Estimated Impacts of COVID-19 on ISO New England Demand

Analysis through 2/14/2021

ISO New England Operations Forecast

Overview

- *ISO is producing a weekly analysis of the impact that the response to COVID-19 is having on system demand*
    - Impact on system demand was first observed in the third week of **March** when the pandemic response began
    - Loads were trending lower than would be expected through **May**. Percentages fluctuate from week to week as shown in the following slides
    - Air conditioning load from **June through August**, combined with limited expansion of re-opening policies, resulted in higher loads than would be expected absent COVID-19 response

Overview (cont'd)

- *ISO is producing a weekly analysis of the impact that the response to COVID-19 is having on system demand*
  - **September** began with the expected higher temperatures and air conditioning demand until the end of the second week. Schools opened after Labor Day in varying configurations.
    - The second half of September had milder temperatures, on average, with less demand for air conditioning. Load forecast accuracy improved with milder temperatures and more forecasting experience with the shift in daily routines (return to school and work for many families).
  - Through **October**, actual load continued to trend toward what would be expected in the absence of COVID-19. Regional re-opening strategies had expanded to their greatest extent so far.

Overview (cont'd)

- *ISO is producing a weekly analysis of the impact that the response to COVID-19 is having on system demand*
  - **November** load was approximately 1% higher than backcast expectations. Lower temperatures had been driving higher loads, in reference to the backcast model output
  - Early **December** data showed the same trend of slightly higher loads that was observed in November, averaging 1%. Both of the traditional vacation weeks at the end of the year showed higher loads. Christmas week loads were higher by an average of 2.4% and the following week showed 2.7% higher.

Overview (cont'd)

- *ISO is producing a weekly analysis of the impact that the response to COVID-19 is having on system demand*
  - **January** load is was approximately 1% to 2% higher than would be expected following the holidays. Snowfall contributed to some of the additional load later in the month, compounding the effects of the pandemic response.
  - Cold weather, snow from January, and additional snowfall combined to push loads to an average of 3% higher in the first two weeks of **February**.

Overview (cont'd)

- *ISO is producing a weekly analysis of the impact that the response to COVID-19 is having on system demand*
  - Looking forward, new cases in New England have subsided through January. The distribution and success rate of the vaccine will influence the actions taken by state governments. System load will likely be impacted by those decisions and the associated societal factors.

Overview (cont'd)

- This report will be updated on a weekly basis on Tuesdays for data up to the prior Sunday
    - https://www.iso-ne.com/markets-operations/system-forecast-status/estimated-impacts-of-covid-19-on-demand/
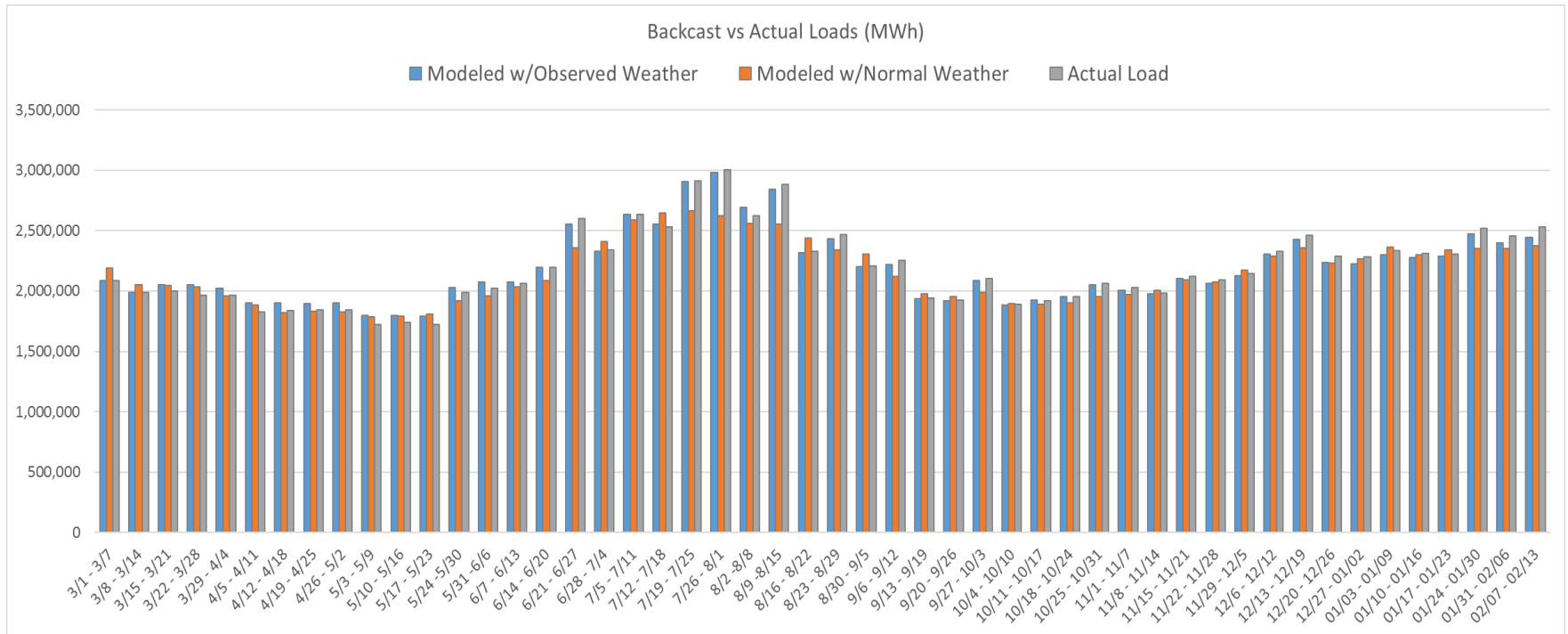
Backcast Analysis

