

# Impacts and Trends of COVID-19 on NYISO Load

Analysis through 5/31/2021

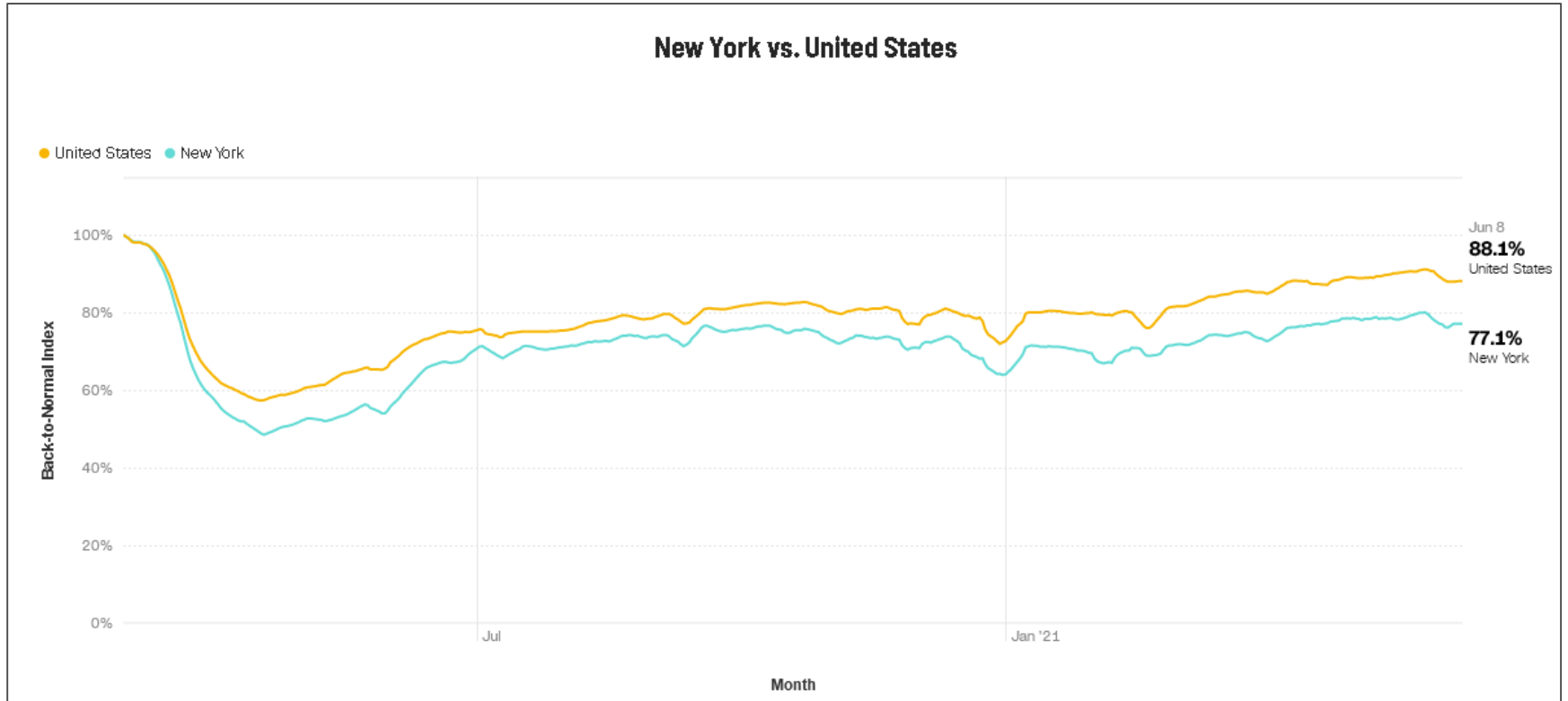
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Chuck Alonge & Maxim Schuler  
Demand Forecasting & Analysis

