New York ISO
Independent System Operator

2022-26 RS-1 Budget Forecast

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RS-1 Forecast Methodology

- **Net Energy**
  - Based on end-use energy models, net of transmission losses, with adjustments. Through July 2021, actual net energy is ahead of the 2021 budget forecast.
  - 2021 through 2026 net energy forecast values generally reflect the Gold Book energy forecast, with adjustments for recent trends and updated economic forecasts. Actual energy usage through July has been incorporated into the updated Net Energy forecast.
- **Wheels and Exports**
  - Forecast levels are determined by judgment and a statistical analysis of recent history. Through July 2021, actual wheels are significantly ahead of the 2021 budget forecast, and actual exports are slightly ahead of forecast.

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Energy Forecast Update

- The 2021 Gold Book NYCA total energy forecast was evaluated against current total energy trends. The forecast is tracking well, with weather-adjusted energy through July 2021 slightly ahead of forecast (within 0.5%).
- The Transmission District level Statistically Adjusted End-use (SAE) models used in the Gold Book were updated, with the estimation including actual weather and load data through July 2021, along with the updated Moody's economic forecast delivery from April 2021.
- The updated models resulted in a slight increase in projected total energy across the RS-1 forecast years (less than 0.4%).
- The Gold Book annual energy forecast was revised slightly upward to account for these factors.

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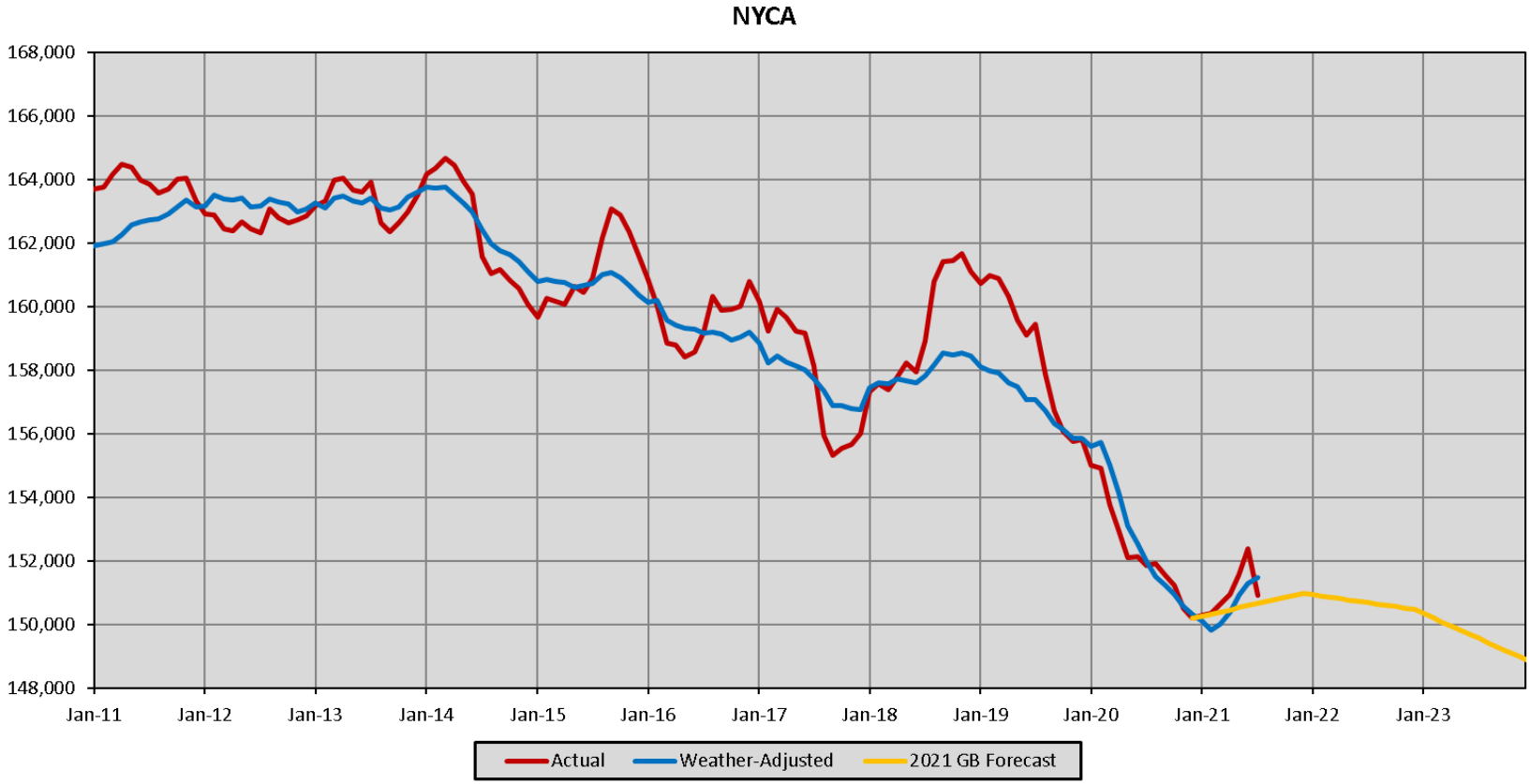
Total Energy GWh 12-Month Moving Sum - NYCA



