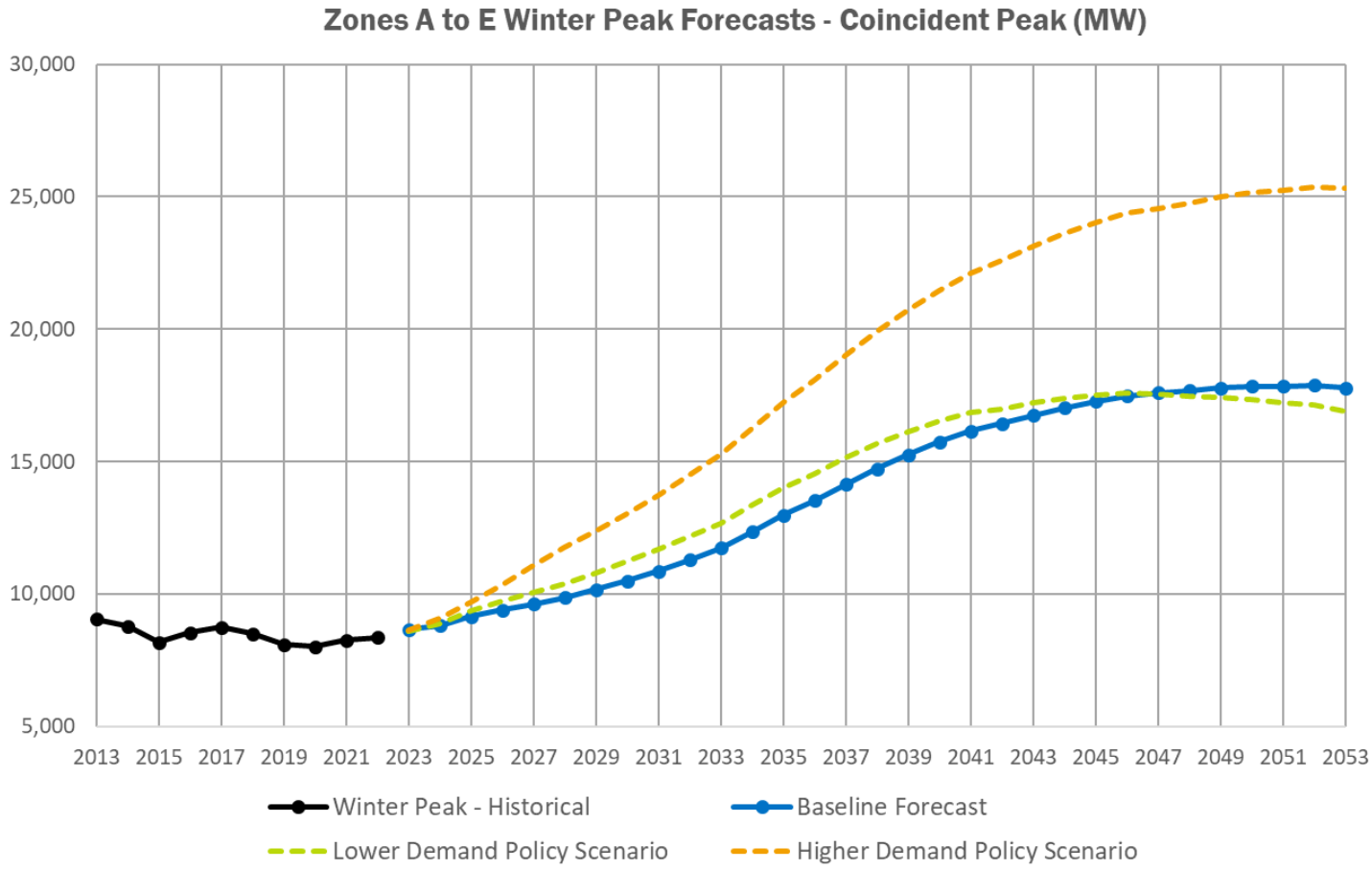

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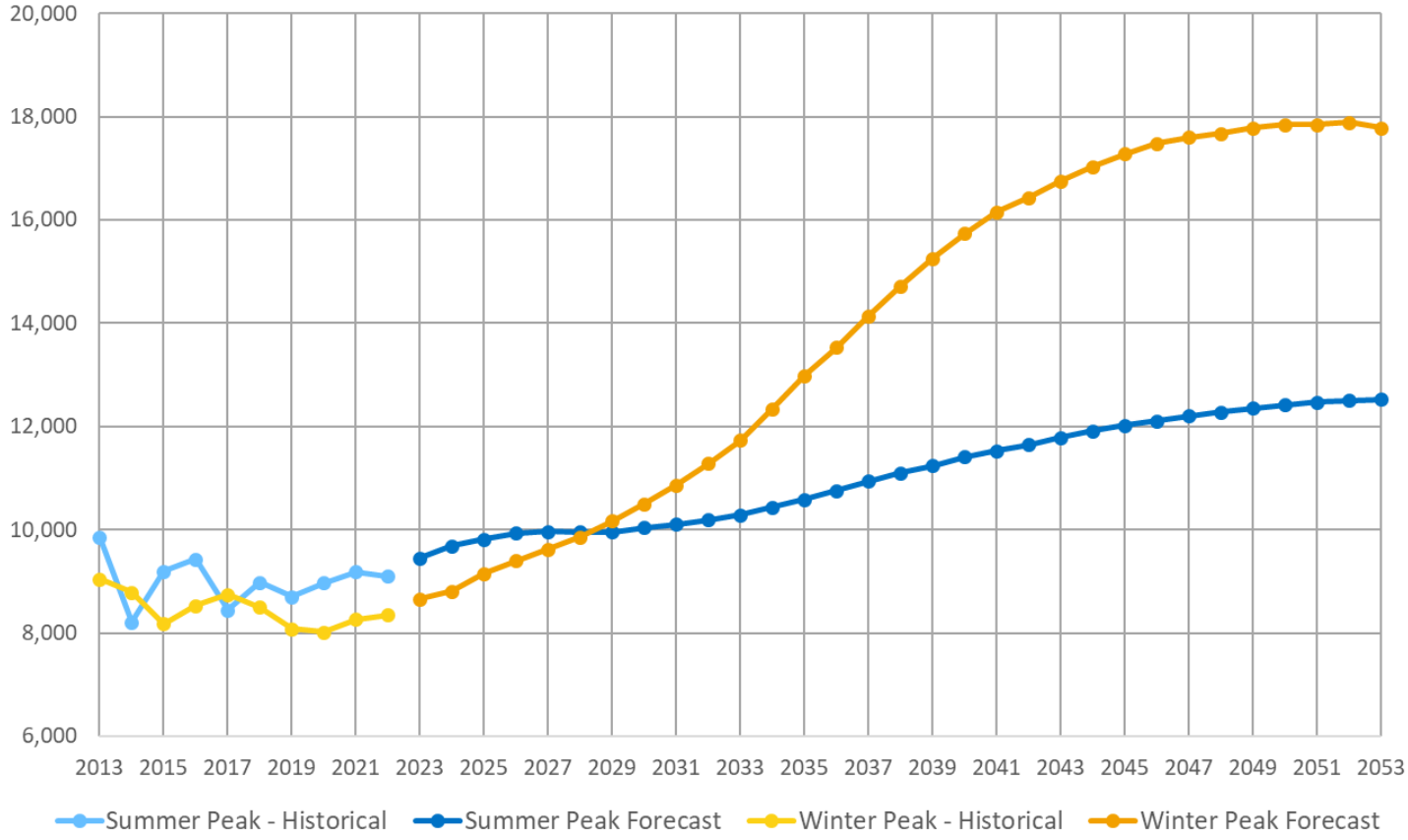
Zones A to E Baseline Peak Forecast Comparison - Coincident Peak (MW)



