



COVID-19 Impacts and Trends on NYISO Load

Analysis through 3/31/2021

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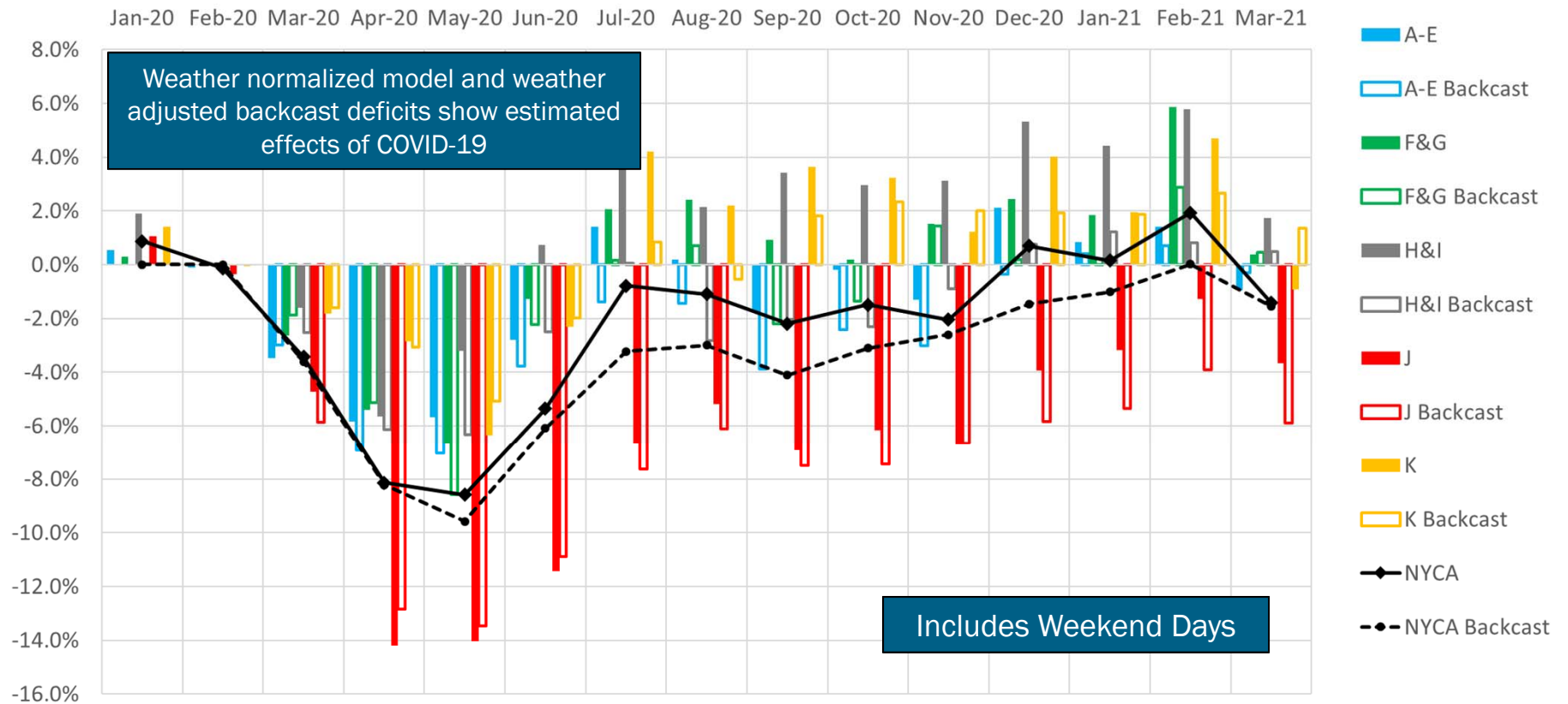
Demand Forecasting & Analysis