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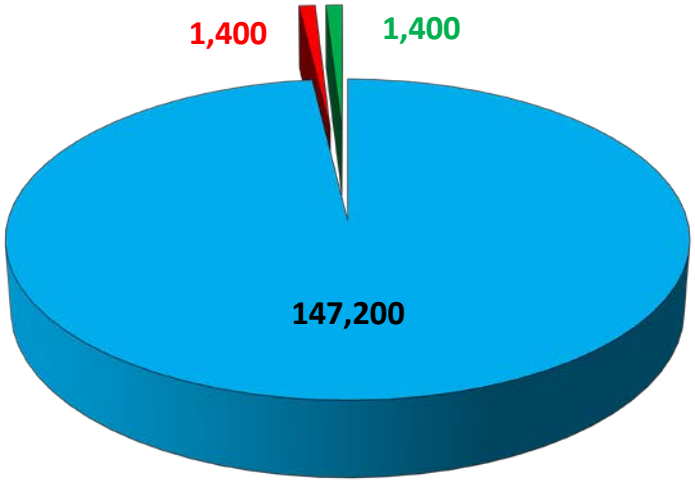
2022 RS-1 Budget Forecast Components

2022 RS-1 Forecast (GWh)

Net Energy -	147,200 GWh
Exports -	1,400 GWh
Wheels -	1,400 GWh
TOTAL -	**150,000 GWh**
2021 RS-1 -	147,300 GWh



Percent of RS-1 Total		
Year	% Exports	% Wheels
2013	4.9%	0.7%
2014	6.2%	0.7%
2015	6.0%	0.9%
2016	1.6%	1.5%
2017	1.5%	1.5%
2018	1.4%	1.1%
2019	1.3%	0.9%
2020	1.1%	0.9%
2021	1.0%	1.4%
2022	0.9%	0.9%

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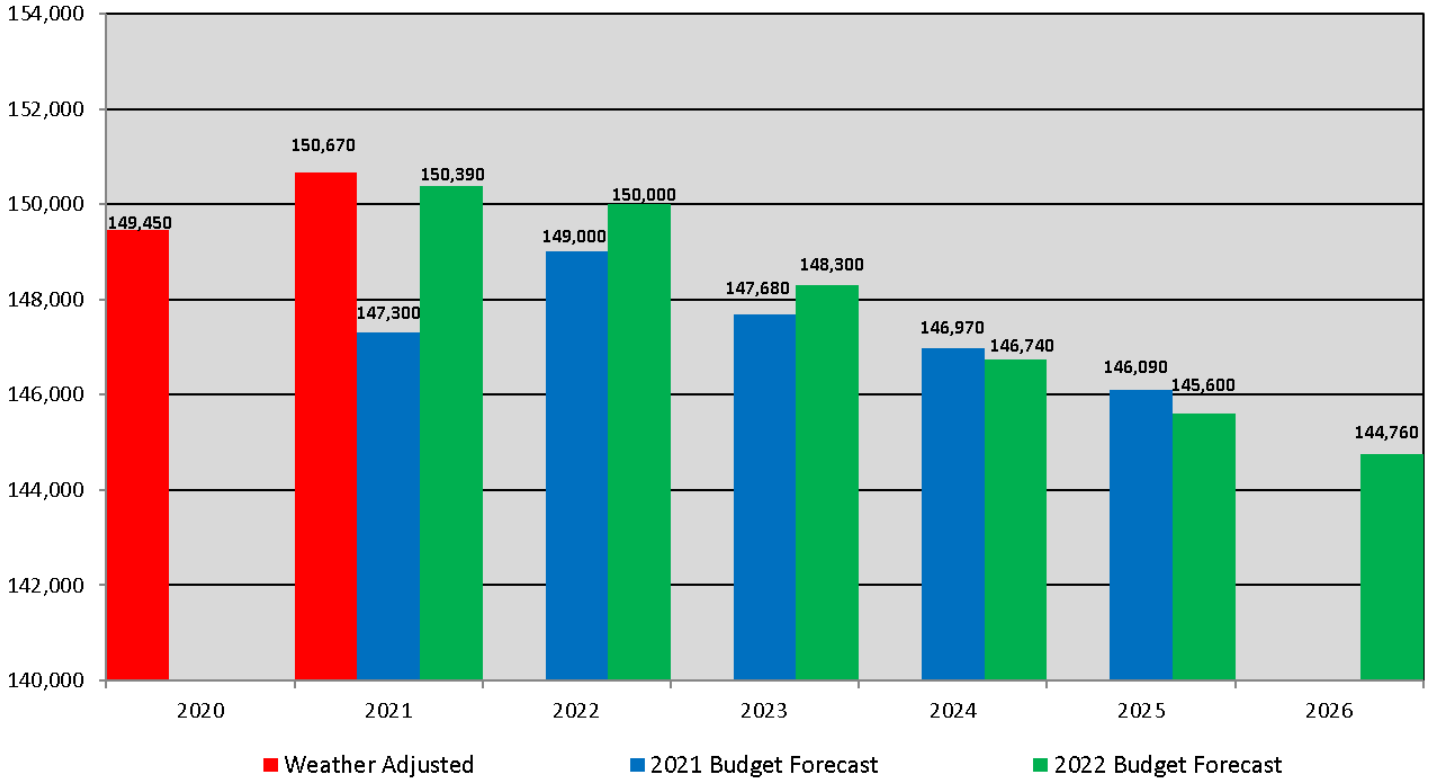
RS-1 Budget Forecast - GWh