**Load Forecasting Task Force**

June 18, 2021; Teleconference

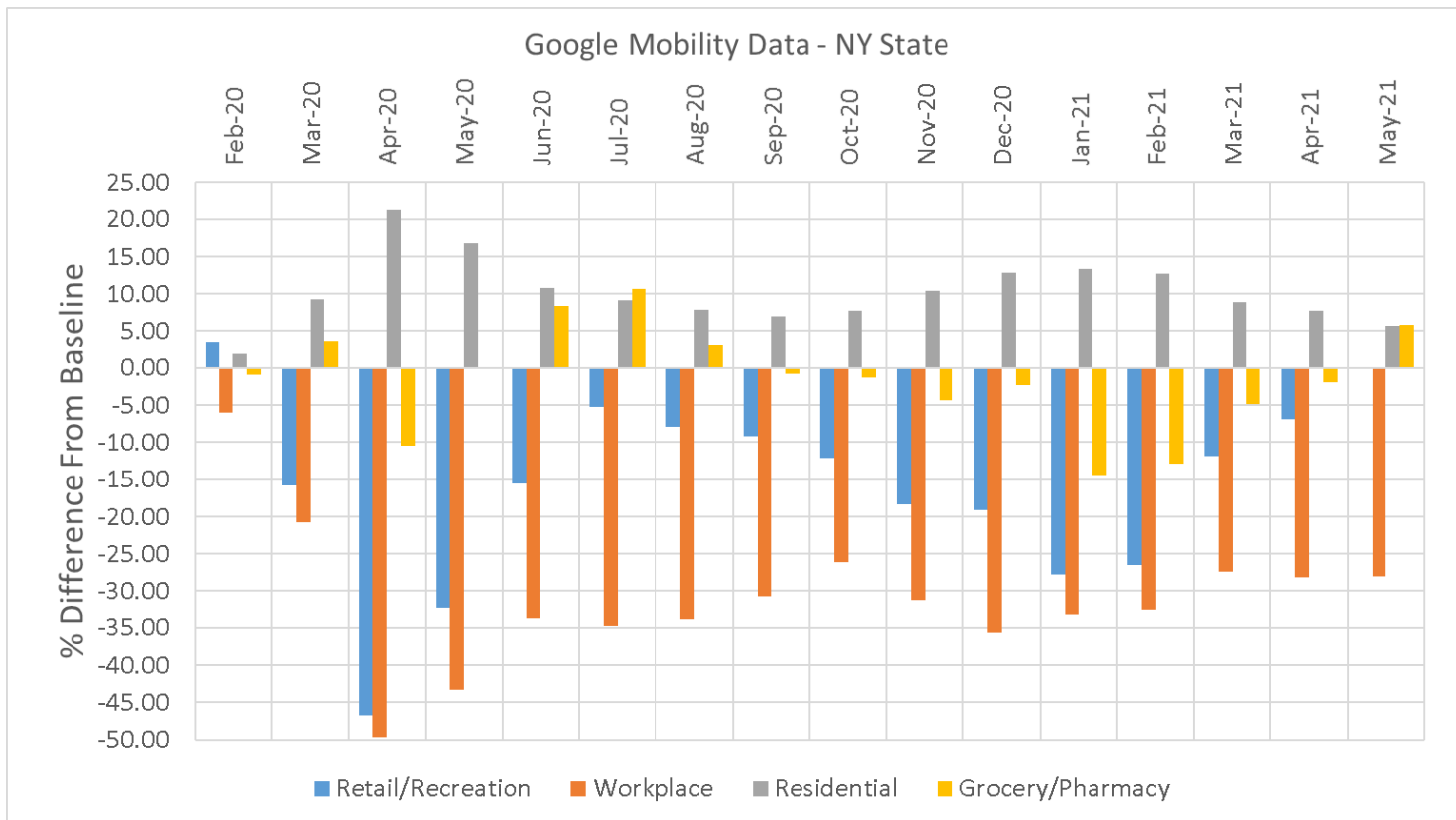
# Back-to-Normal Index (Moody's Analytics)



Source: CNN/Moody's Analytics: <https://www.cnn.com/business/us-economic-recovery-coronavirus>