Load Forecasting Task Force

April 26, 2021

Impacts on Daily Energy by Month

Weather Normalized and Backcast Monthly Energy Use - % Versus Expected/Actual (Areas)



Model Explanation - Impacts on Daily Energy by Month

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

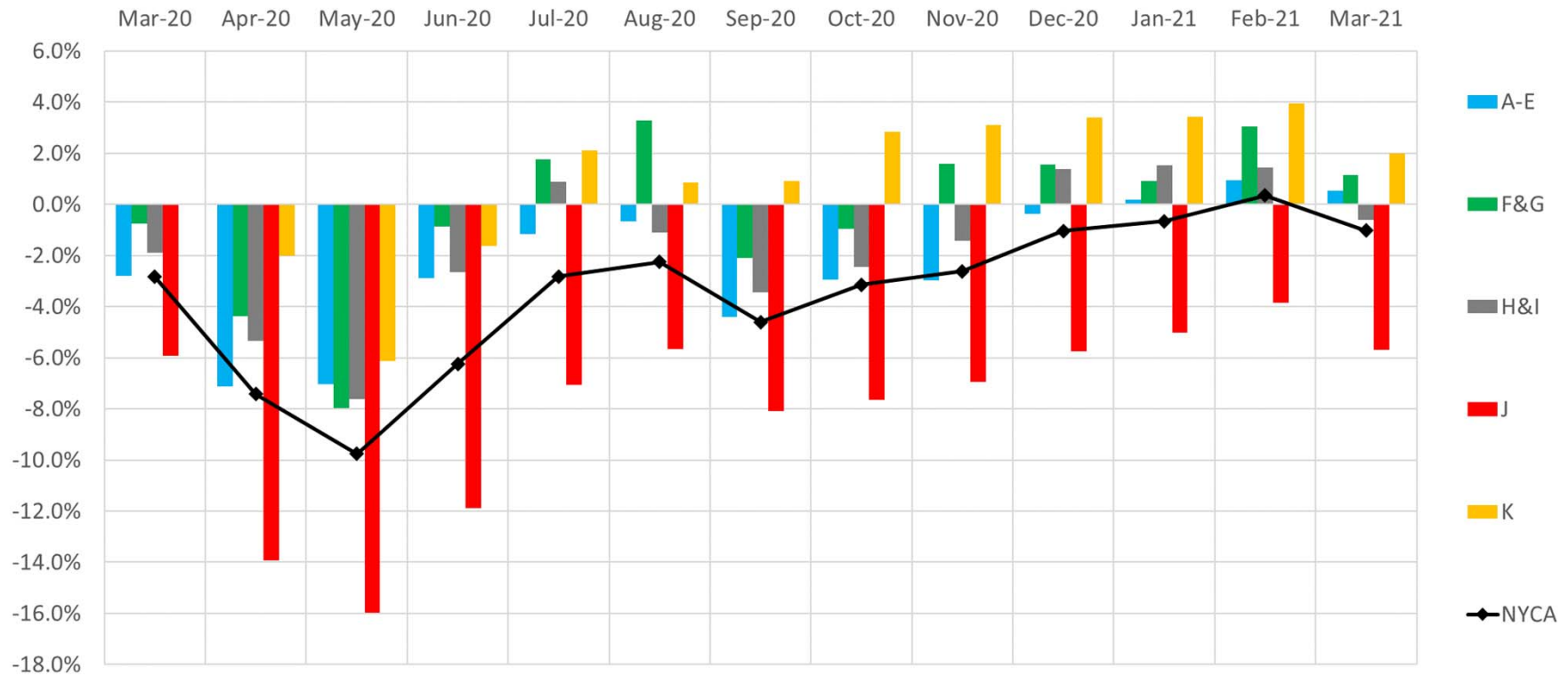
- Equals: Weather Normalized Load - Expected Load
- Weather Normalized Load is calculated via Zonal models regressing daily energy against daily weather variables and binaries. These models estimate what the load would have been on a given date under normal weather conditions
- These models are fit through 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