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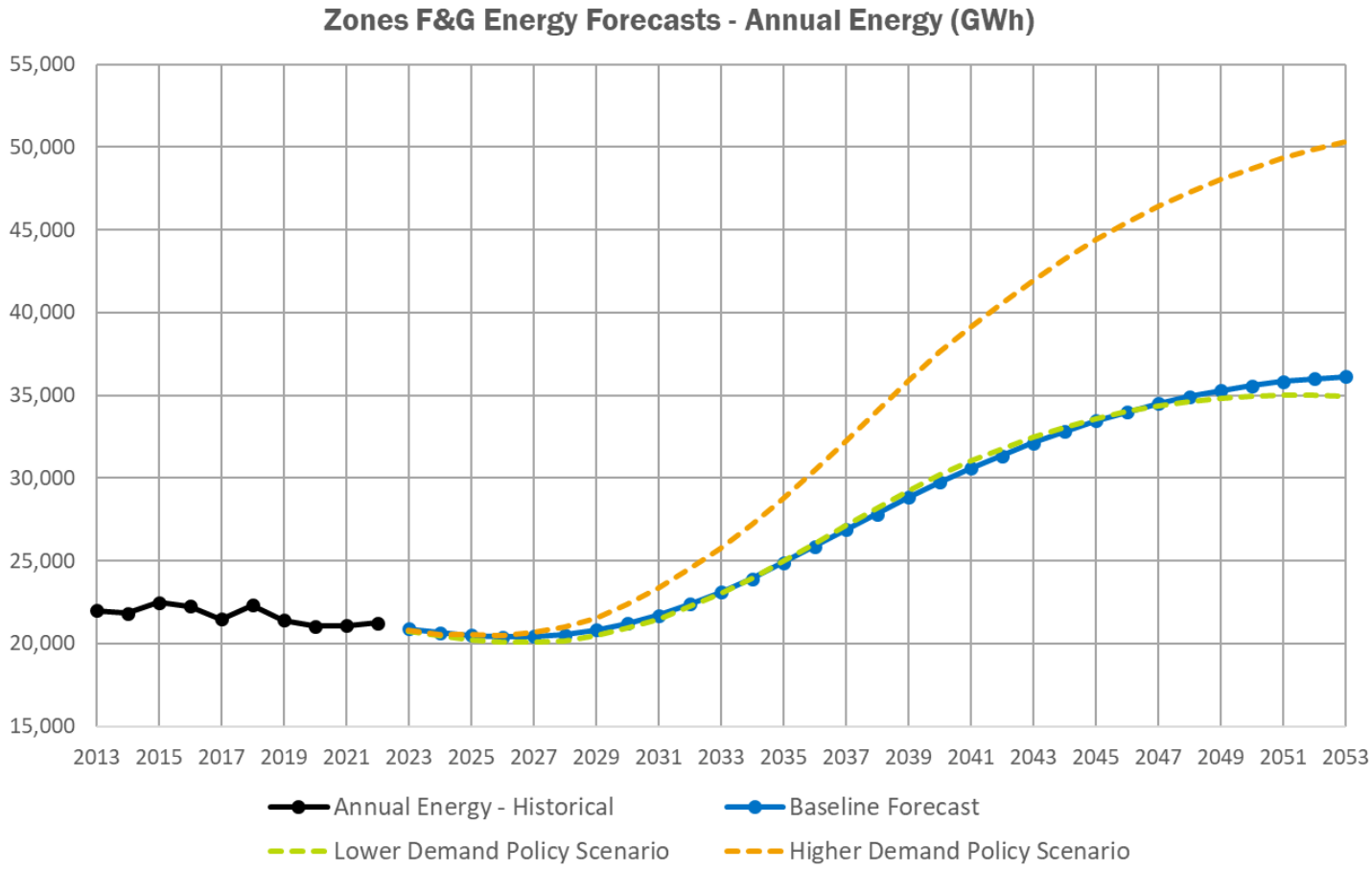

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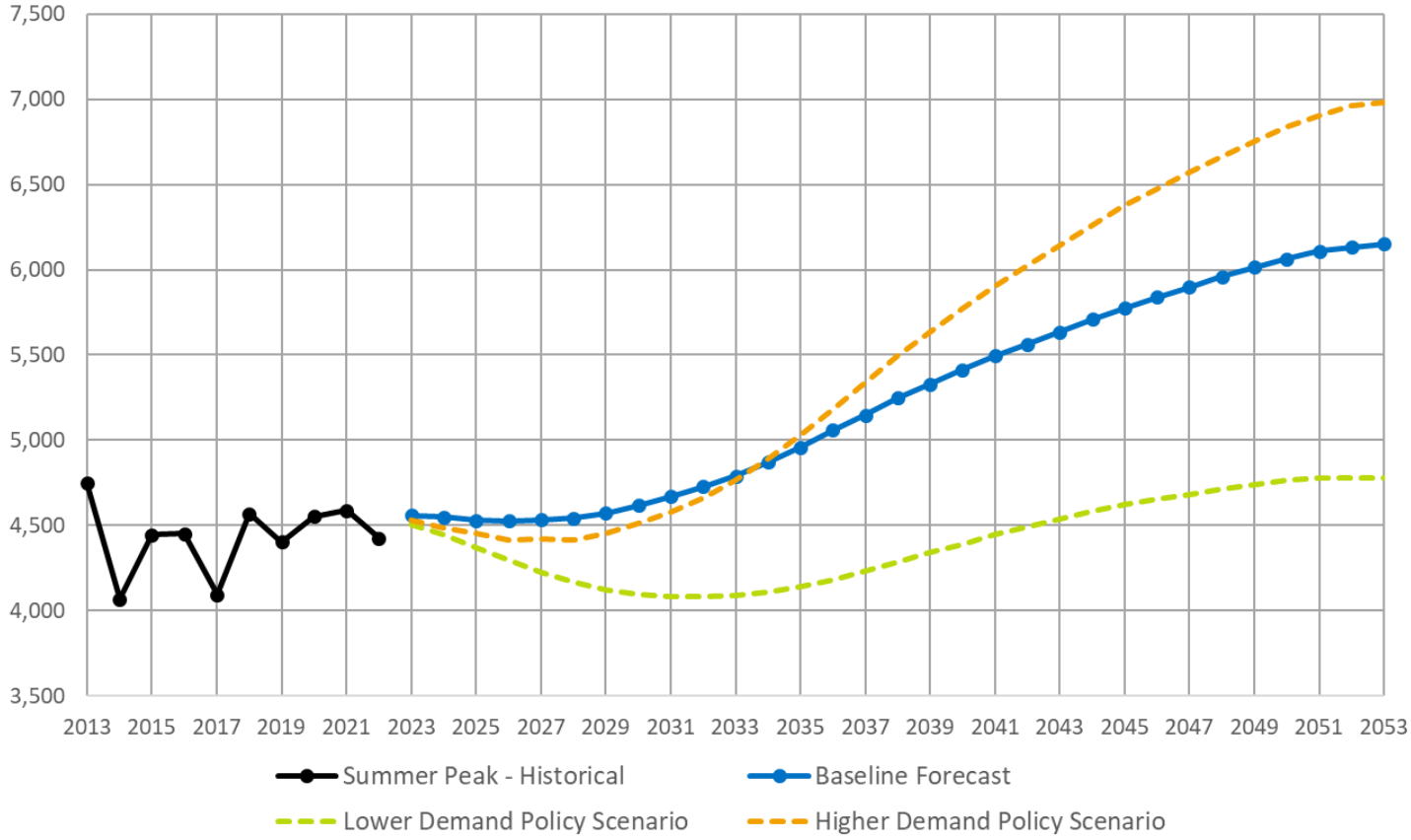
Zones F&G Summer Peak Forecasts - Coincident Peak (MW)