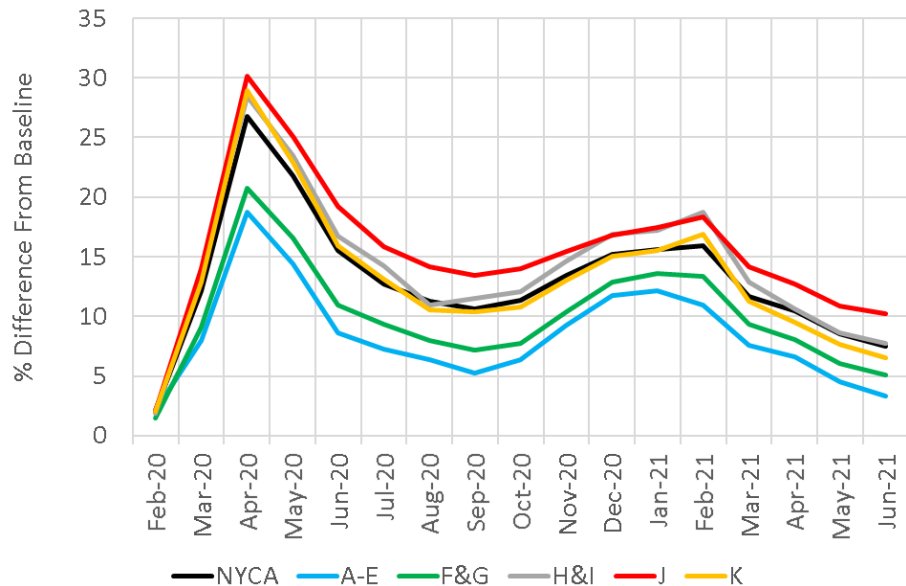
# New York Insights - Google Mobility



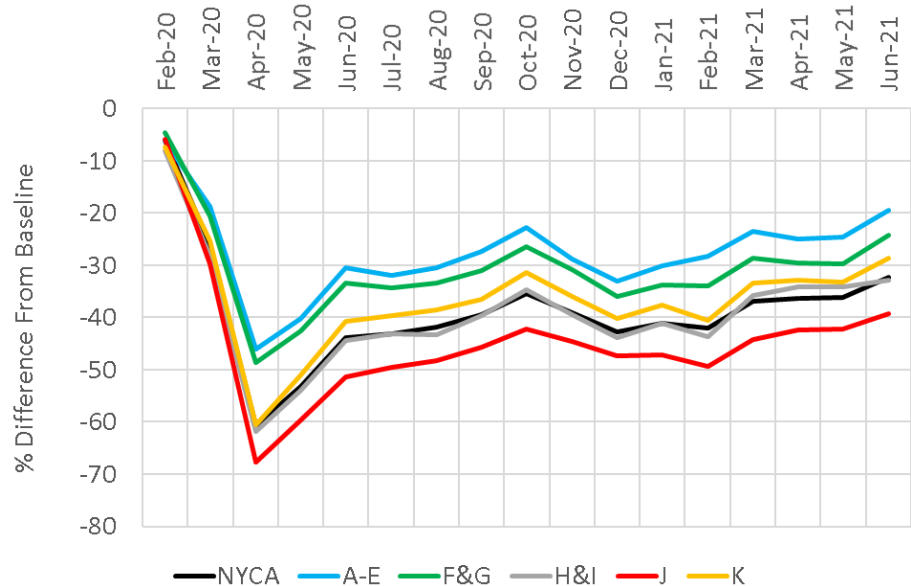
Source: Google Mobility Data, <https://www.google.com/covid19/mobility/>