Red 2021 bar represents weather adjusted loads through June plus updated budget outlook for rest of year.

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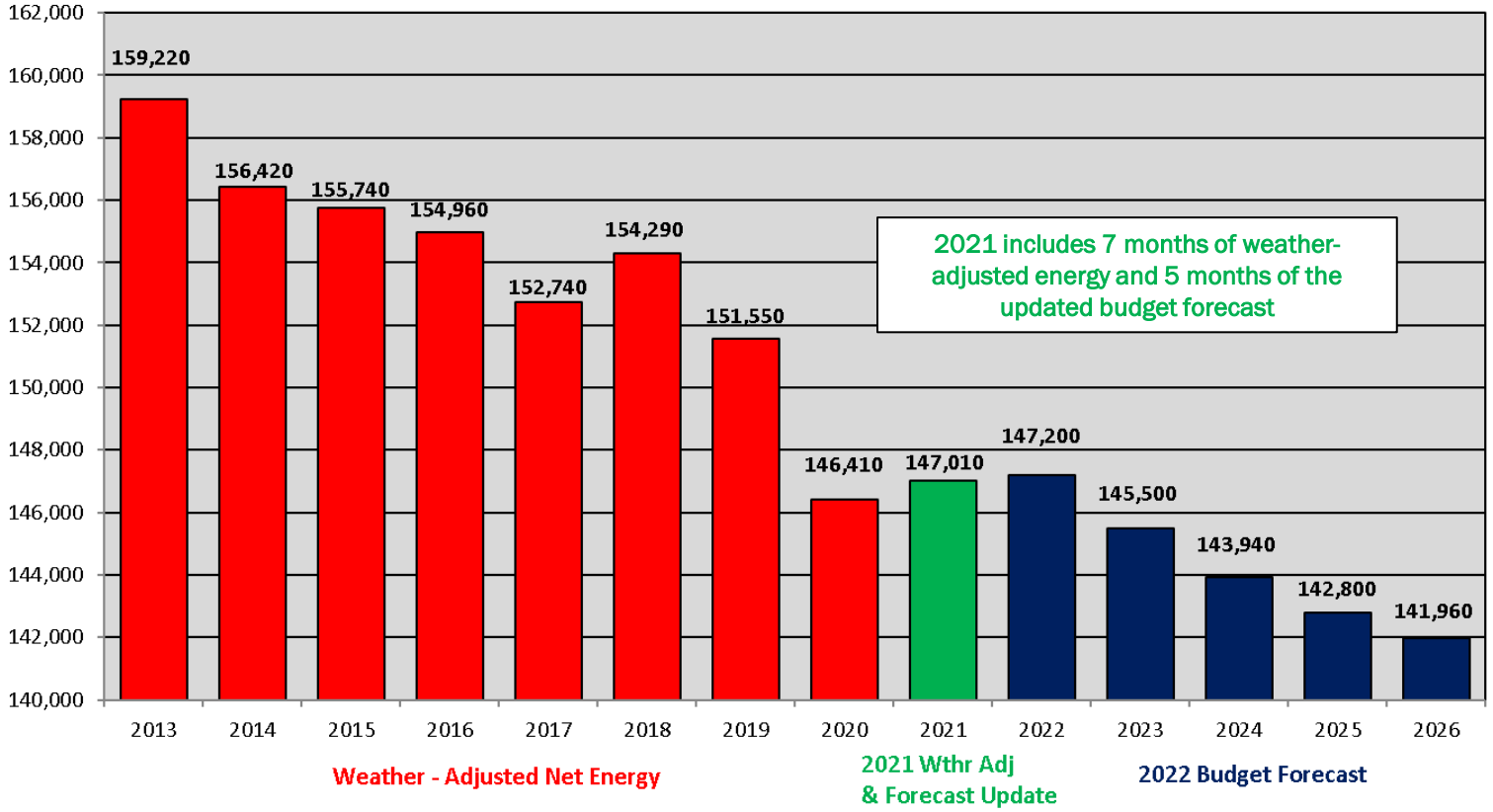
Net Energy - GWh