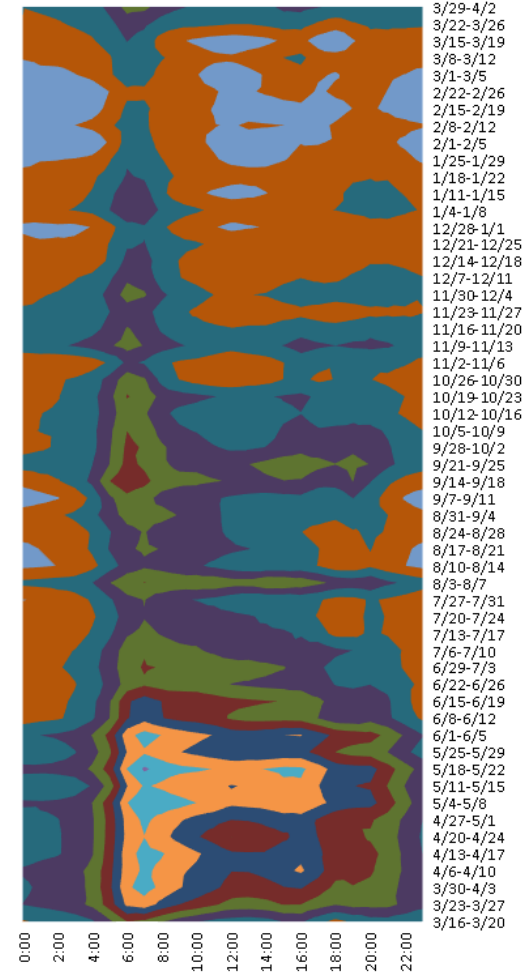
Regional Impacts on Peak Demand

2020-2021 Backcast Peaks - % Versus Actual (Areas)