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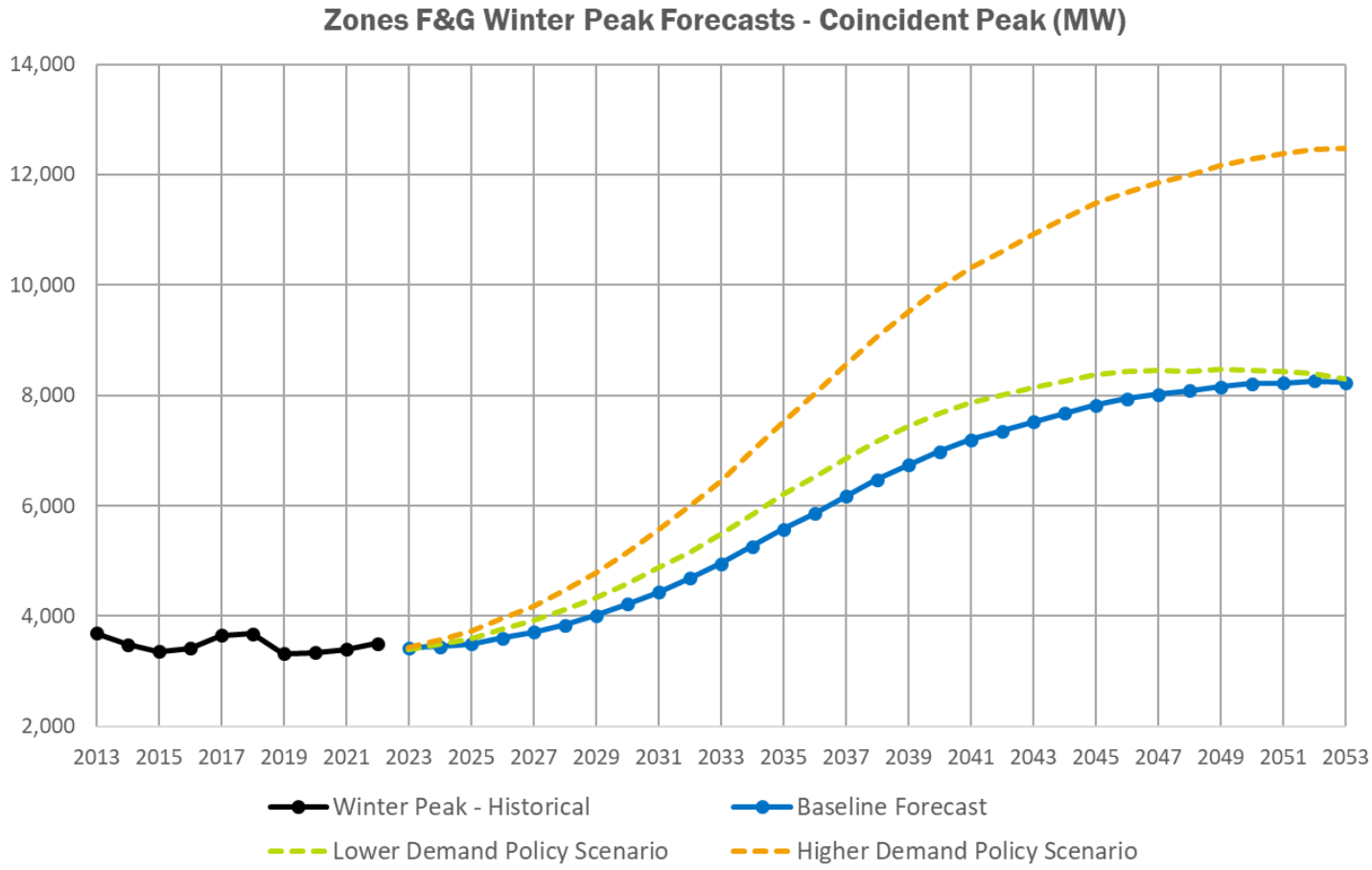

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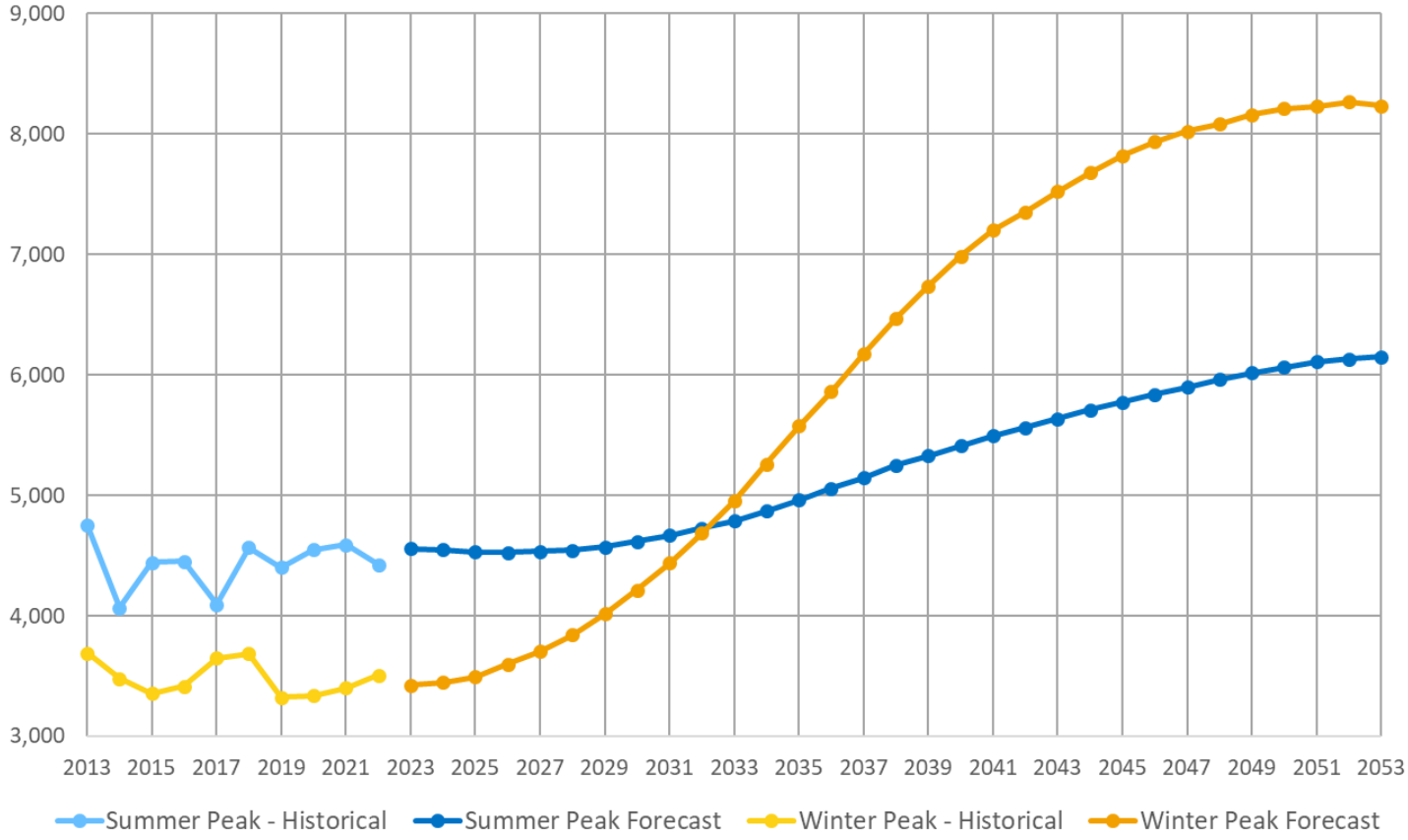
Zones F&G Baseline Peak Forecast Comparison - Coincident Peak (MW)



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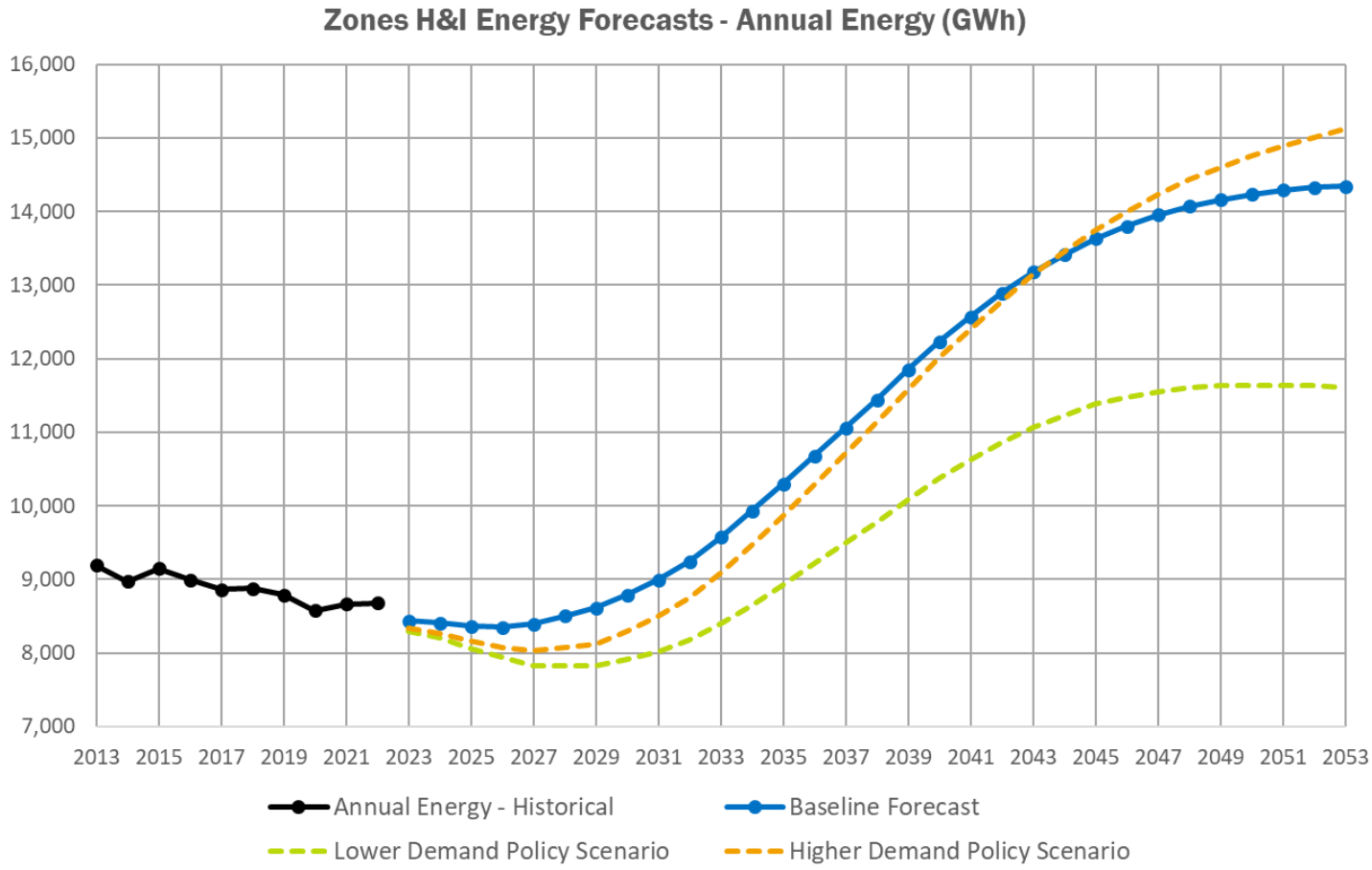