- Using load forecast models trained only with load and weather from prior to COVID-19 outbreak to produce 2 sets of modeled load data
  - Replaced forecasted weather with **observed weather** to produce a backcast of expected load, absent the impacts of COVID-19
  - Replaced forecasted weather with a **10-year average weather** to compute "Normal Weather" loads, absent the impacts of COVID-19

- Output from both models is compared to the actual hourly loads
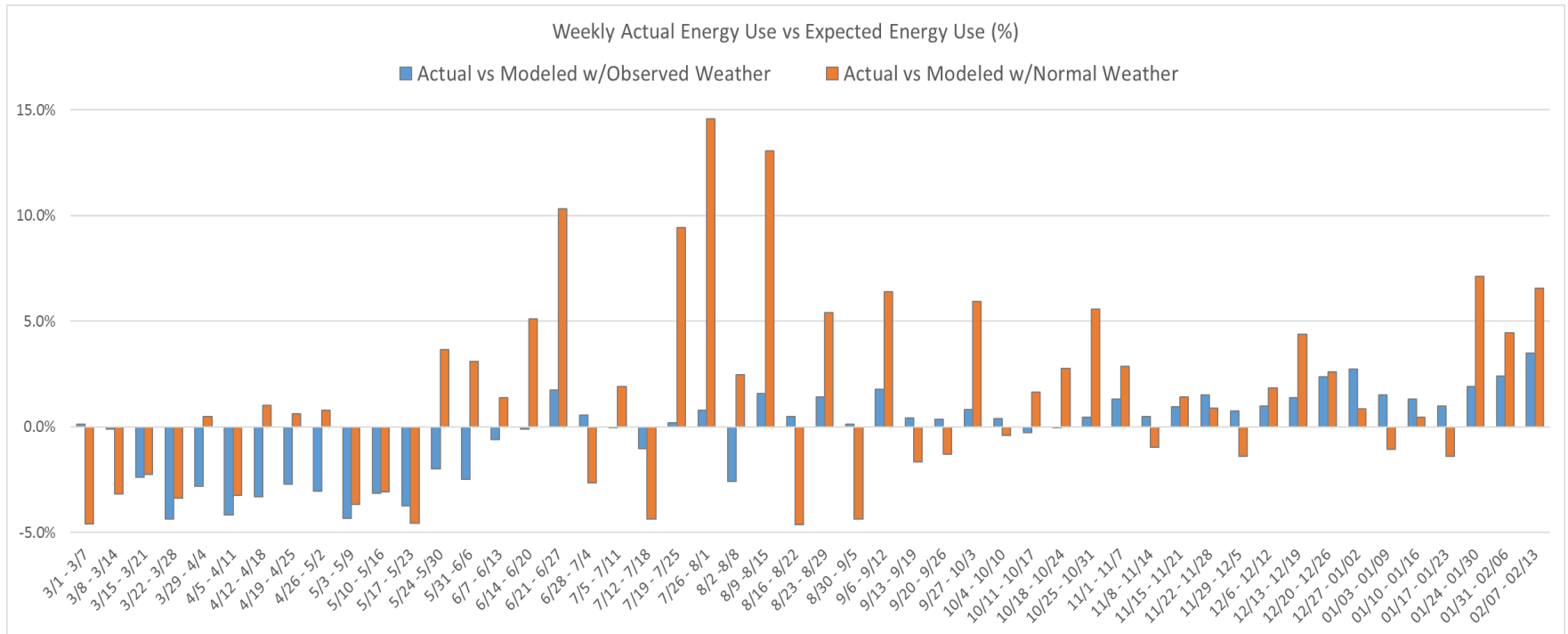
Backcast Load Analysis