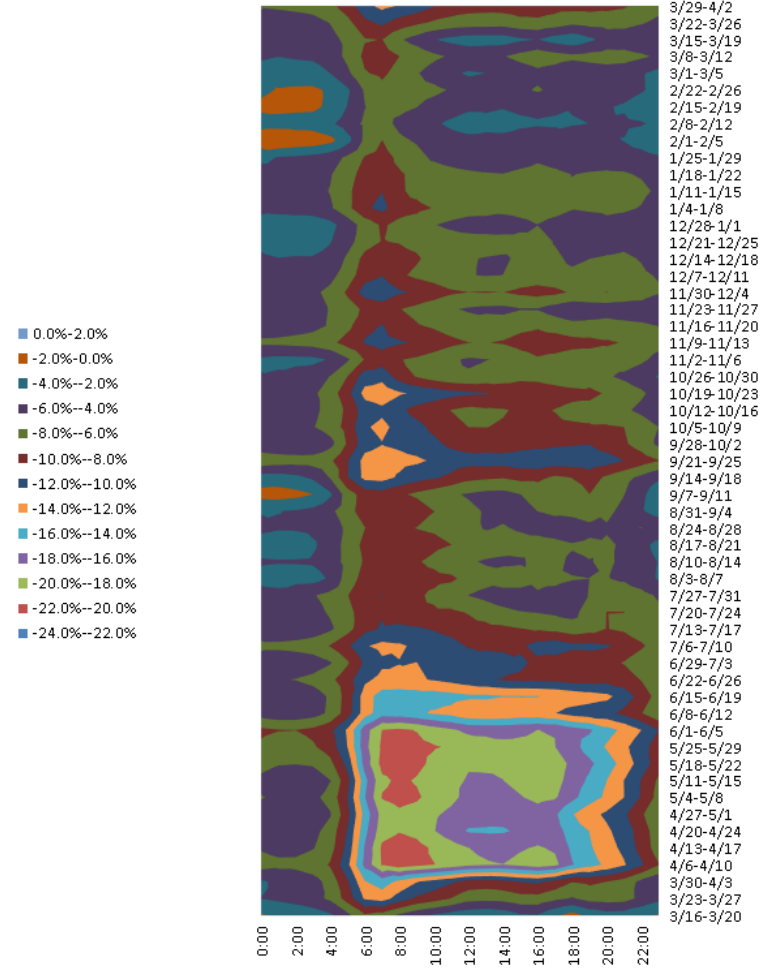


Impacts on Hourly Load Patterns

NYCA Load Profile - Weekday Diurnal Load Changes

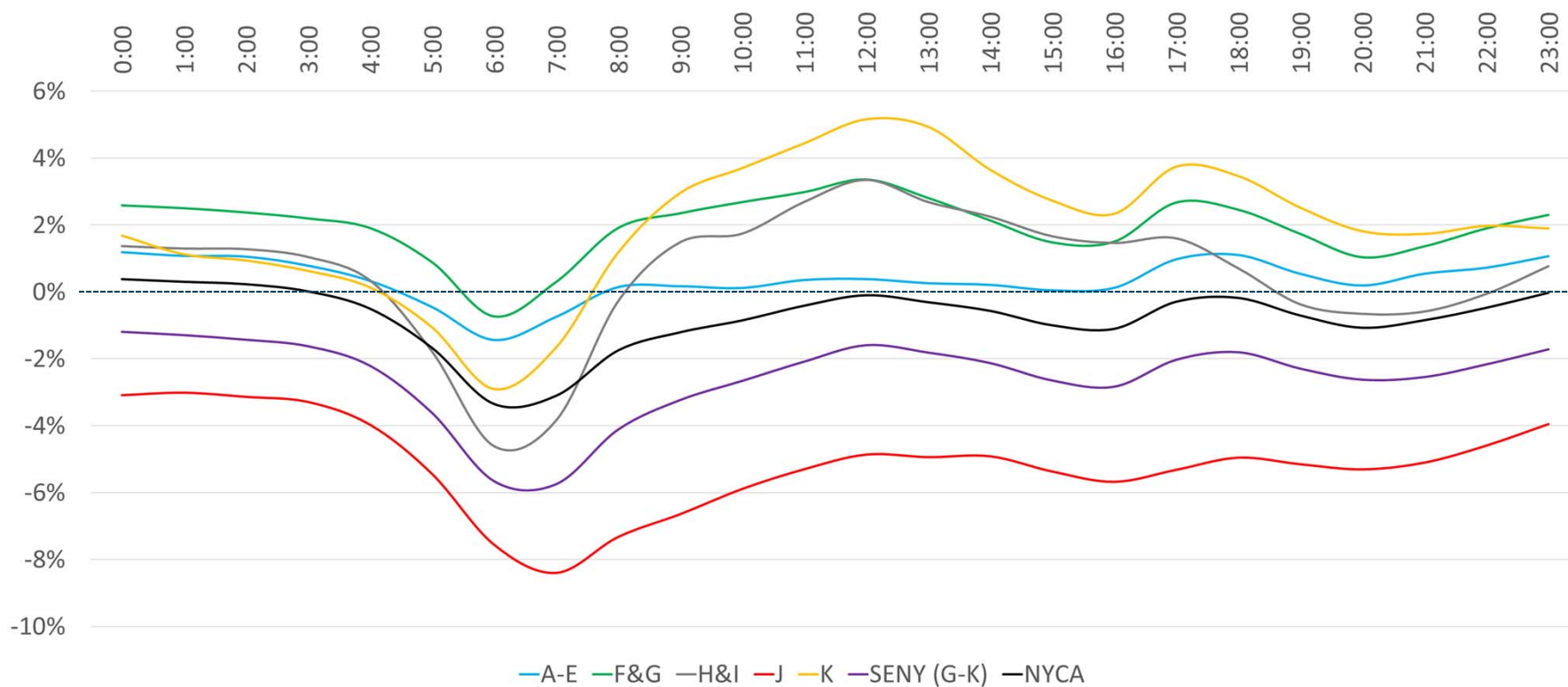


Zone J (NYC) Load Profile - Weekday Diurnal Load Changes



Impacts on Hourly Load Patterns (Area)