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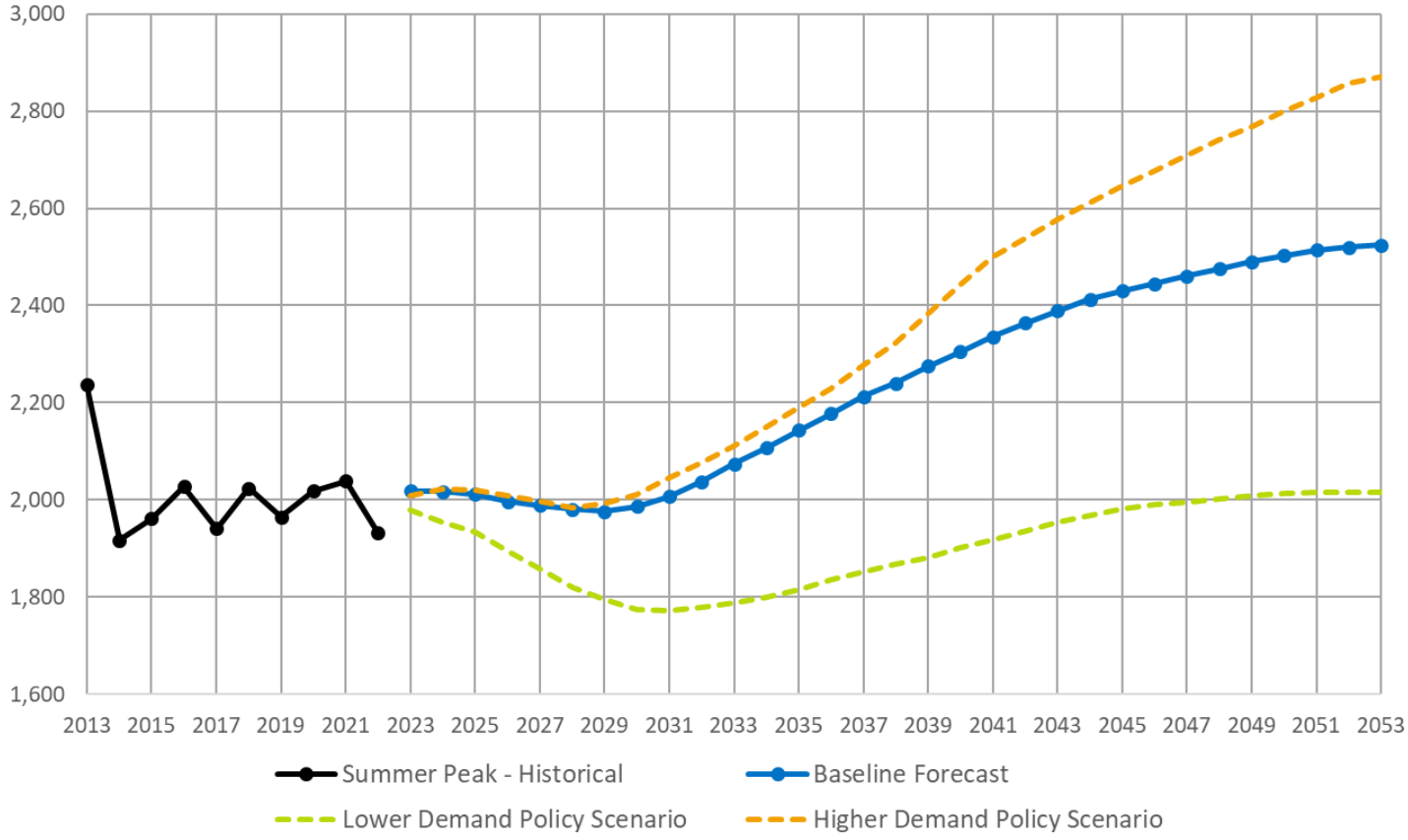
Zones H&I Summer Peak Forecasts - Coincident Peak (MW)



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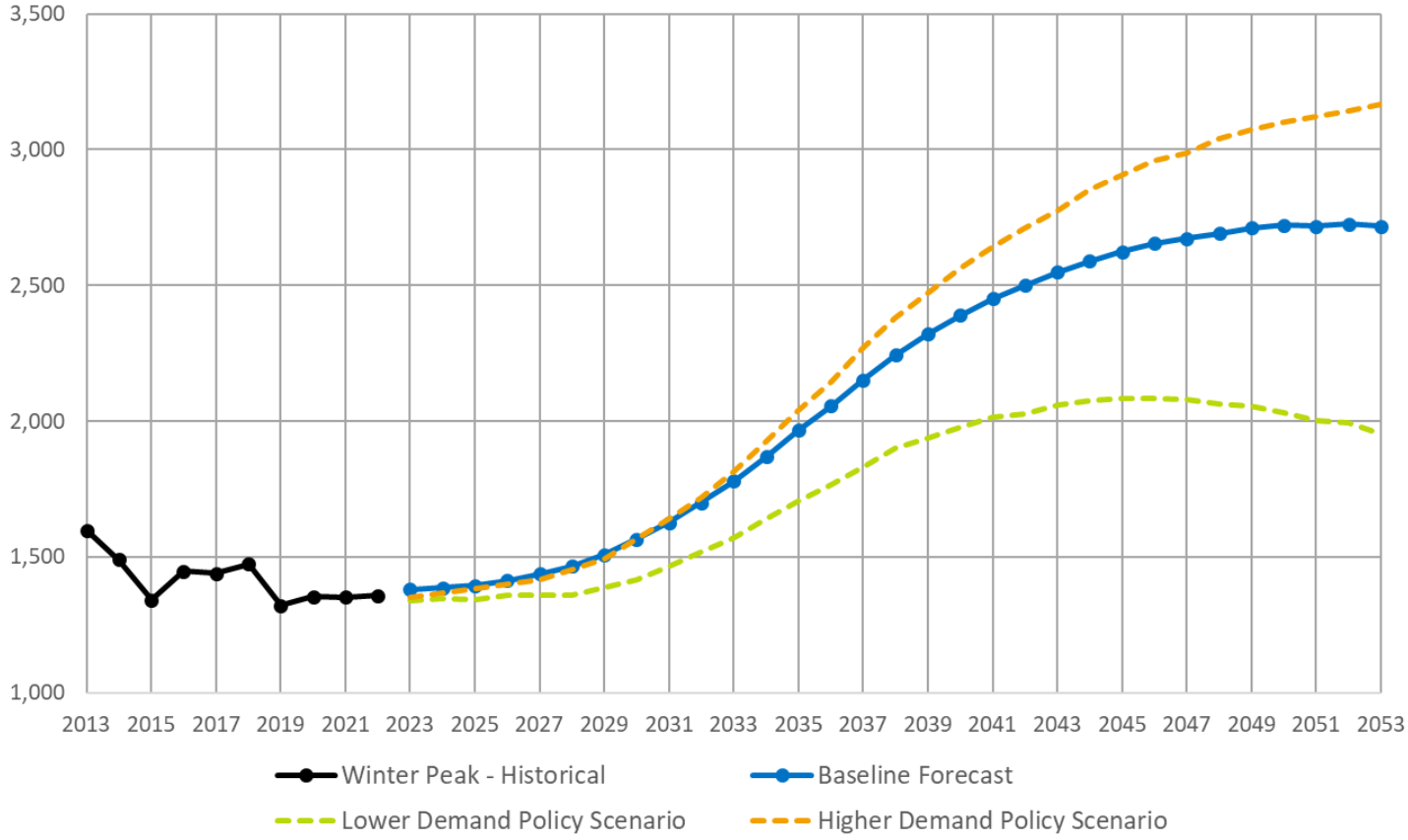
Zones H&I Winter Peak Forecasts - Coincident Peak (MW)



