New York ISO
Independent System Operator

# Estimated Impacts of COVID-19 on NYISO Load

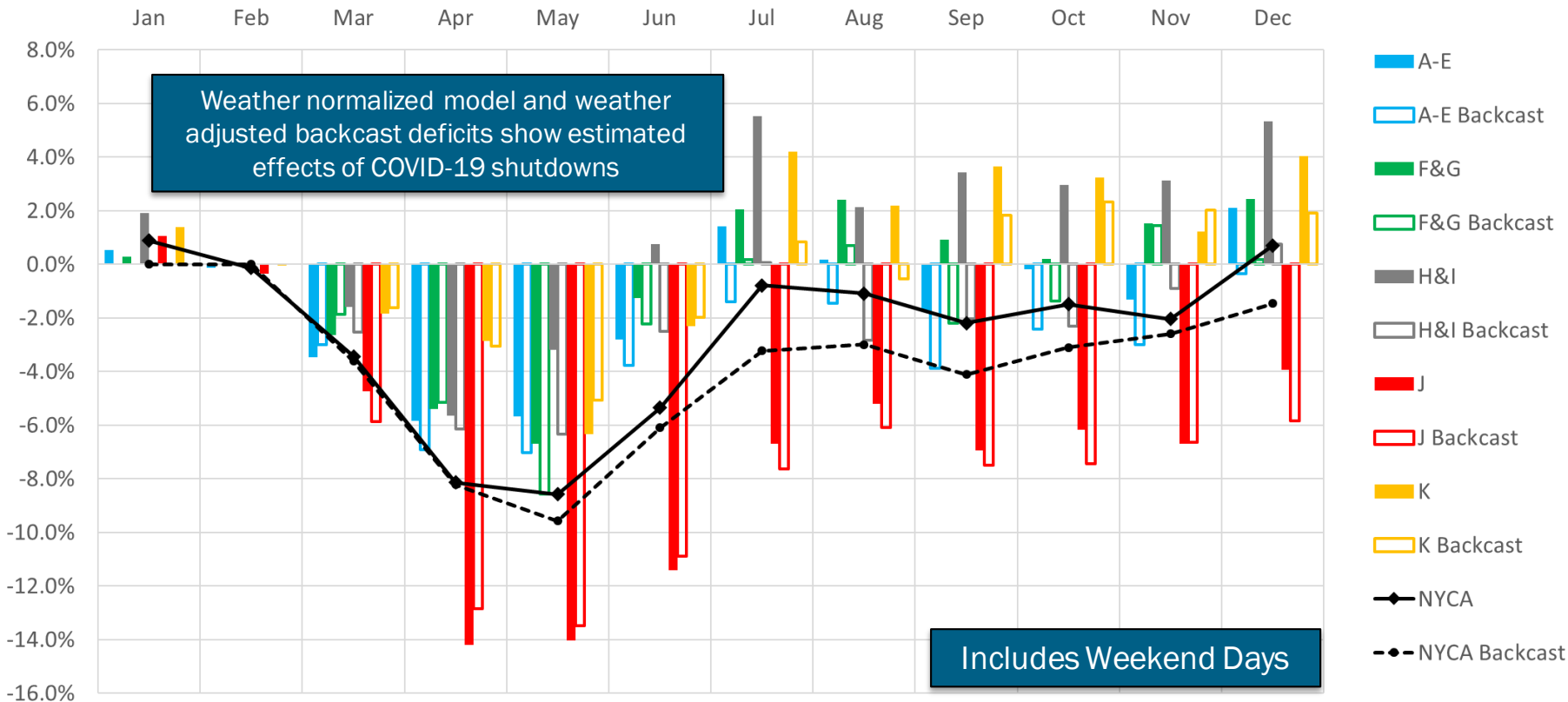## Analysis through 12/31/2020

### Demand Forecasting & Analysis Team

System & Resource Planning

### COVID-19 Tracking Update

January 13, 2021

# Impacts on Daily Energy by Month

2020 Weather Normalized and Backcast Monthly Energy Use - % Versus Expected/Actual (Areas)



Weather normalized model and weather adjusted backcast deficits show estimated effects of COVID-19 shutdowns

Includes Weekend Days

Legend: A-E, A-E Backcast, F&G, F&G Backcast, H&I, H&I Backcast, J, J Backcast, K, K Backcast, NYCA, NYCA Backcast