# Regional Insights - Google Mobility

Google Mobility - Residential

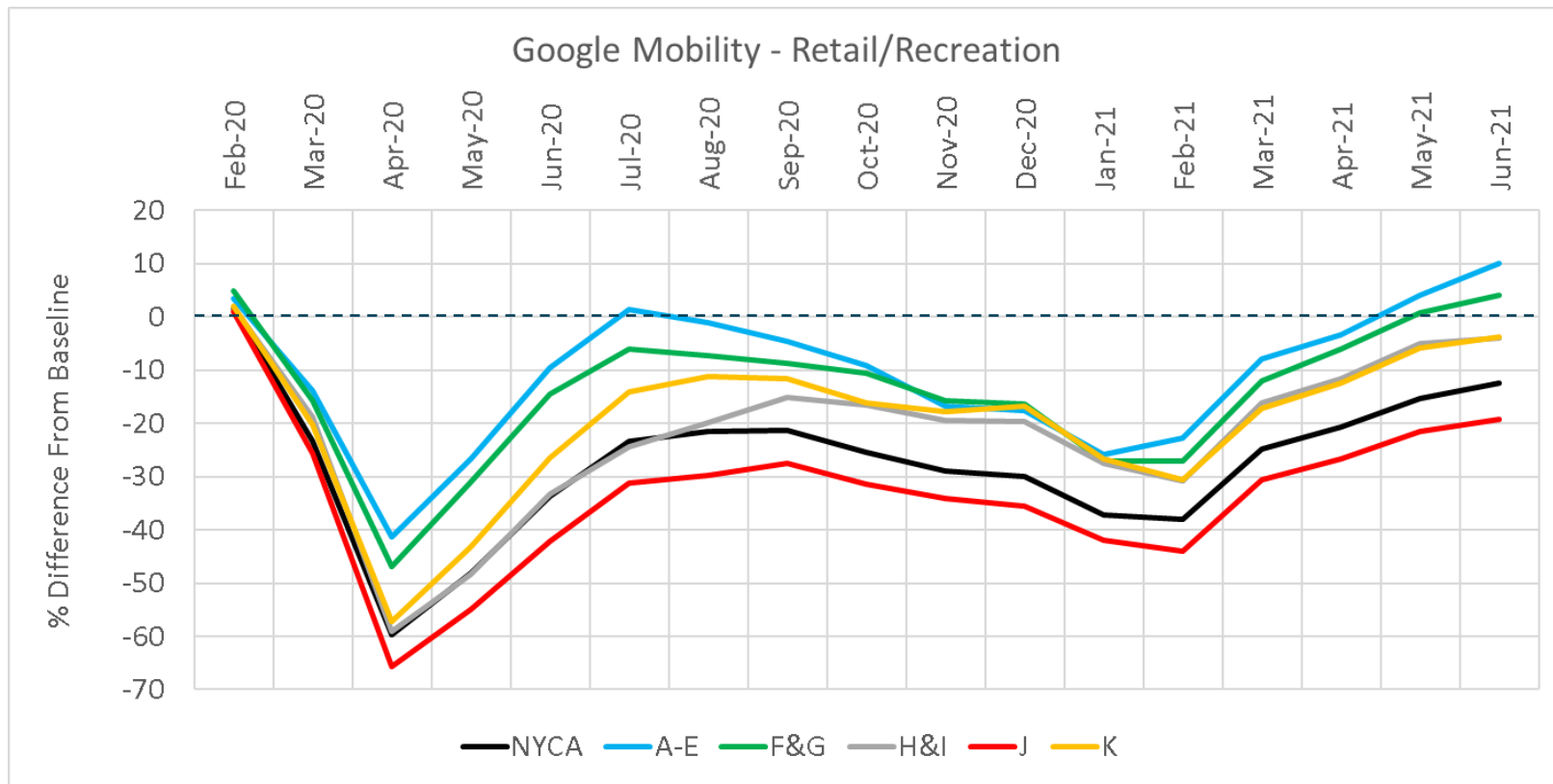


Google Mobility - Workplaces



Source: Google Mobility Data, <https://www.google.com/covid19/mobility/>

# Regional Insights - Google Mobility

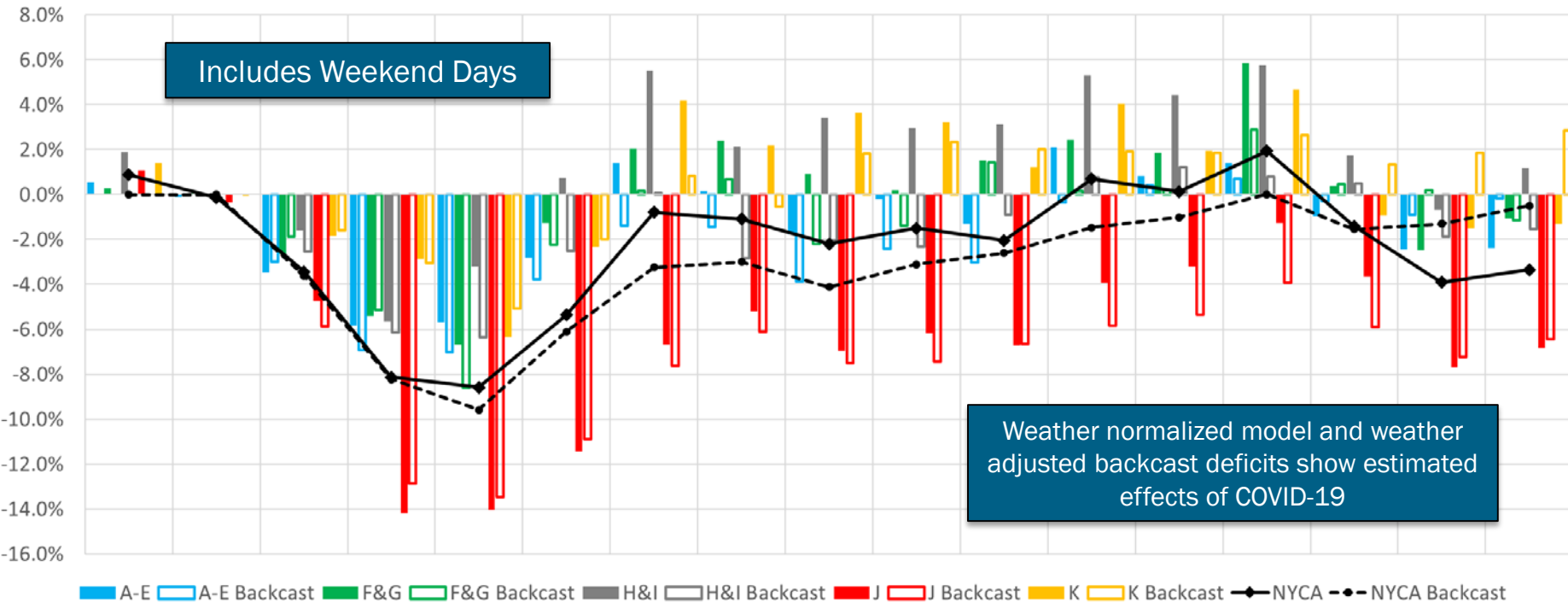


Source: Google Mobility Data, <https://www.google.com/covid19/mobility/>

# Impacts on Daily Energy by Month

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

Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20 Jan-21 Feb-21 Mar-21 Apr-21 May-21



# 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

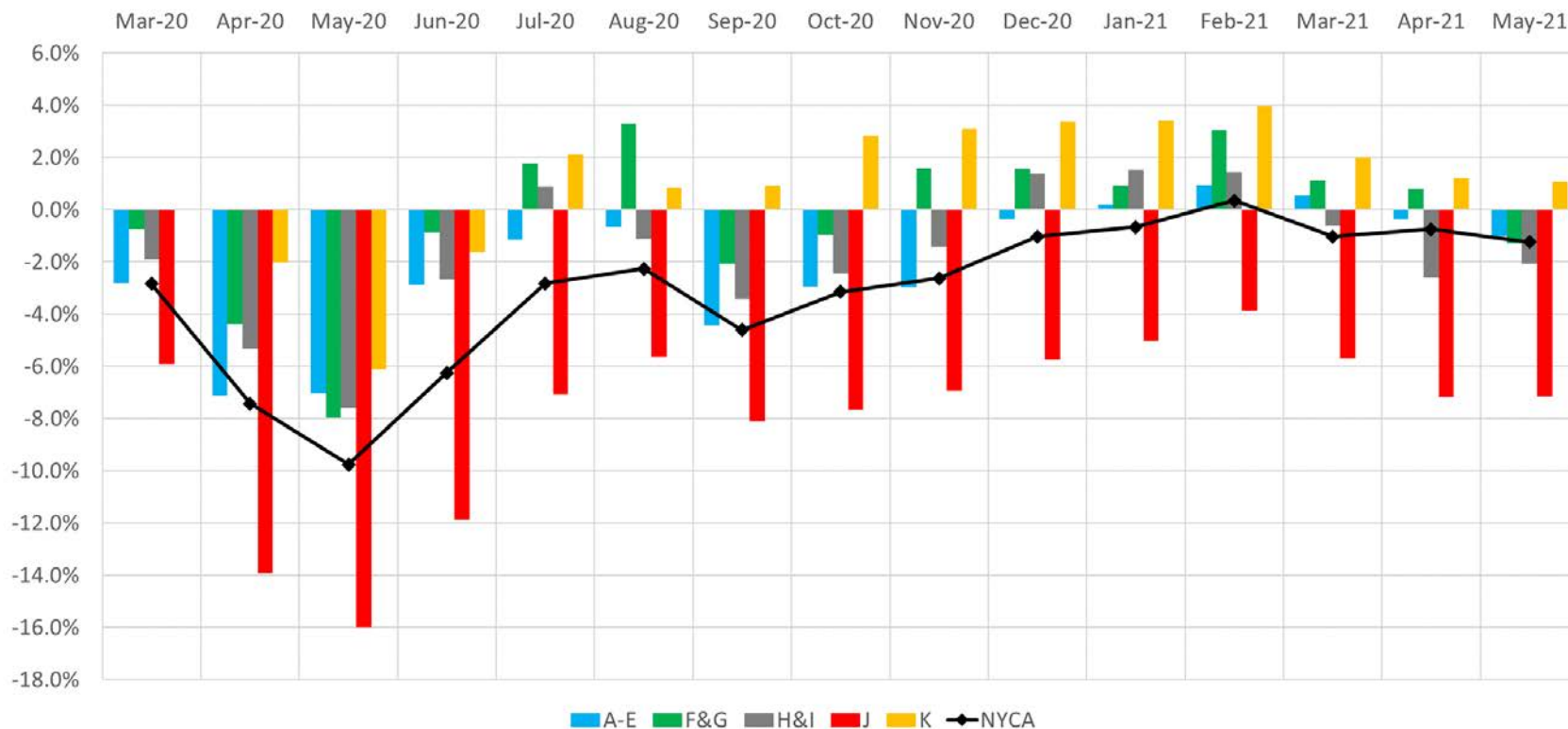
- Equals: Weather Normalized Load – Expected Load
- Weather Normalized Load is calculated via Zonal models regressing daily energy against daily weather variables and binaries. These models estimate what the load would have been on a given date under normal weather conditions
- These models are fit through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