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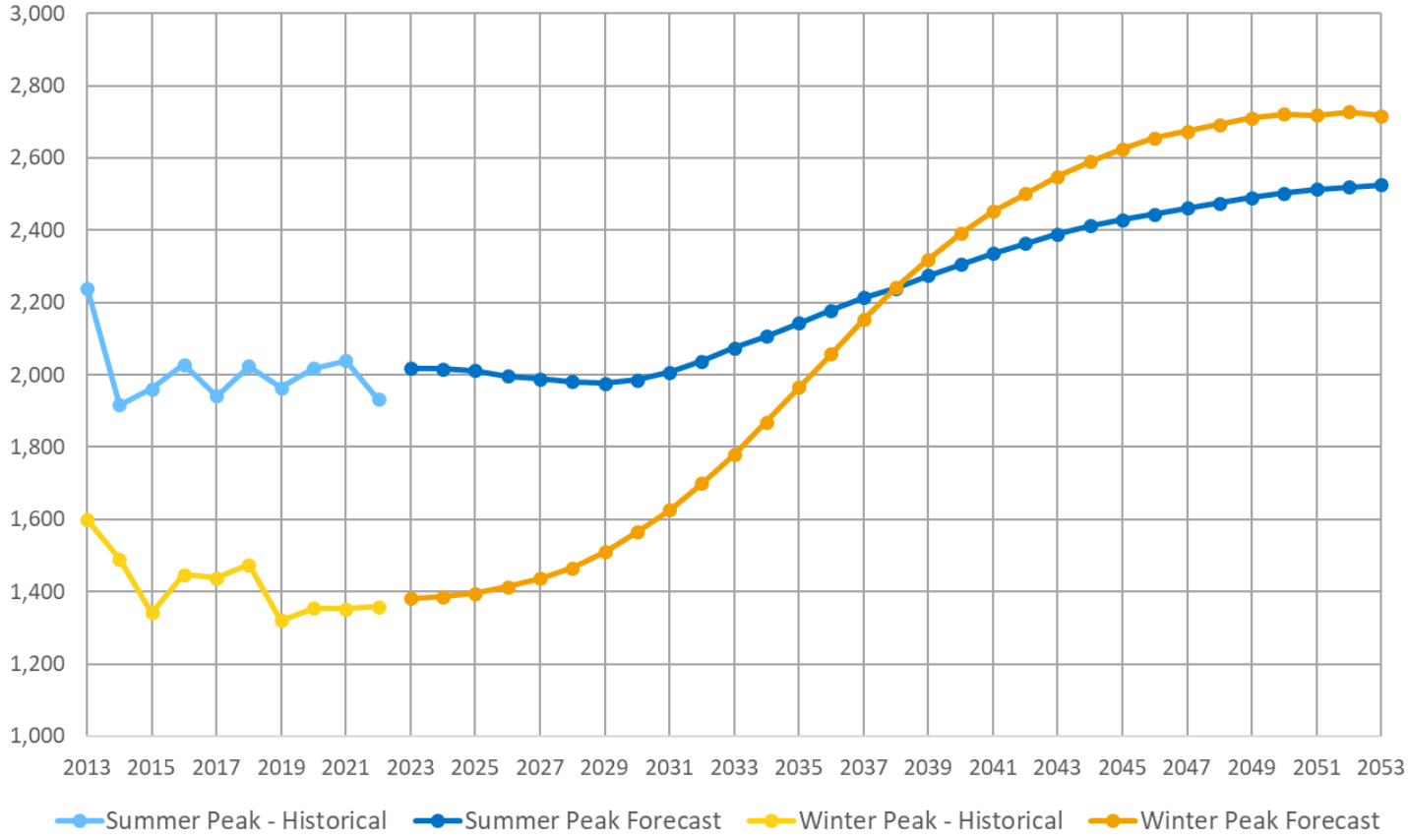
Zones H&I Baseline Peak Forecast Comparison - Coincident Peak (MW)



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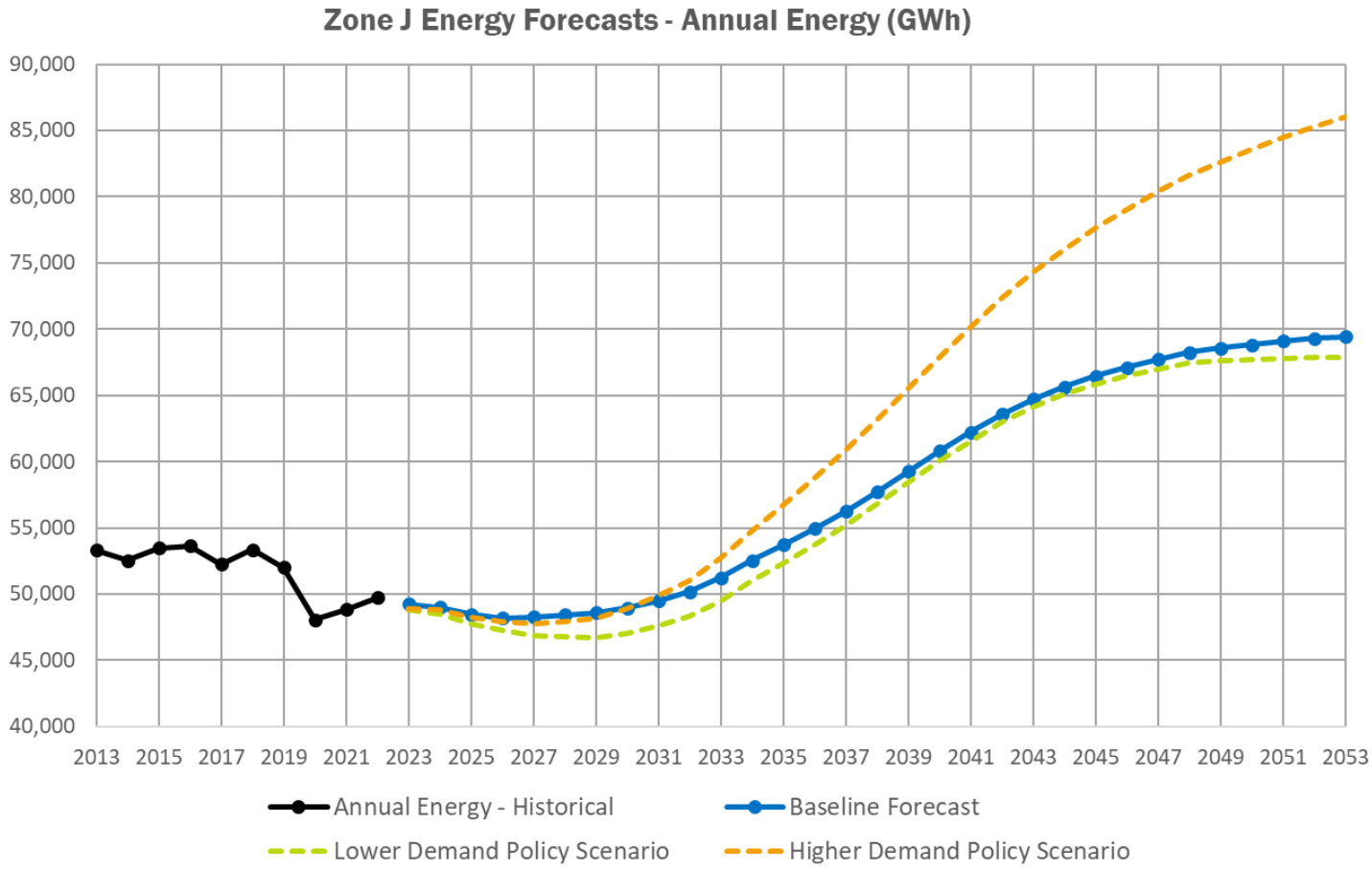