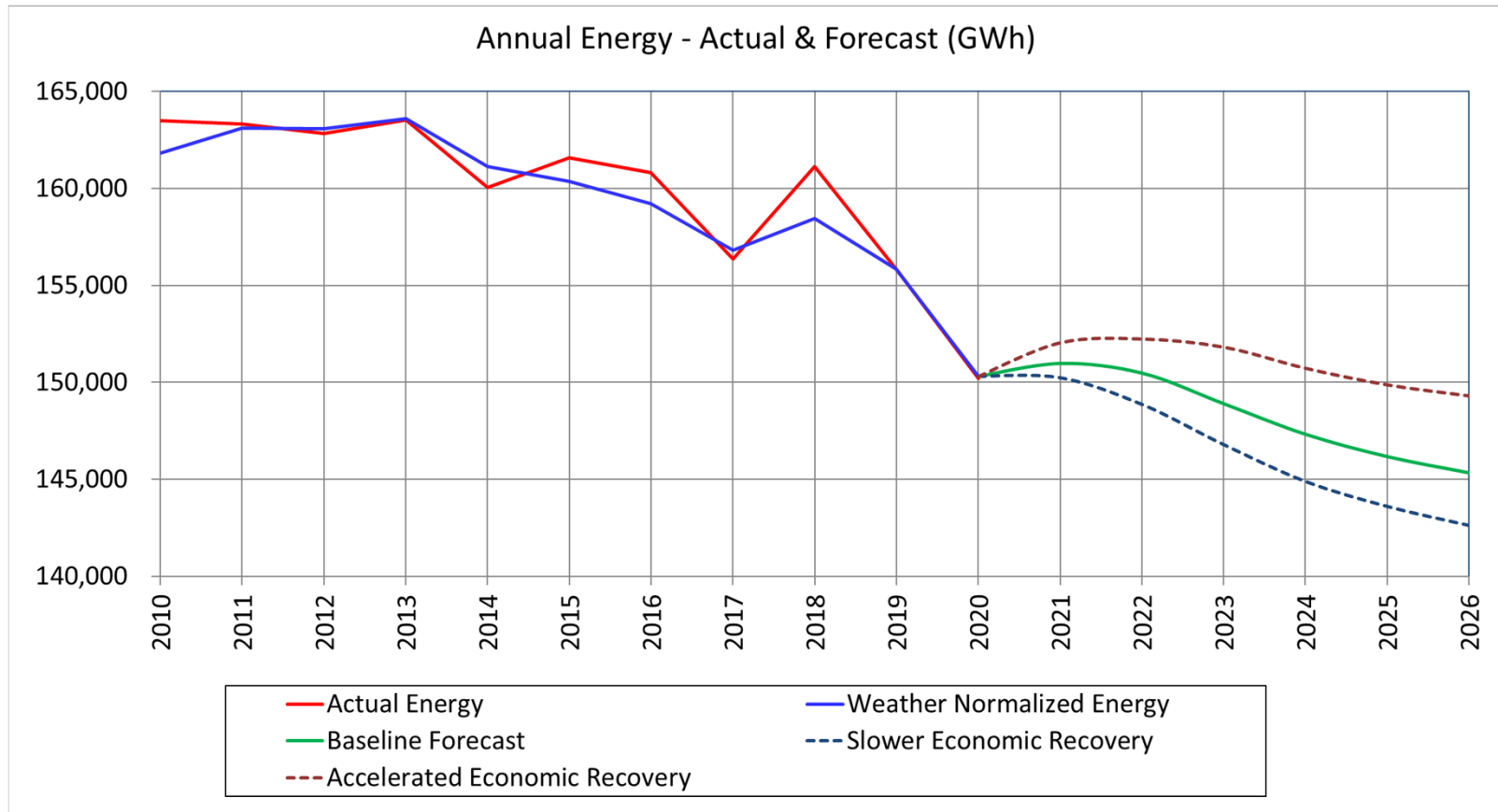
Average Hourly Deviation from Expected by Area, 3/1 through 3/31 (Weekdays)