# Model Explanation - Impacts on Daily Energy by Month

## Actual Difference

- Equals: Actual Load – Expected Load

- Expected Load is the 2020 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
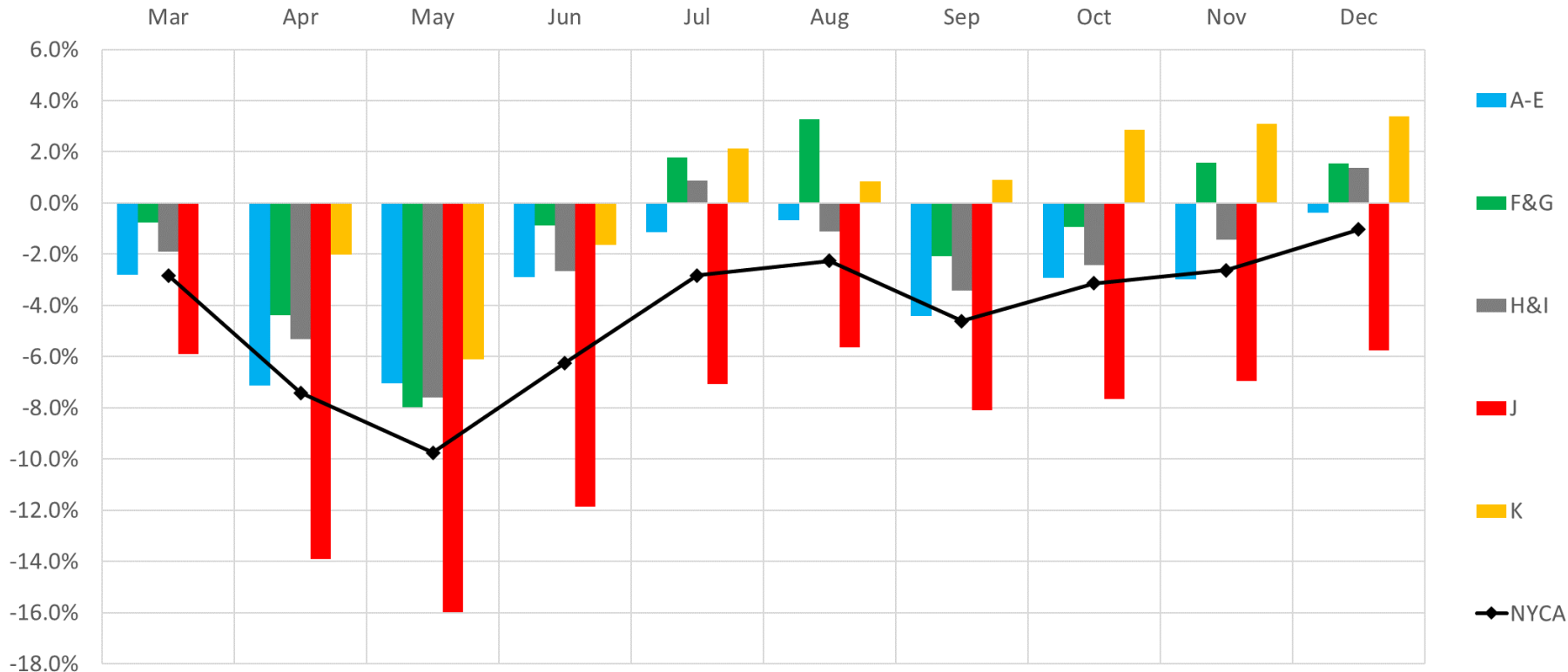
## Weather Normalized Difference