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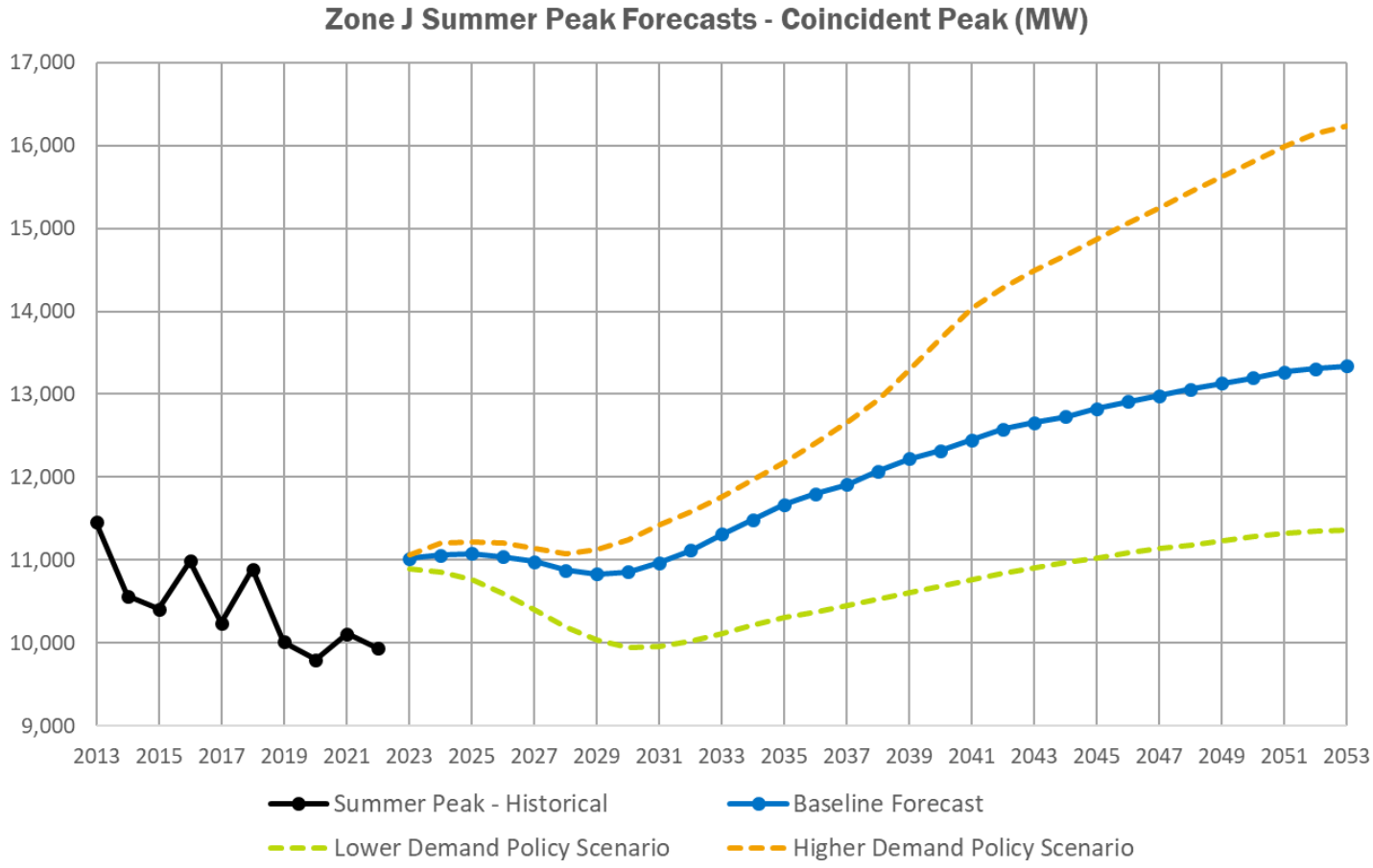

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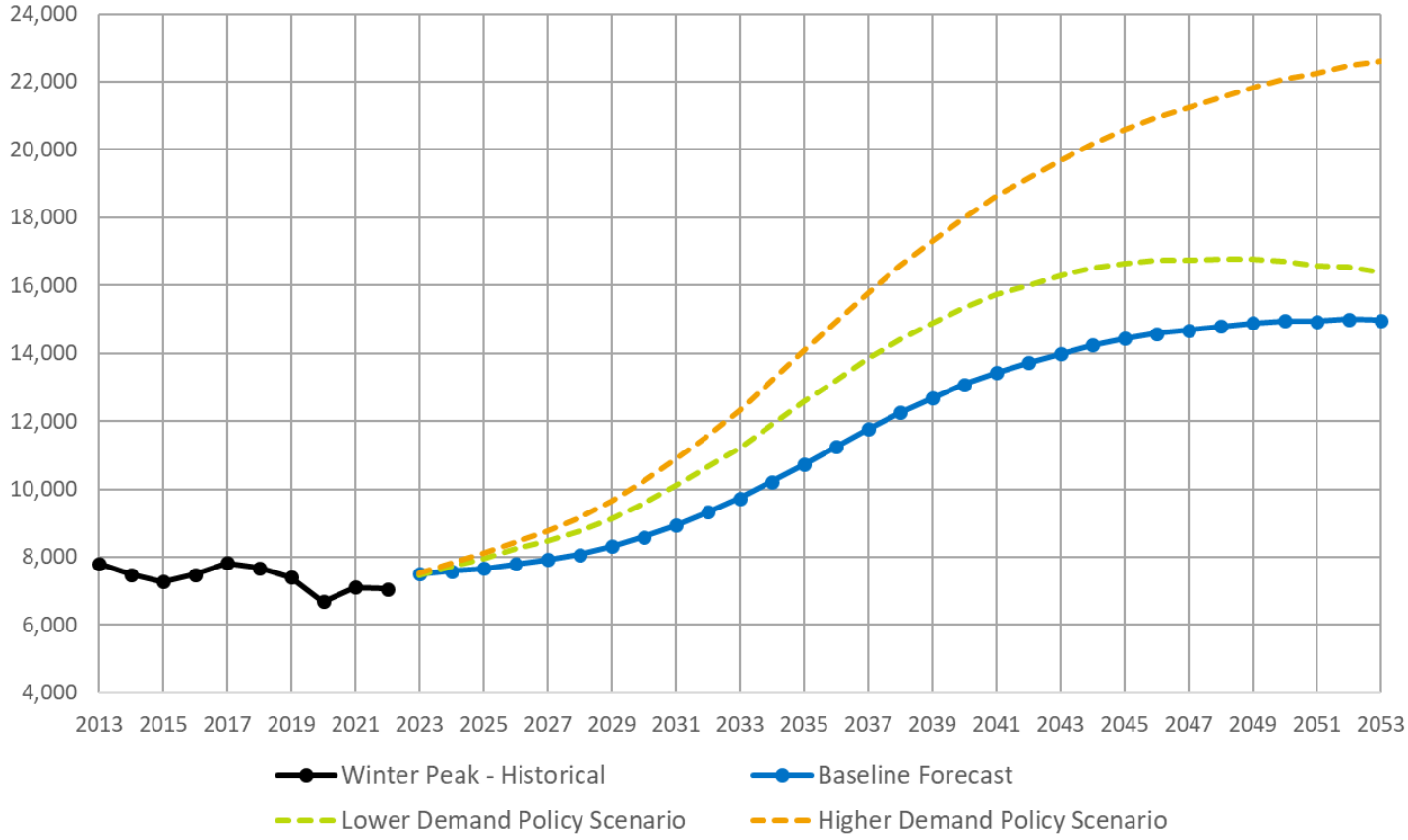
Zone J Winter Peak Forecasts - Coincident Peak (MW)