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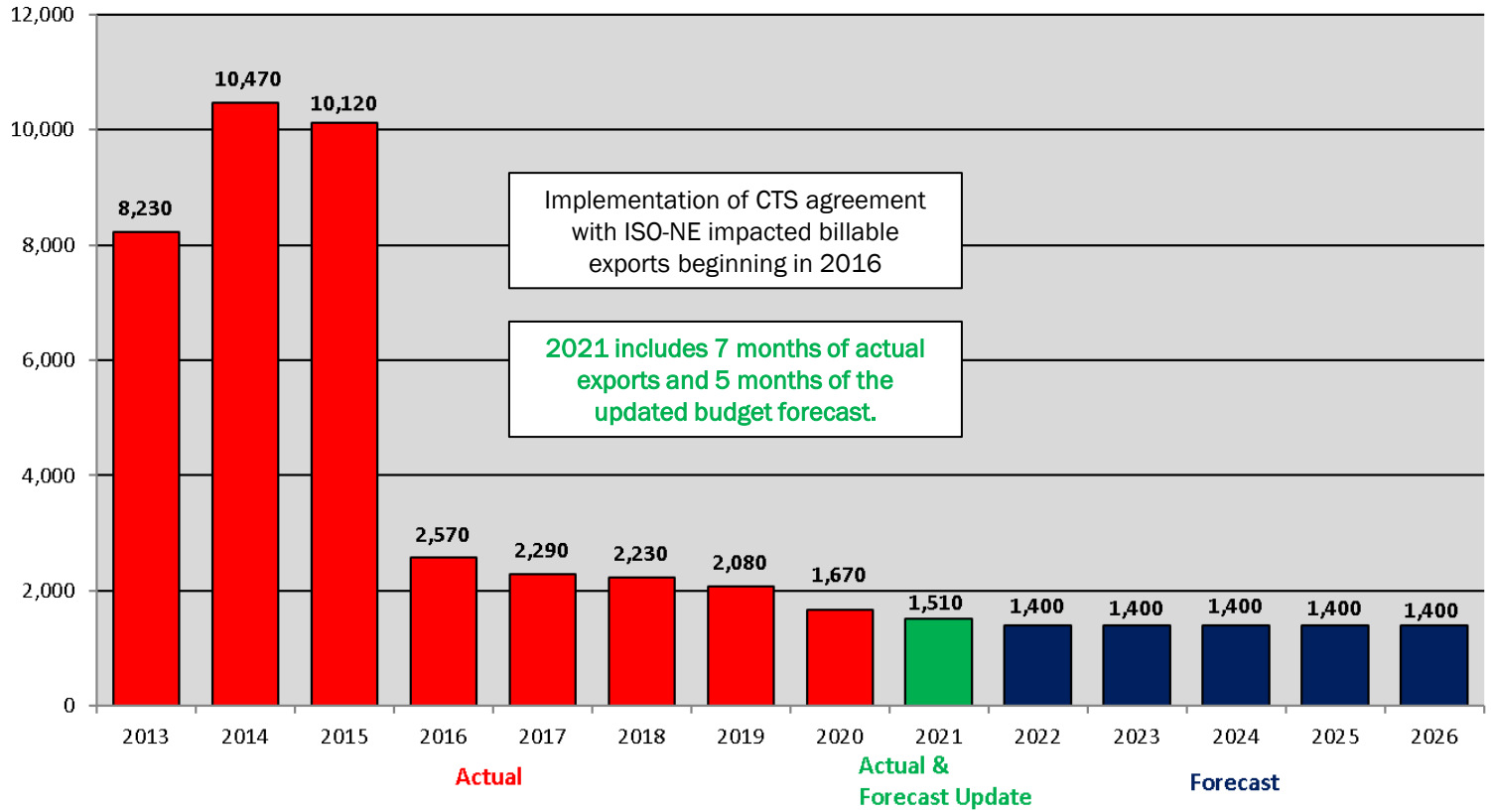
Exports - GWh