- 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

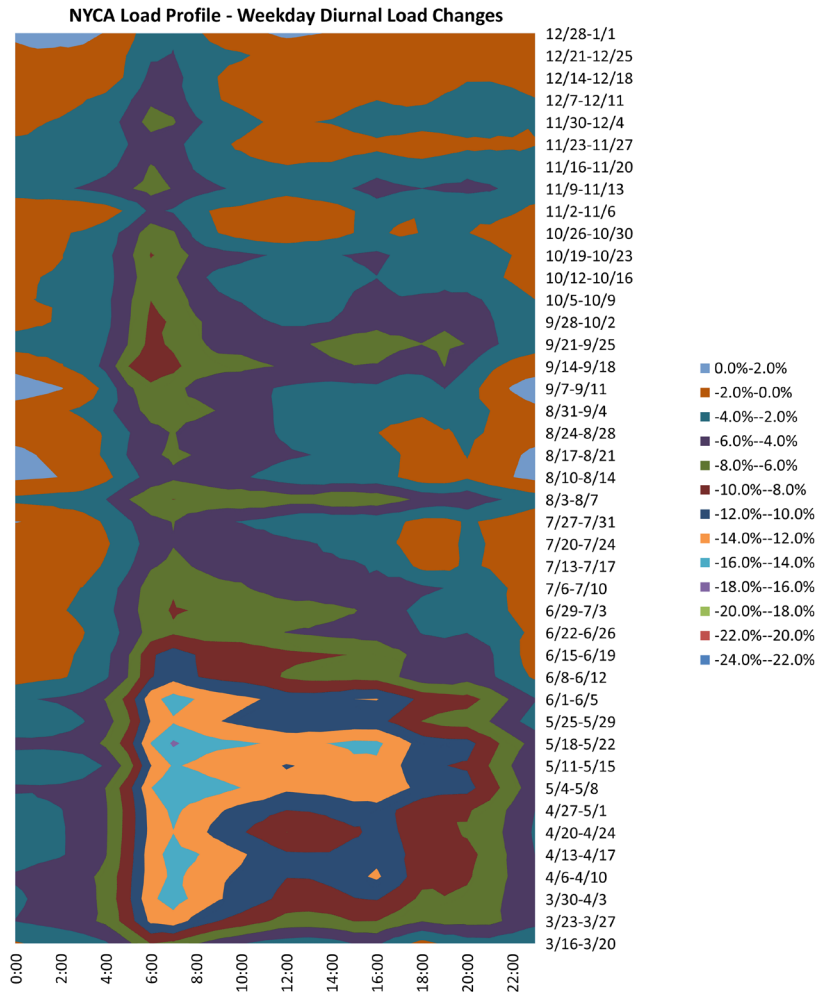## Weather Adjusted Backcast Difference

- 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. Thus, these backcasts estimate what the load would have been on a given day under pre-COVID conditions

- These models were fit through February, 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 Backcast Peaks - % Versus Actual (Areas)

# Impacts on Hourly Load Patterns



NYCA Load Profile - Weekday Diurnal Load Changes

# Impacts on Hourly Load Patterns



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

Legend:
- 0.0%-2.0%
- -2.0%-0.0%
- -4.0%--2.0%
- -6.0%--4.0%
- -8.0%--6.0%
- -10.0%--8.0%
- -12.0%--10.0%
- -14.0%--12.0%
- -16.0%--14.0%
- -18.0%--16.0%
- -20.0%--18.0%
- -22.0%--20.0%
- -24.0%--22.0%
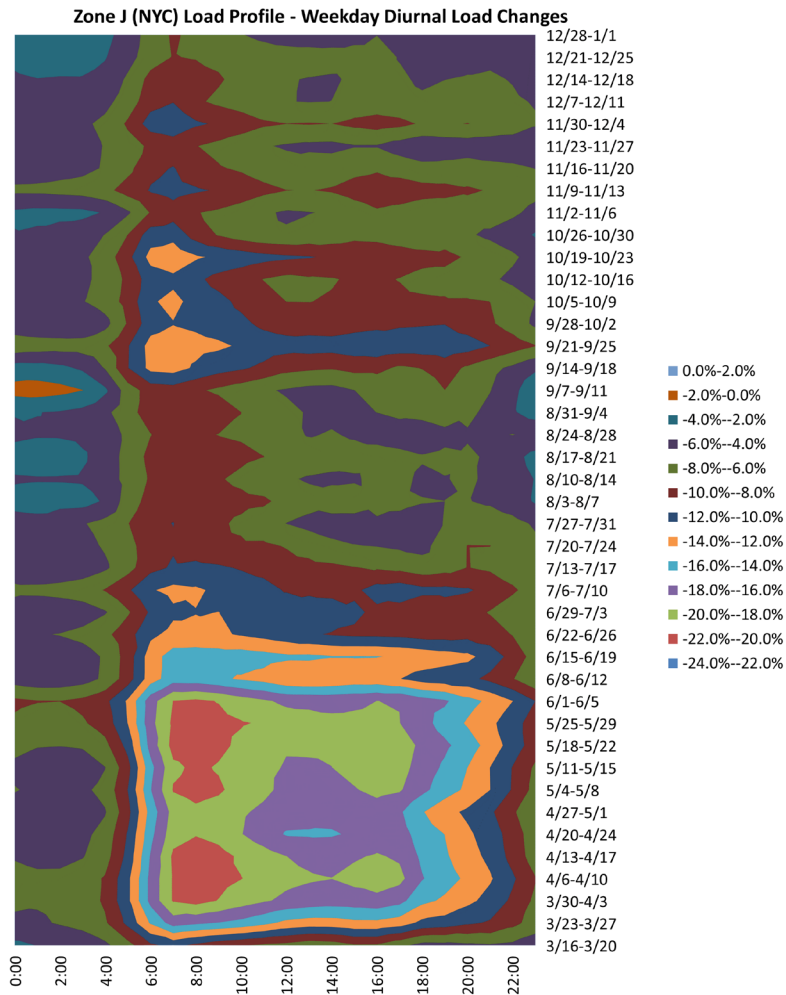
# Impacts on Hourly Load Patterns (Area)