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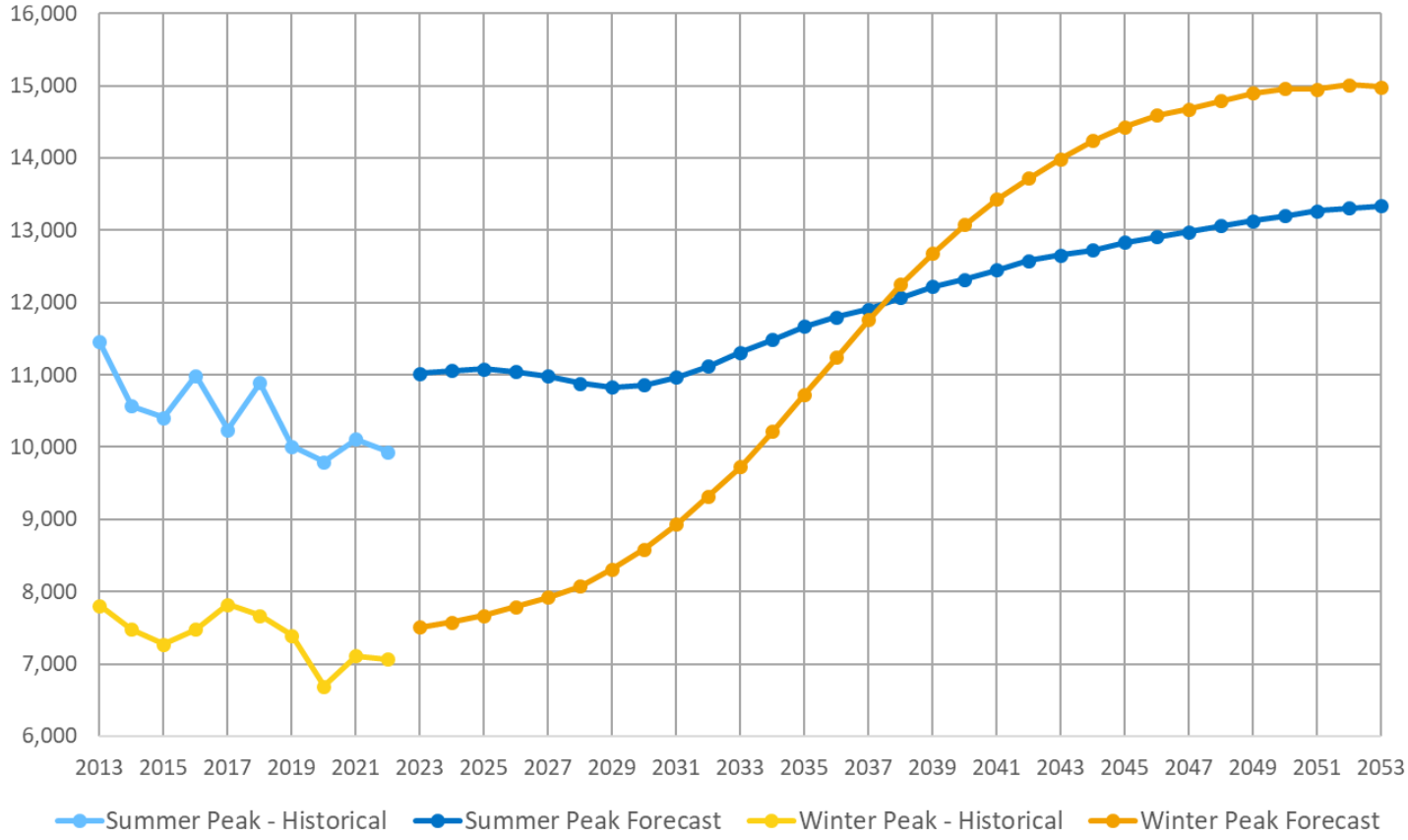
Zone J Baseline Peak Forecast Comparison - Coincident Peak (MW)



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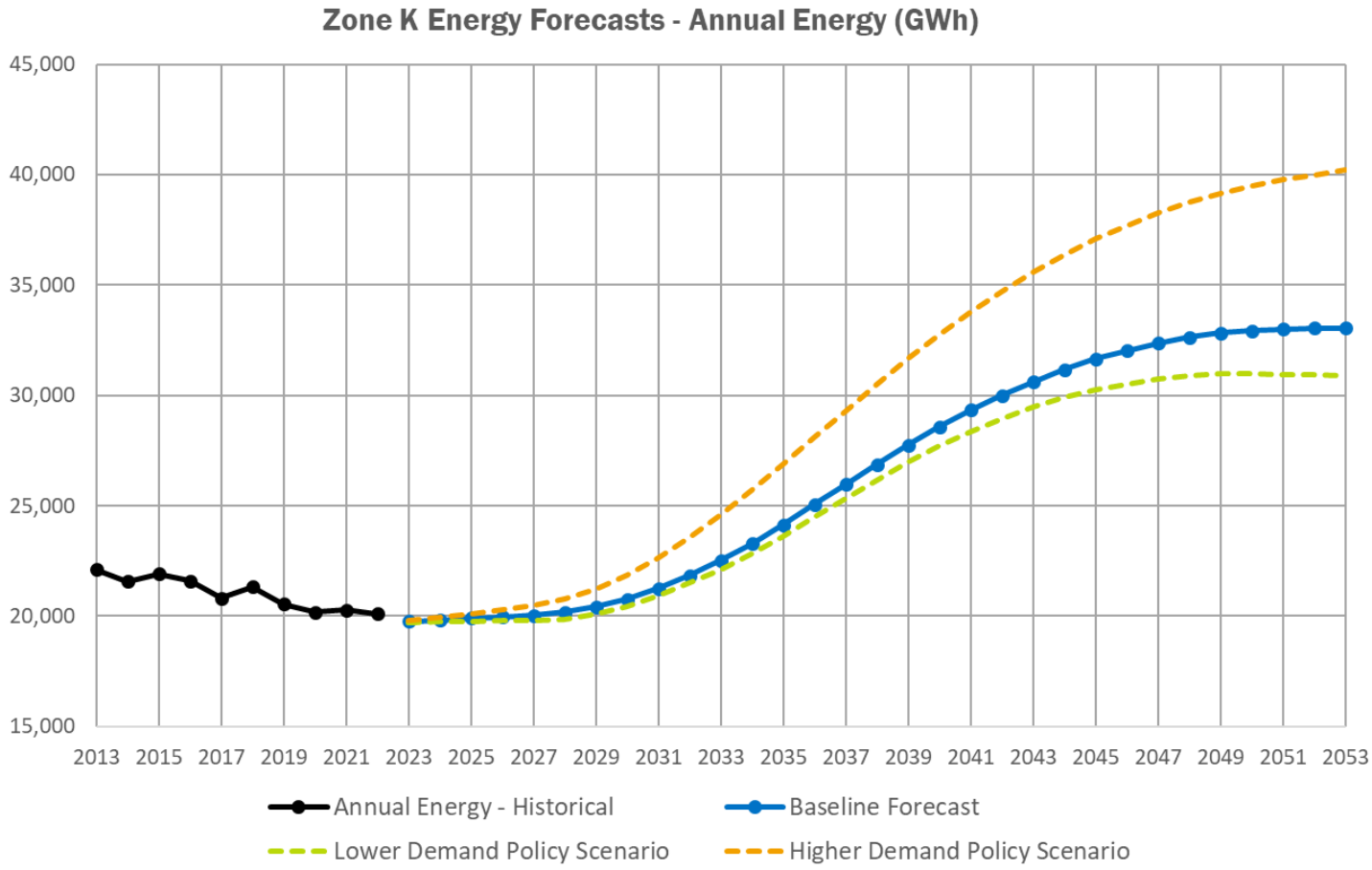

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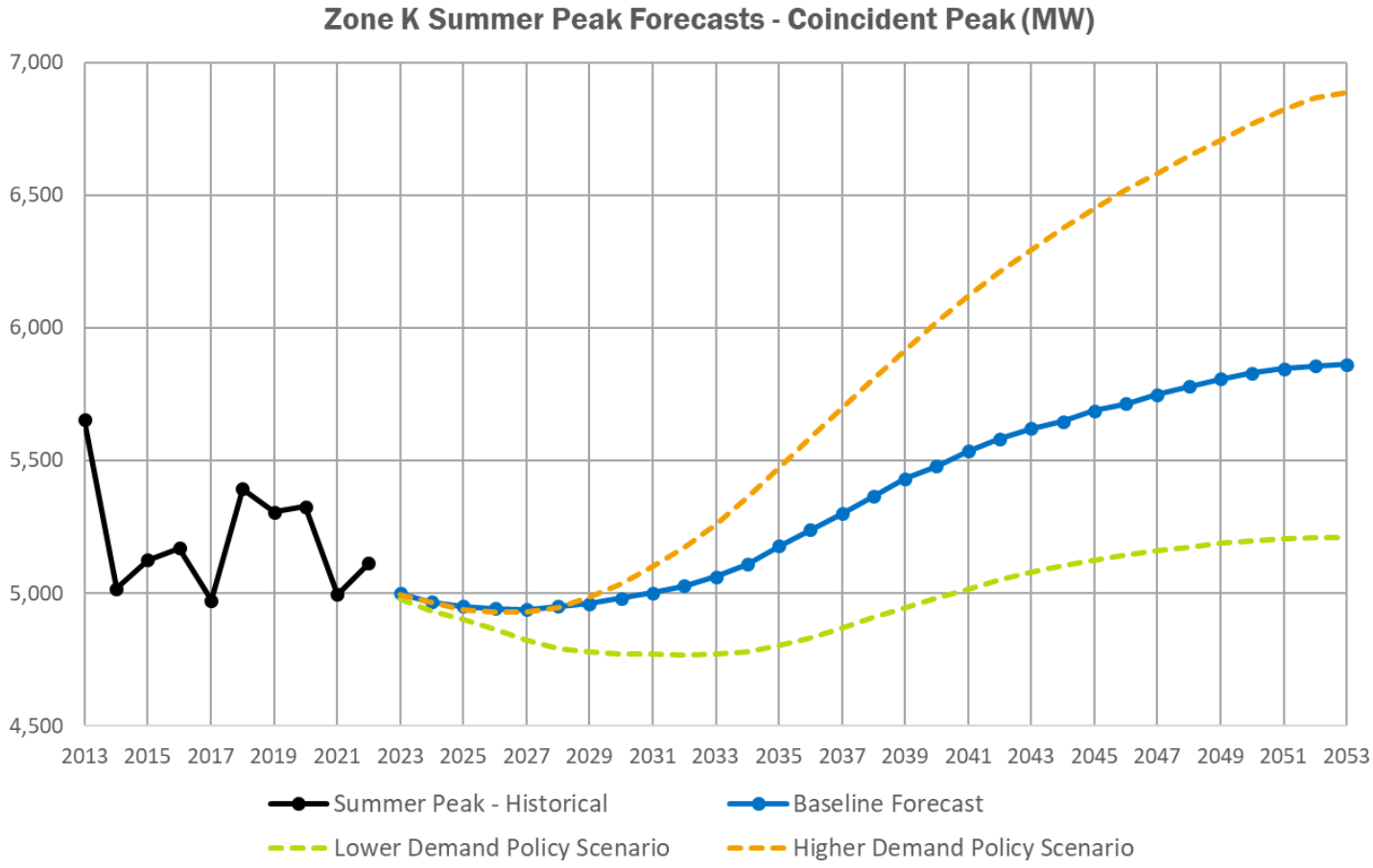