- ISO New England Backcast models showing Weekly Energy trends using Normal and Observed Weather.

Backcast Load Analysis

- ISO New England actual load trends during COVID-19

Weekly Actual Energy Use vs Expected Energy Use (%)

■ Actual vs Modeled w/Observed Weather   ■ Actual vs Modeled w/Normal Weather
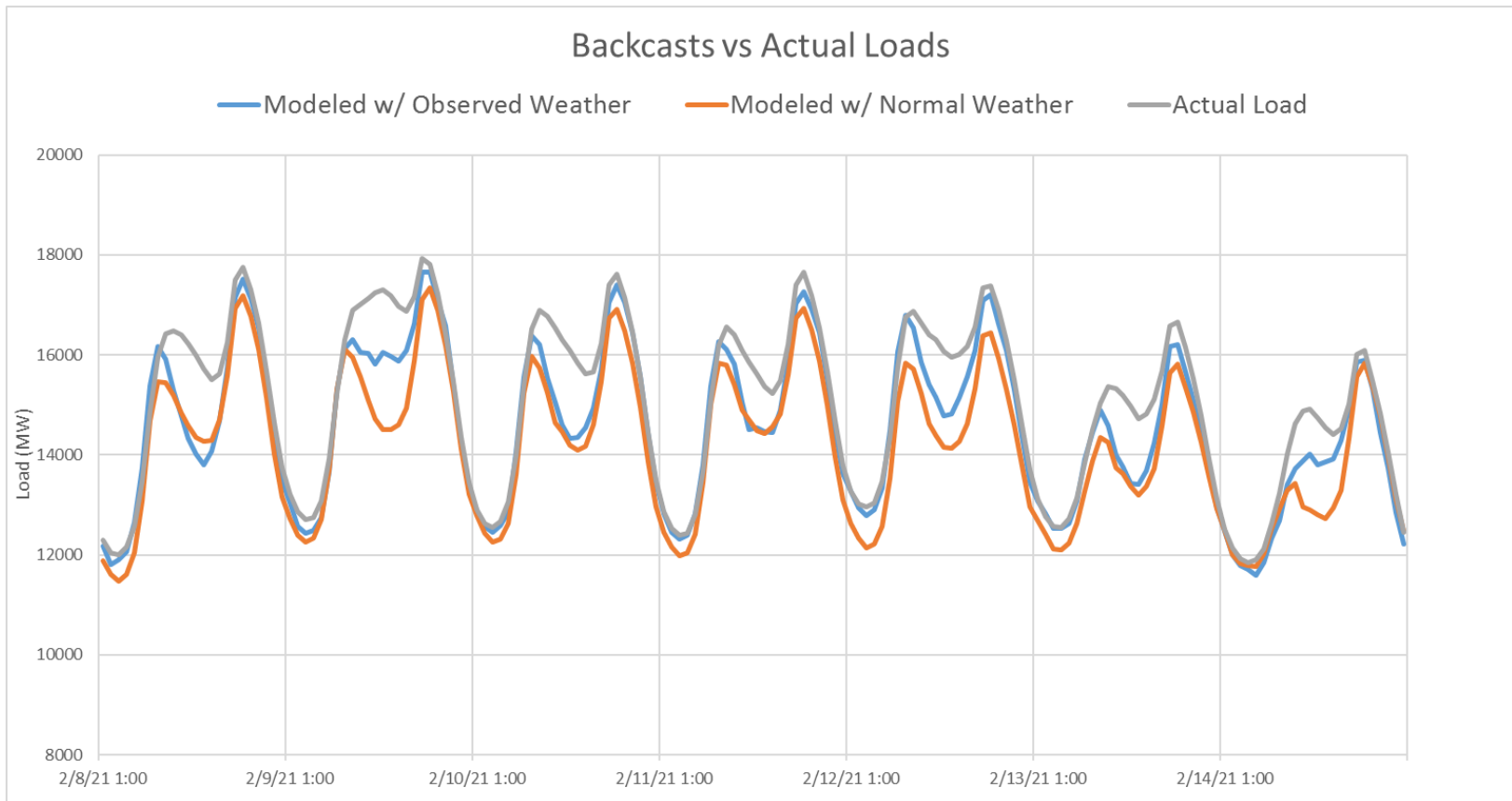
System Load Deviation