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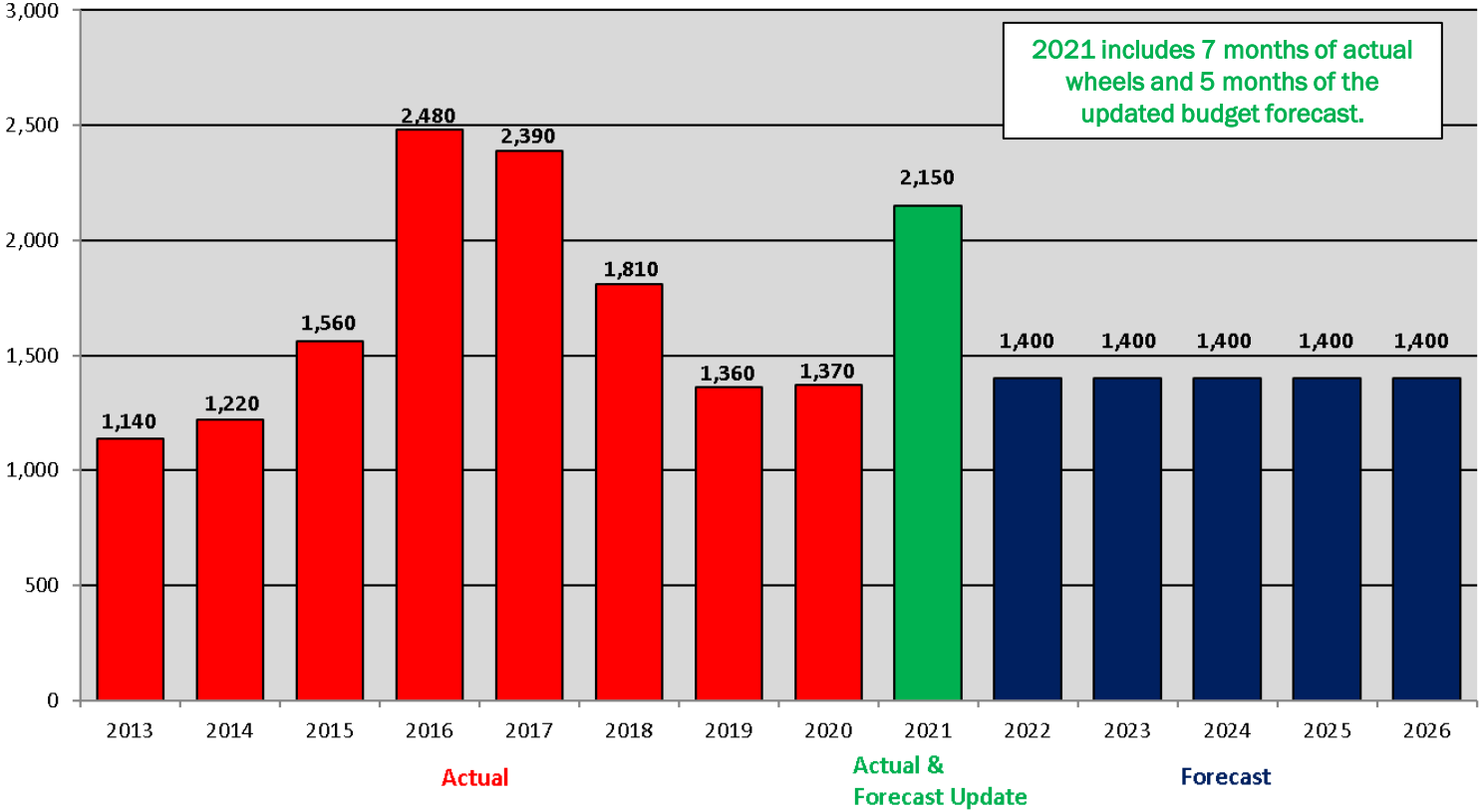
Wheels - GWh



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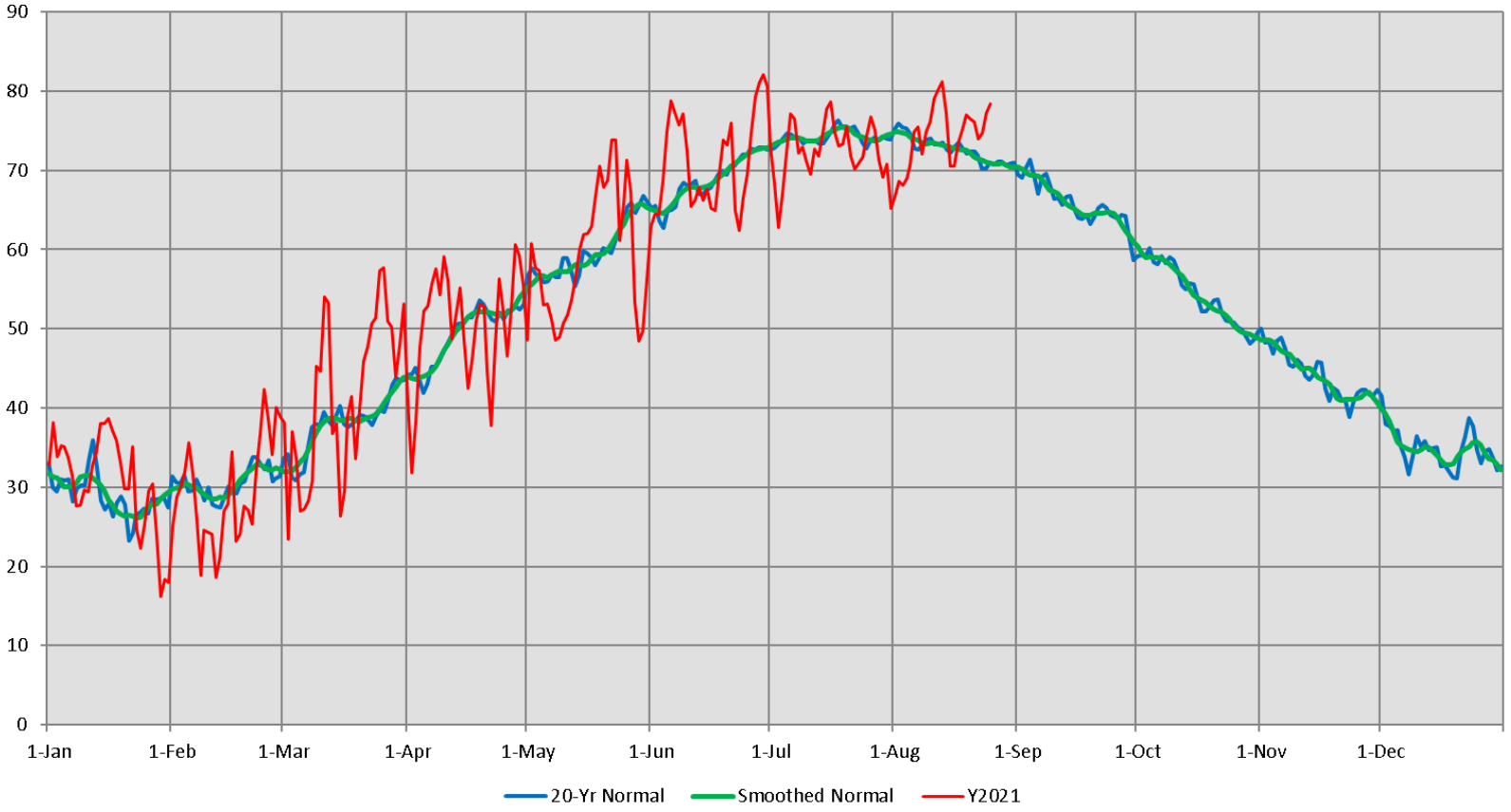
2021 Budget Forecast Updated Outlook