Average Hourly Deviation from Expected by Area, 12/1 through 12/31(Weekdays)

# Impacts on Hourly Load Patterns (Area)

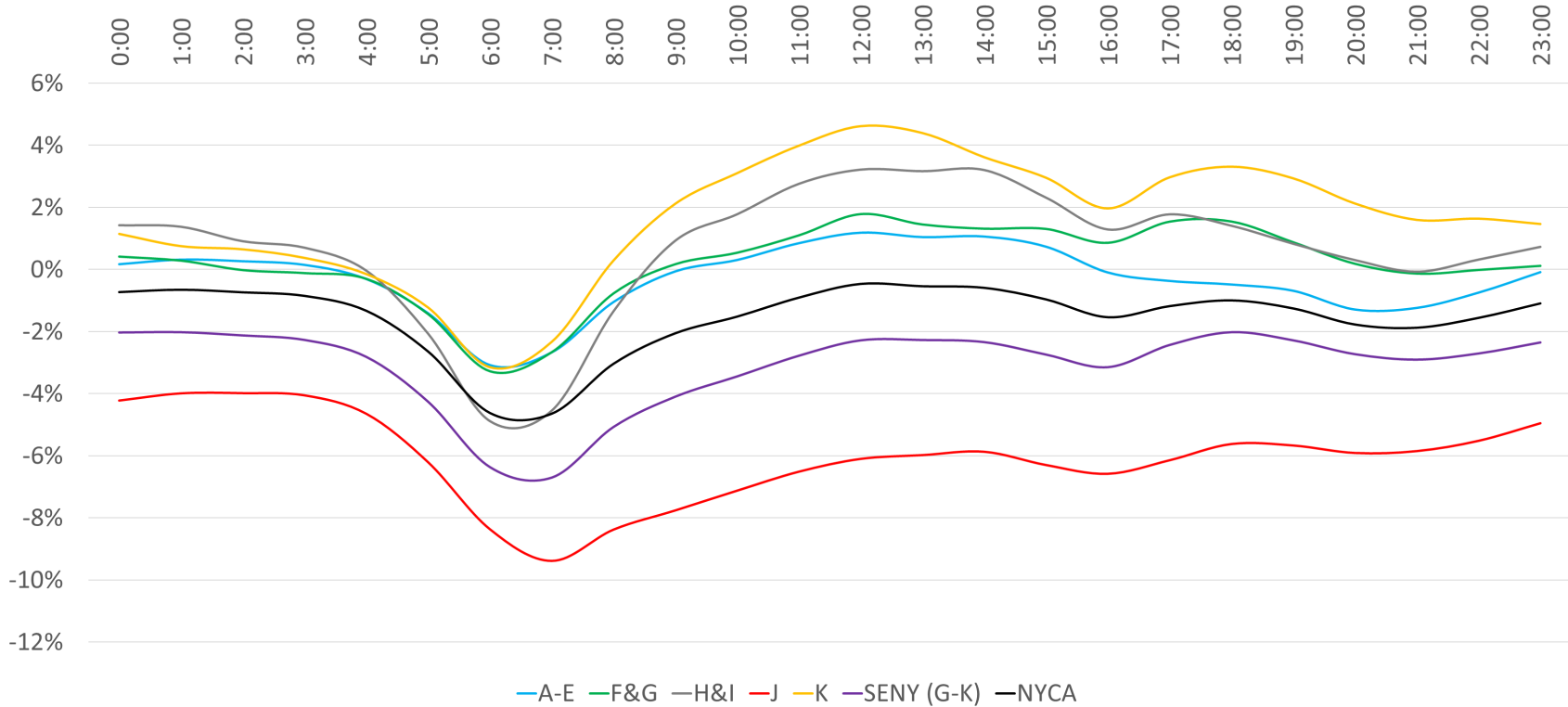| Hour | A-E | F&G | H&I | J | K | SENY (G-K) | NYCA |
|---|---|---|---|---|---|---|---|
| 0:00 | 0% | 0% | 1% | -4% | 1% | -2% | -1% |
| 1:00 | 0% | 0% | 1% | -4% | 1% | -2% | -1% |
| 2:00 | 0% | 0% | 1% | -4% | 1% | -2% | -1% |
| 3:00 | 0% | 0% | 1% | -4% | 0% | -2% | -1% |
| 4:00 | 0% | 0% | 0% |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

Average Hourly
Load Deficit
By Area
12/1 - 12/31
(Weekdays)

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# Impacts on Hourly Load Patterns (Zone)

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

**Average Hourly Load Deficit by Zone, 12/1 - 12/31 (Weekdays)**

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# 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

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