- ISO New England daily and rolling seven-day forecast load deviation trends.
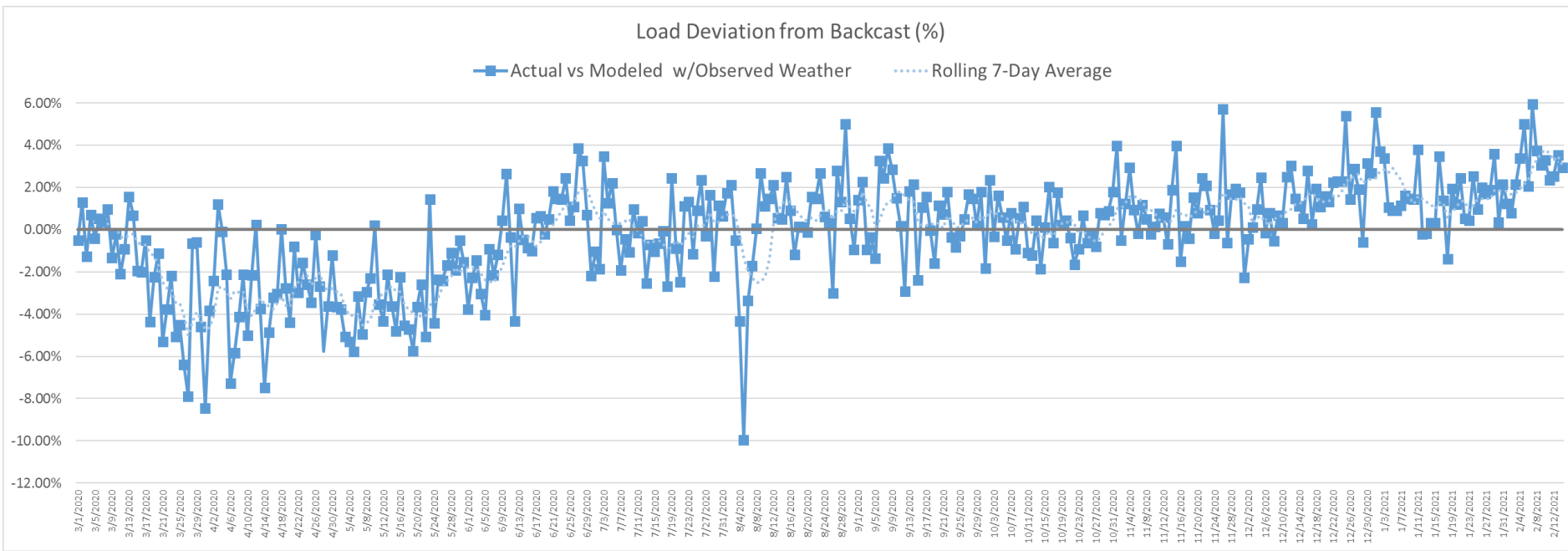
Daily Backcast Model comparison

- Daily load variation showing volatility from BTM PV and Covid-19 impacts

Backcasts vs Actual Loads

Backcast Load Tabular Data

- The following table provides the data that is represented on the charts above

Backcast vs Actual Loads (MWh)	3/1 - 3/7	3/8 - 3/14	3/15 - 3/21	3/22 - 3/28	3/29 - 4/4	4/5 - 4/11	4/12 - 4/18	4/19 - 4/25	4/26 - 5/2	5/3 - 5/9	5/10 - 5/16	5/17 - 5/23	5/24 -5/30	5/31 -6/6	6/7 - 6/13
Modeled w/Observed Weather	2,085,829	1,990,206	2,051,625	2,054,137	2,024,895	1,904,321	1,902,755	1,894,423	1,899,232	1,800,585	1,796,038	1,792,771	2,031,820	2,073,500	2,075,276
Modeled w/Normal Weather	2,189,017	2,053,459	2,048,462	2,033,440	1,958,375	1,885,873	1,821,355	1,831,988	1,827,282	1,787,795	1,794,733	1,808,218	1,921,100	1,961,313	2,034,583
Actual Load	2,088,378	1,987,982	2,002,463	1,964,684	1,968,097	1,825,006	1,839,585	1,843,156	1,841,494	1,722,430	1,739,679	1,725,598	1,991,305	2,021,913	2,062,865