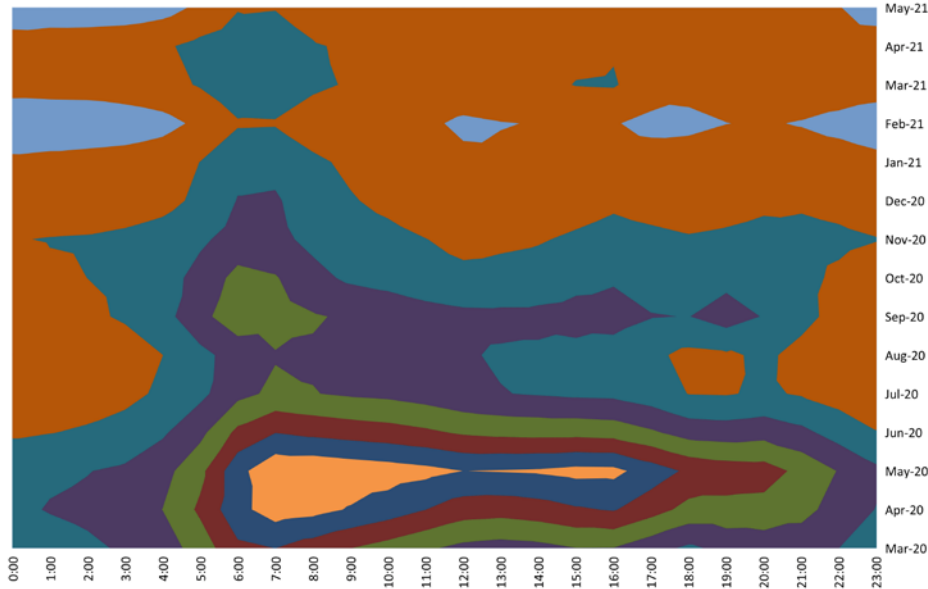
2020-2021 Backcast Peaks - % Versus Actual (Areas)



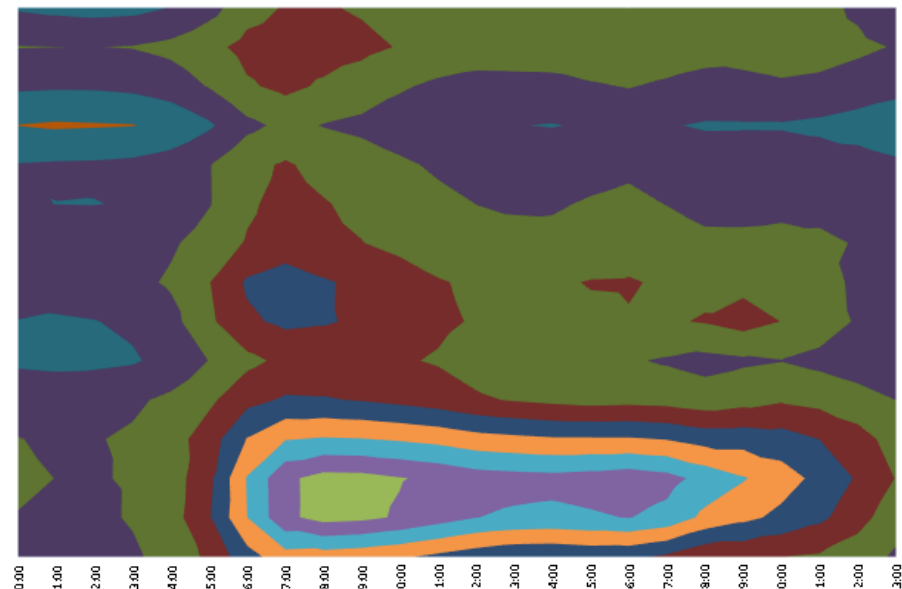


# Impacts on Hourly Load Patterns (Monthly)

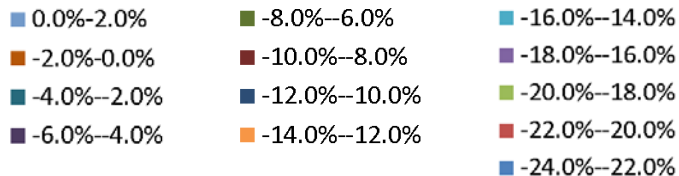
NYCA Load Profile - Weekday Diurnal Load Changes