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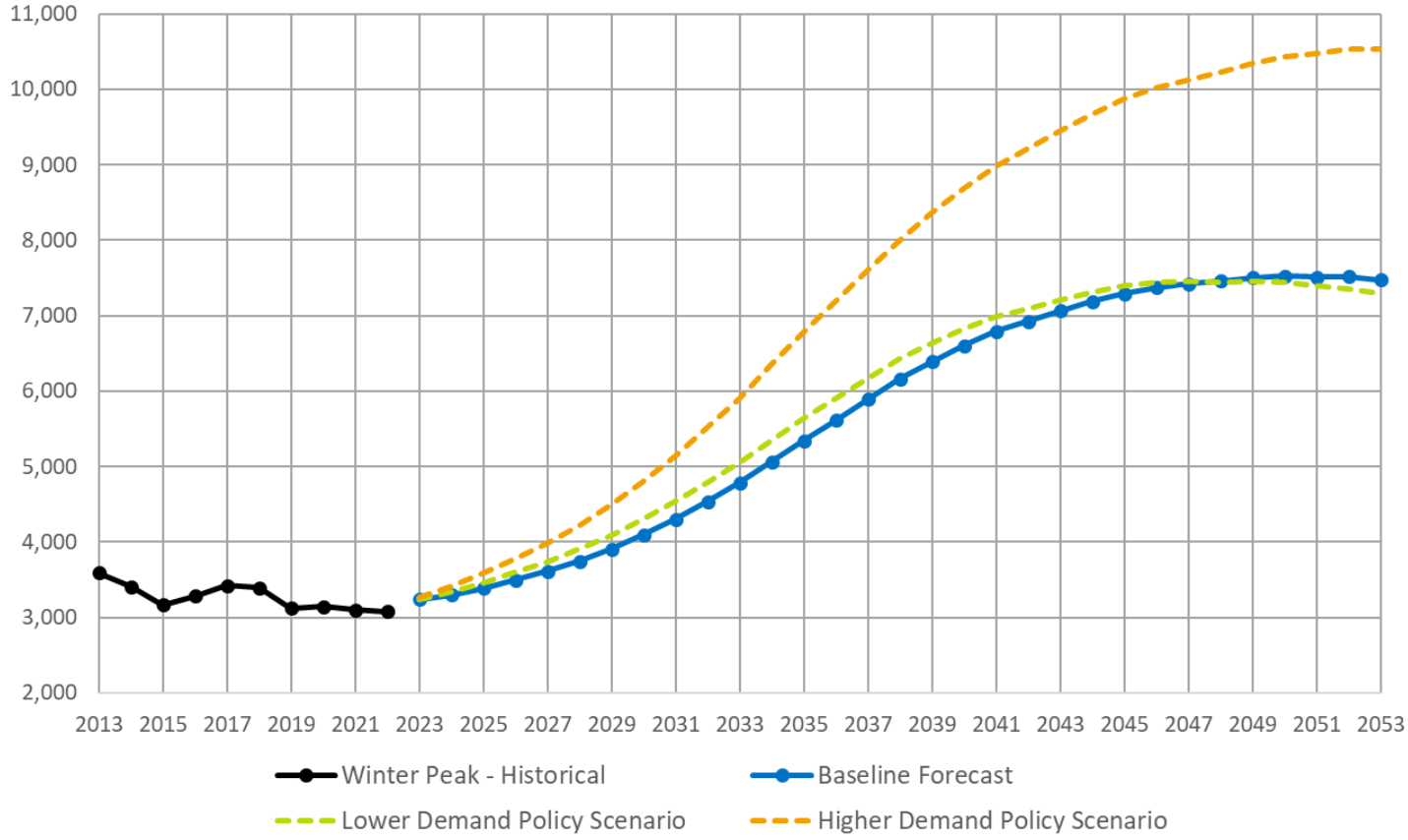
Zone K Winter Peak Forecasts - Coincident Peak (MW)



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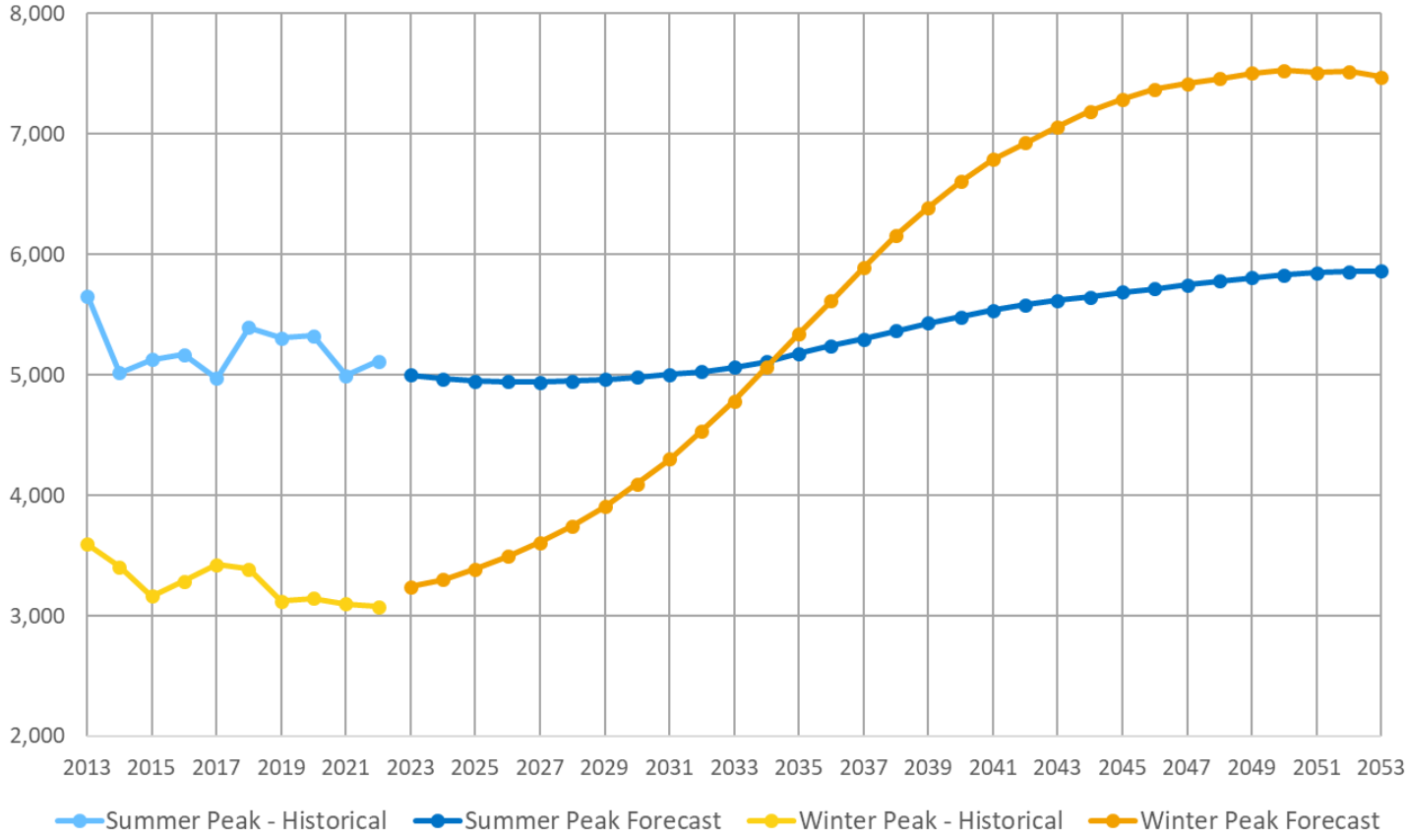
Zone K Baseline Peak Forecast Comparison - Coincident Peak (MW)



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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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