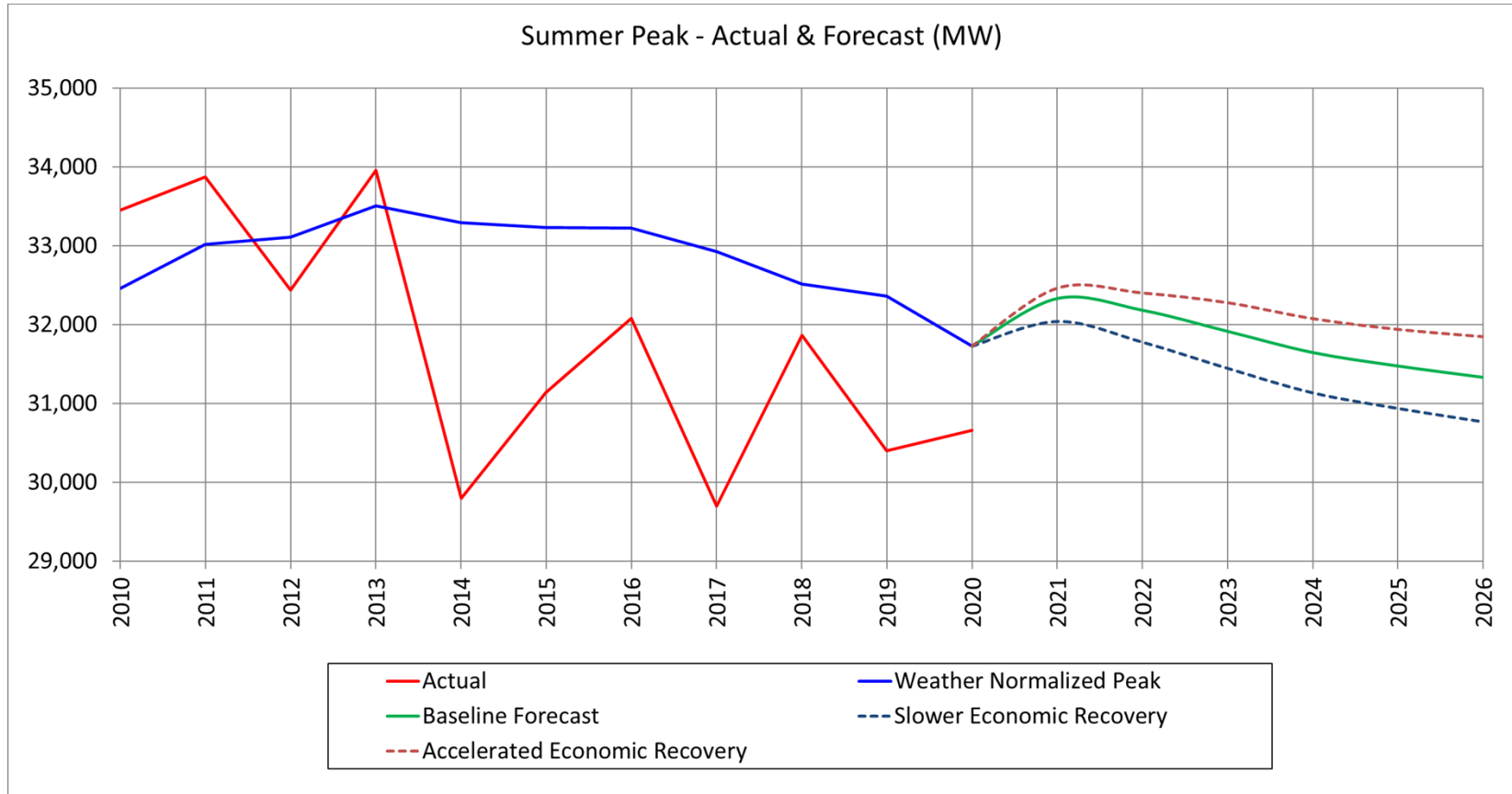
Gold Book 2021 - Economic Forecast Scenarios