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

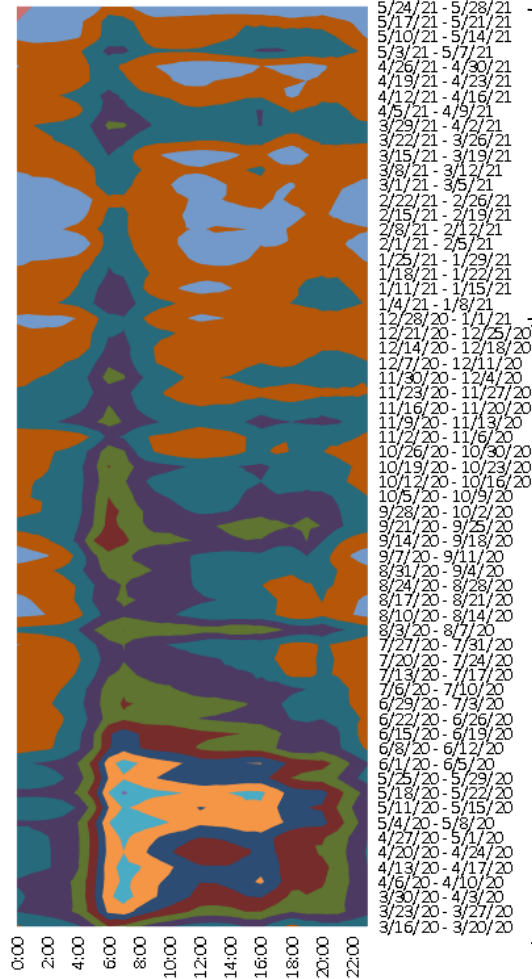


% Difference from Expected

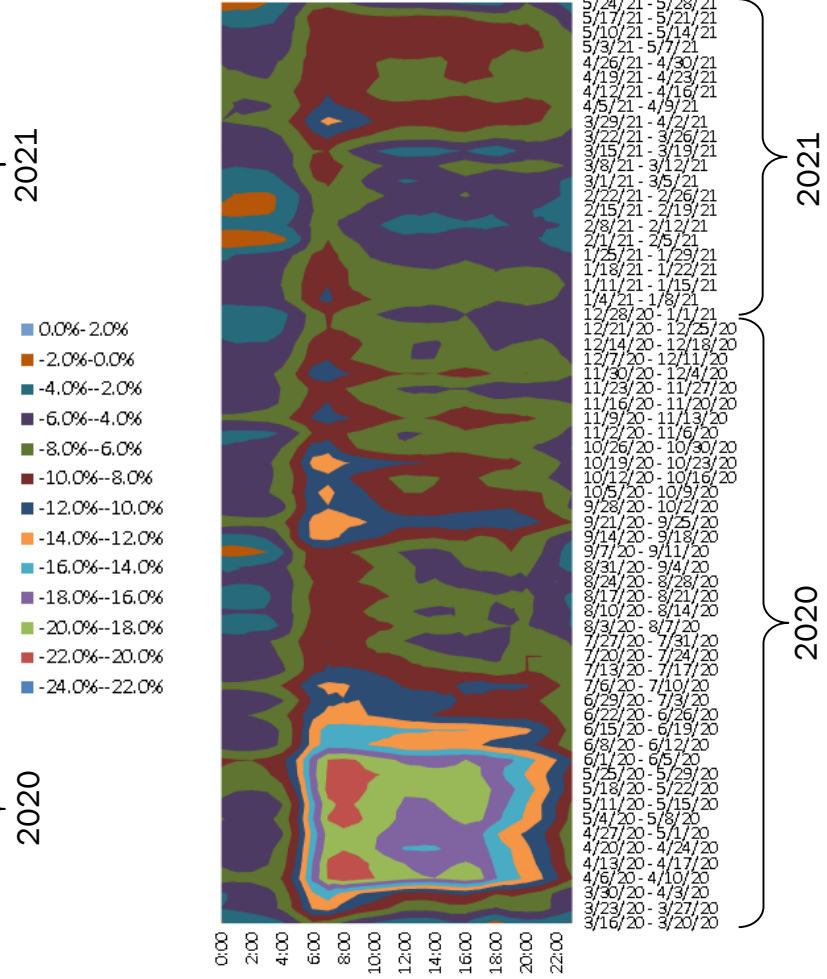


# Impacts on Hourly Load Patterns (Weekly)

NYCA Load Profile - Weekday Diurnal Load Changes



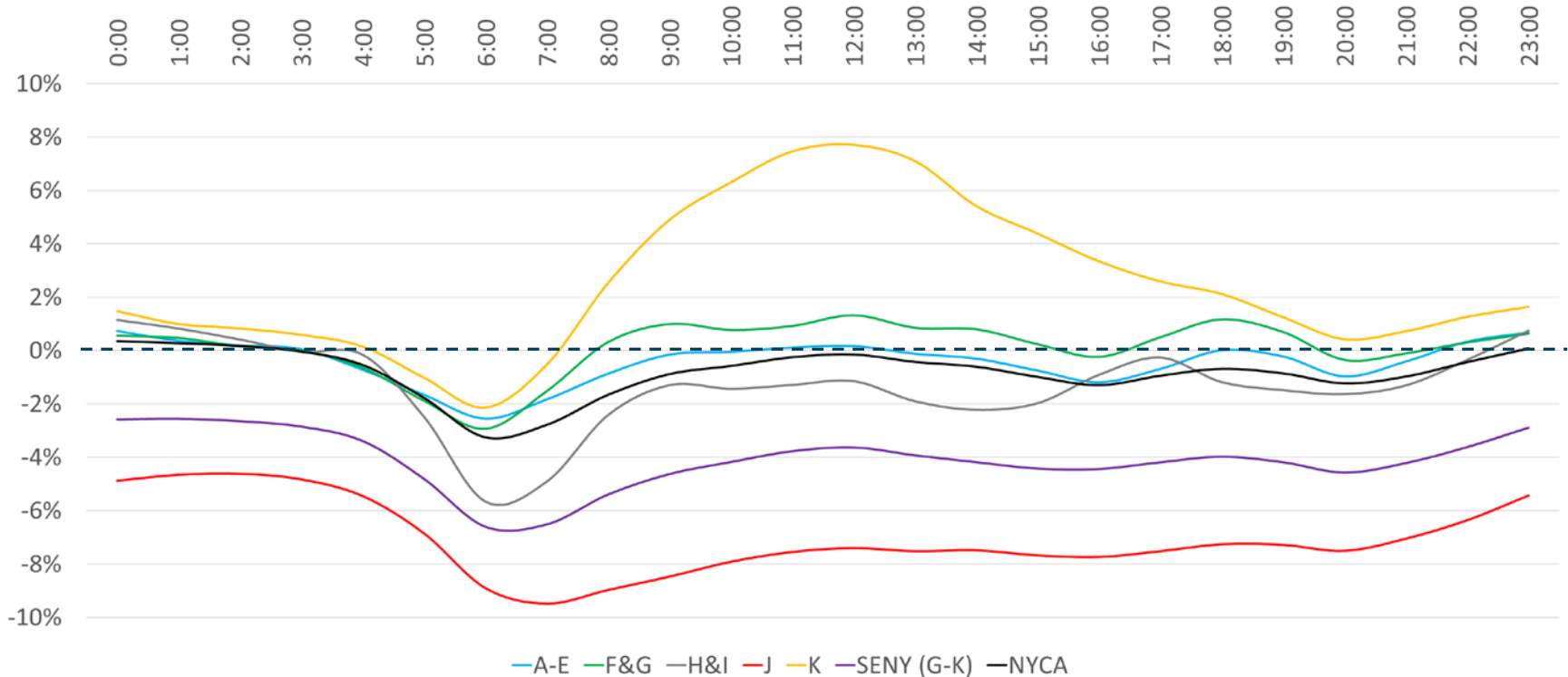
Zone J (NYC) Load Profile - Weekday Diurnal Load Changes



- 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, 4/1 through 5/31 (Weekdays)



# Questions/Discussion

# Impacts on Hourly Load Patterns (Area)

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

Average Hourly  
Load Deficit  
By Area  
4/1 - 5/31  
(Weekdays)

# Impacts on Hourly Load Patterns (Zone)

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

Average Hourly Load Deficit by Zone, 4/1 - 5/31 (Weekdays)

# 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