- January, March, and April were mild months. February was slightly cooler than normal. During the January – April period, weather related impacts were estimated at -450 GWh (relative to the budget forecast under normal weather).

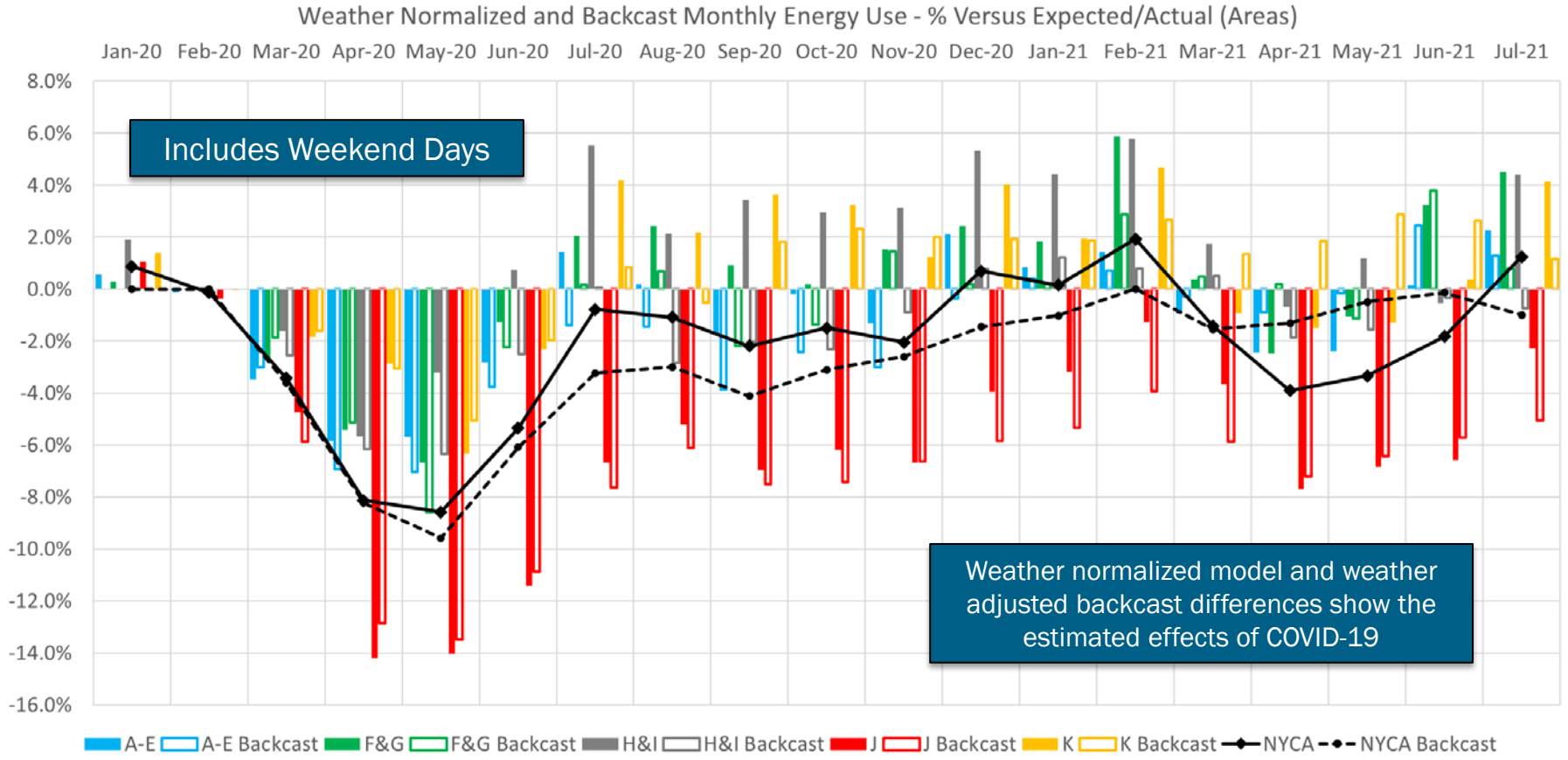
- Energy usage in June (July), was high (low) due to the warmer (cooler) than normal weather. May was slightly warmer than average. May through June weather has contributed an offsetting weather impact of +150 GWh (relative to budget forecast under normal weather).