- In the near term, the economy recovery will continue to be a major driver in the energy and peak forecasts.
- The projected impacts of the recovery on the 2021 summer peak load were considered as part of the 2021 ICAP forecast, which forms the basis for the 2021 summer peak forecast.
- The baseline forecast assumes the economic recovery will be complete by early 2023 (Gross State Product will match the pre-COVID level). Total employment returns to the pre-COVID forecast trend by 2024.
- Stronger and weaker economic recoveries are assumed in the high load scenario and low load scenario energy and peak forecasts respectively.

Economic Forecast Scenarios – Annual Energy



Economic Forecast Scenarios – Annual Peak



COVID-19 Tracking Next Steps

- **NYISO Operations and Demand Forecasting Team will continue to monitor and assess shifts in load patterns throughout the control area**
 - Consult with Transmission Owners on updated sector impacts
 - Track the vaccination rate/levels and impacts on commercial & residential activity
- **NYISO continues to fine-tune its models (monthly training) to improve forecast accuracy in day-ahead and real-time markets**
 - Track the evolving changes to load-weather sensitivity
- **NYISO will shift to quarterly reporting with the COVID-19 impact analysis. NYISO will provide additional analysis at the 2021 Spring Economic Conference in June.**
 - Any significant shifts in load patterns will continue to be reported to stakeholders

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system



Impacts on Hourly Load Patterns (Area)

| Hour | A-E | F&G | H&I | J | K | SENY (G-K) | NYCA |
|-------|-----|-----|-----|-----|-----|------------|------|
| 0:00 | 1% | 3% | 1% | -3% | 2% | -1% | 0% |
| 1:00 | 1% | 3% | 1% | -3% | 1% | -1% | 0% |
| 2:00 | 1% | 2% | 1% | -3% | 1% | -1% | 0% |
| 3:00 | 1% | 2% | 1% | -3% | 1% | -2% | 0% |
| 4:00 | 0% | 2% | 0% | -4% | 0% | -2% | -1% |
| 5:00 | 0% | 1% | -2% | -5% | -1% | -4% | -2% |
| 6:00 | -1% | -1% | -5% | -8% | -3% | -6% | -3% |
| 7:00 | -1% | 0% | -4% | -8% | -2% | -6% | -3% |
| 8:00 | 0% | 2% | 0% | -7% | 1% | -4% | -2% |
| 9:00 | 0% | 2% | 1% | -7% | 3% | -3% | -1% |
| 10:00 | 0% | 3% | 2% | -6% | 4% | -3% | -1% |
| 11:00 | 0% | 3% | 3% | -5% | 4% | -2% | 0% |
| 12:00 | 0% | 3% | 3% | -5% | 5% | -2% | 0% |
| 13:00 | 0% | 3% | 3% | -5% | 5% | -2% | 0% |
| 14:00 | 0% | 2% | 2% | -5% | 4% | -2% | -1% |
| 15:00 | 0% | 1% | 2% | -5% | 3% | -3% | -1% |
| 16:00 | 0% | 2% | 1% | -6% | 2% | -3% | -1% |
| 17:00 | 1% | 3% | 2% | -5% | 4% | -2% | 0% |
| 18:00 | 1% | 2% | 1% | -5% | 3% | -2% | 0% |
| 19:00 | 1% | 2% | 0% | -5% | 3% | -2% | -1% |
| 20:00 | 0% | 1% | -1% | -5% | 2% | -3% | -1% |
| 21:00 | 1% | 1% | -1% | -5% | 2% | -3% | -1% |
| 22:00 | 1% | 2% | 0% | -5% | 2% | -2% | 0% |
| 23:00 | 1% | 2% | 1% | -4% | 2% | -2% | 0% |