- The load-reducing impacts of COVID-19 have contributed an estimated -850 GWh of energy reductions relative to expected values through July.

NYCA Composite Daily Average Temperature, 2021 and Normal

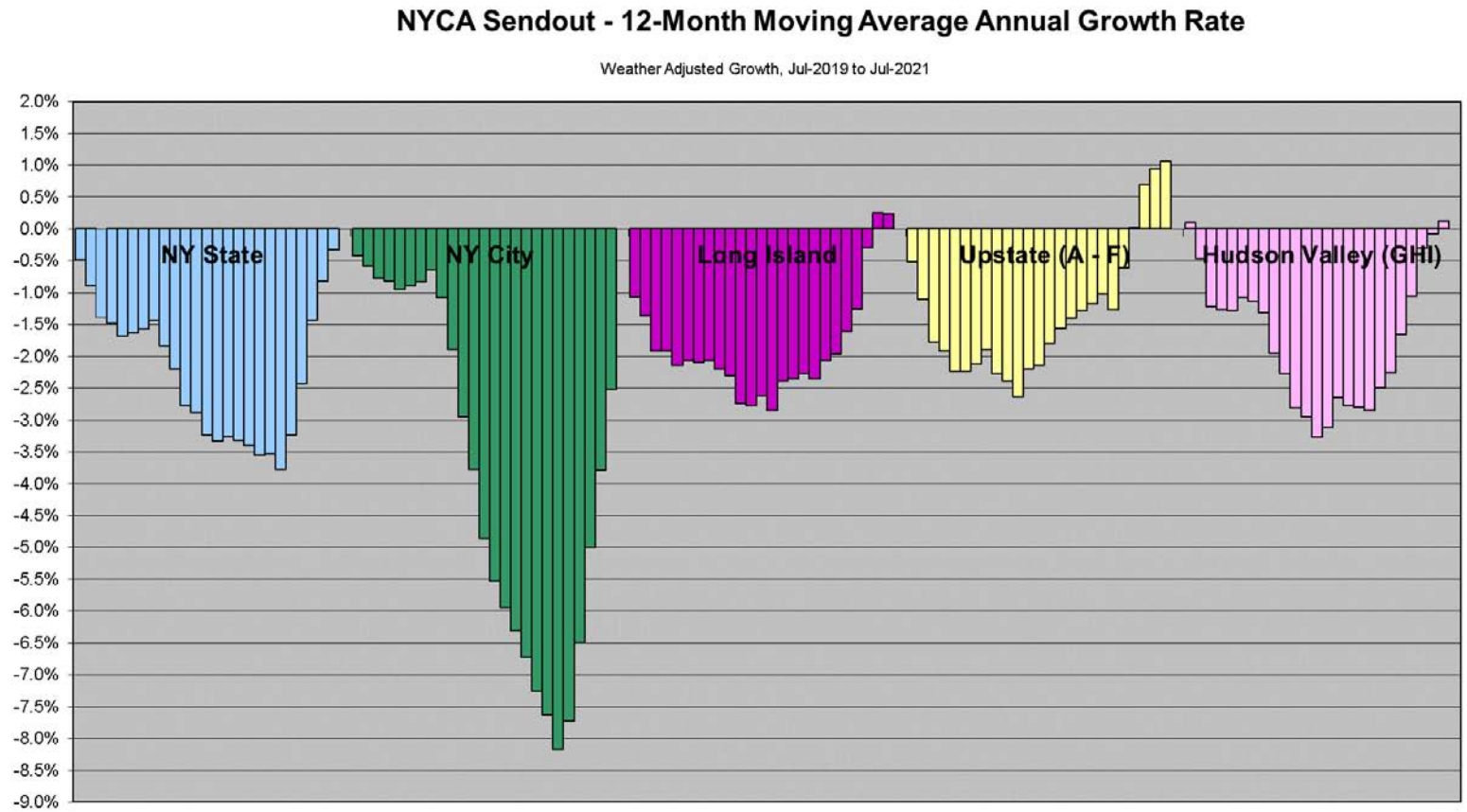


COVID-19 Impacts on Daily Energy by Month



Additional model information provided on Slide 17

Weather Adjusted Energy Growth Rates, July 2019 to July 2021



RS-1 Budget Summary - GWh

Actual & Forecast Energy - GWh								
						Pct Growth		
Year	Net Energy	Exports	Wheels	RS-1 Total	Forecast	Net Energy [a]	RS-1 Tot [b]	Cumulative [c]
2015	157,310	10,120	1,560	168,990				
2016	156,820	2,570	2,480	161,870				
2017	152,040	2,290	2,390	156,720				
2018	156,850	2,230	1,810	160,890				
2019	151,550	2,080	1,360	154,990				
2020	146,230	1,670	1,370	149,270				
2021*	146,730	1,510	2,150	150,390	150,390	0.34%	0.75%	0.75%
2022	147,200	1,400	1,400	150,000	150,000	0.32%	-0.26%	0.49%
2023	145,500	1,400	1,400	148,300	148,300	-1.15%	-1.13%	-0.64%
2024	143,940	1,400	1,400	146,740	146,740	-1.07%	-1.05%	-1.69%
2025	142,800	1,400	1,400	145,600	145,600	-0.79%	-0.78%	-2.47%
2026	141,960	1,400	1,400	144,760	144,760	-0.59%	-0.58%	-3.05%

* 2021 Includes 7 months actual & 5 months updated 2021 budget forecast

(a) - year-over-year percent change in net energy

(b) - year-over-year percent change in total RS-1 Budget forecast

(c) - cumulate percent change in total RS-1 Budget forecast relative to 2020 RS-1 Actual GWh

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RS-1 Budget by Month, Actual and Forecast - GWh

Month	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	15,320	13,710	13,380	14,380	13,890	12,940	13,190	13,240	13,180	13,000	12,920	12,830
2	14,660	12,750	11,720	11,860	12,110	11,970	12,180	11,400	11,330	11,540	11,100	11,020
3	14,670	12,400	13,050	12,730	12,620	11,520	12,010	11,570	11,470	11,310	11,240	11,160
4	12,190	11,690	11,280	11,690	11,090	10,200	10,730	10,400	10,310	10,170	10,120	10,050
5	12,970	12,410	12,000	12,360	11,470	10,530	11,350	11,230	11,110	10,970	10,920	10,860
6	13,760	13,730	13,570	13,350	12,870	12,910	13,750	12,990	12,850	12,720	12,670	12,620
7	16,110	16,580	15,470	16,390	16,660	16,440	14,930	16,530	16,330	16,140	16,080	16,030
8	16,140	17,100	14,840	16,630	15,070	15,150	15,500	15,880	15,690	15,520	15,460	15,410