Average Hourly
Load Deficit
By Area
3/1 - 3/31
(Weekdays)

Impacts on Hourly Load Patterns (Zone)

| Hour | A | B | C | D | E | F | G | H | I | J | K |
|-------|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|
| 0:00 | 0% | 2% | 0% | 2% | 5% | 4% | 1% | 1% | 2% | -3% | 2% |
| 1:00 | -1% | 1% | 0% | 2% | 5% | 4% | 1% | -1% | 2% | -3% | 1% |
| 2:00 | -1% | 1% | 0% | 2% | 6% | 4% | 0% | -1% | 2% | -3% | 1% |
| 3:00 | -1% | 1% | 0% | 2% | 5% | 4% | 0% | -1% | 2% | -3% | 1% |
| 4:00 | -1% | 1% | -1% | 1% | 4% | 3% | 0% | -2% | 2% | -4% | 0% |
| 5:00 | -2% | 0% | -1% | 1% | 3% | 2% | -1% | -4% | 0% | -5% | -1% |
| 6:00 | -3% | -2% | -2% | 1% | 1% | 1% | -2% | -7% | -3% | -8% | -3% |
| 7:00 | -2% | 0% | -1% | -1% | 2% | 2% | -2% | -3% | -4% | -8% | -2% |
| 8:00 | -1% | 1% | -1% | 0% | 4% | 4% | 0% | 1% | -1% | -7% | 1% |
| 9:00 | -1% | 1% | -1% | 1% | 3% | 4% | 0% | 4% | 0% | -7% | 3% |
| 10:00 | -1% | 1% | -1% | 2% | 4% | 5% | -1% | 5% | 0% | -6% | 4% |
| 11:00 | -1% | 1% | -1% | 3% | 4% | 6% | 0% | 6% | 1% | -5% | 4% |
| 12:00 | -1% | 1% | -1% | 4% | 4% | 6% | 0% | 8% | 1% | -5% | 5% |
| 13:00 | -1% | 1% | -2% | 4% | 3% | 5% | 0% | 6% | 1% | -5% | 5% |
| 14:00 | -1% | 1% | -2% | 3% | 3% | 5% | -1% | 5% | 1% | -5% | 4% |
| 15:00 | -1% | 1% | -2% | 3% | 3% | 4% | -1% | 4% | 0% | -5% | 3% |
| 16:00 | -1% | 1% | -1% | 2% | 3% | 3% | -1% | 4% | 0% | -6% | 2% |
| 17:00 | -1% | 2% | 0% | 2% | 4% | 4% | 1% | 2% | 1% | -5% | 4% |
| 18:00 | -1% | 2% | 0% | 2% | 5% | 3% | 2% | 0% | 1% | -5% | 3% |
| 19:00 | -1% | 2% | -1% | 1% | 4% | 2% | 1% | -1% | 0% | -5% | 3% |
| 20:00 | -1% | 1% | -1% | 0% | 4% | 2% | 0% | -2% | 0% | -5% | 2% |
| 21:00 | -1% | 2% | -1% | 2% | 4% | 2% | 0% | -2% | 0% | -5% | 2% |
| 22:00 | -1% | 2% | -1% | 2% | 4% | 3% | 0% | 0% | 0% | -5% | 2% |
| 23:00 | -1% | 2% | 0% | 4% | 4% | 4% | 1% | 0% | 1% | -4% | 2% |

Average Hourly Load Deficit by Zone, 3/1 - 3/31 (Weekdays)