9	14,730	13,840	13,230	13,790	12,590	12,170	12,090	12,090	11,930	11,790	11,730	11,670
10	12,950	12,110	12,320	12,330	11,570	11,380	11,180	11,200	11,020	10,860	10,800	10,720
11	12,670	11,990	12,090	12,280	11,920	11,150	10,970	10,980	10,800	10,630	10,560	10,480
12	12,820	13,560	13,770	13,100	13,130	12,910	12,510	12,490	12,280	12,090	12,000	11,910
Annual	168,990	161,870	156,720	160,890	154,990	149,270	150,390	150,000	148,300	146,740	145,600	144,760

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Questions?

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Reference: Modeling COVID-19 Impacts on Daily Energy Usage

Actual Difference

- Equals: Actual Load – Expected Load
- Expected Load is the pre-COVID baseline annual load forecast, shared out on a daily basis using the 10-year history of daily weather-normalized energy
- This difference reflects the total change in load relative to expected levels, including weather, economic, virus, and any other impacts

Weather Normalized Difference

- Equals: Weather Normalized Load – Expected Load
- Weather Normalized Load is calculated via Zonal models regressing daily energy against daily weather variables and binaries. These models estimate what the load would have been on a given date under normal weather conditions
- These models are fit through the most recent 12 months of data and have recent weather response signals.
- Expected Load is equivalent to that defined in the Actual Difference calculation
- This difference reflects non-weather driven changes in load levels, including economic, virus, and other impacts. The comparison is weather neutral as normal weather is used on both sides of the comparison

Weather Adjusted Backcast Difference

- Equals: Actual Load - Backcast Load
- Backcast Load is the load generated by the Zonal hourly day-ahead models using actual weather, where the model estimation period ends in February 2020. Thus, these backcasts estimate what the load would have been on a given day under pre-COVID conditions
- These models were fit through February 2020, so they do not contain the most recent weather response signals
- This difference reflects non-weather driven changes in load levels, including economic, virus, and other impacts. The comparison is weather neutral as actual weather is used on both sides of the comparison

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