Weely Use vs Expected %	3/1 - 3/7	3/8 - 3/14	3/15 - 3/21	3/22 - 3/28	3/29 - 4/4	4/5 - 4/11	4/12 - 4/18	4/19 - 4/25	4/26 - 5/2	5/3 - 5/9	5/10 - 5/16	5/17 - 5/23	5/24 -5/30	5/31 -6/6	6/7 - 6/13
Actual vs Modeled w/Observed Weather	0.1%	-0.1%	-2.4%	-4.4%	-2.8%	-4.2%	-3.3%	-2.7%	-3.0%	-4.3%	-3.1%	-3.7%	-2.0%	-2.5%	-0.6%
Actual vs Modeled w/Normal Weather	-4.6%	-3.2%	-2.2%	-3.4%	0.5%	-3.2%	1.0%	0.6%	0.8%	-3.7%	-3.1%	-4.6%	3.7%	3.1%	1.4%

Backcast vs Actual Loads (MWh)	6/14 - 6/20	6/21 - 6/27	6/28 - 7/4	7/5 - 7/11	7/12 - 7/18	7/19 - 7/25	7/26 - 8/1	8/2 -8/8	8/9 -8/15	8/16 - 8/22	8/23 - 8/29	8/30 - 9/5	9/6 - 9/12	9/13 - 9/19	9/20 - 9/26
Modeled w/Observed Weather	2,198,167	2,555,121	2,331,177	2,637,735	2,557,541	2,908,270	2,983,977	2,693,711	2,841,915	2,315,180	2,431,586	2,204,901	2,217,098	1,934,498	1,919,168
Modeled w/Normal Weather	2,088,937	2,356,220	2,407,507	2,587,188	2,646,456	2,662,591	2,624,278	2,560,685	2,553,125	2,439,809	2,339,771	2,308,285	2,120,383	1,975,314	1,951,543
Actual Load	2,195,885	2,599,377	2,343,821	2,636,541	2,530,756	2,913,748	3,007,386	2,623,728	2,886,661	2,326,736	2,466,169	2,207,642	2,256,186	1,942,851	1,926,227

Weely Use vs Expected %	6/14 - 6/20	6/21 - 6/27	6/28 - 7/4	7/5 - 7/11	7/12 - 7/18	7/19 - 7/25	7/26 - 8/1	8/2 -8/8	8/9 -8/15	8/16 - 8/22	8/23 - 8/29	8/30 - 9/5	9/6 - 9/12	9/13 - 9/19	9/20 - 9/26
Actual vs Modeled w/Observed Weather	-0.1%	1.7%	0.5%	0.0%	-1.0%	0.2%	0.8%	-2.6%	1.6%	0.5%	1.4%	0.1%	1.8%	0.4%	0.4%
Actual vs Modeled w/Normal Weather	5.1%	10.3%	-2.6%	1.9%	-4.4%	9.4%	14.6%	2.5%	13.1%	-4.6%	5.4%	-4.4%	6.4%	-1.6%	-1.3%

Backcast vs Actual Loads (MWh)	9/27 - 10/3	10/4 - 10/10	10/11 - 10/17	10/18 - 10/24	10/25 - 10/31	11/1 - 11/7	11/8 - 11/14	11/15 - 11/21	11/22 - 11/28	11/29 - 12/5	12/6 - 12/12	12/13 - 12/19	12/20 - 12/26	12/27 - 01/02	01/03 - 01/09
Modeled w/Observed Weather	2,089,275	1,882,750	1,924,405	1,955,225	2,054,923	2,003,584	1,975,145	2,103,084	2,061,247	2,128,226	2,308,306	2,427,218	2,236,799	2,224,338	2,301,896
Modeled w/Normal Weather	1,988,166	1,898,026	1,888,031	1,901,899	1,955,095	1,973,358	2,004,229	2,093,942	2,074,250	2,174,121	2,288,487	2,357,500	2,231,917	2,265,648	2,362,165
Actual Load	2,106,326	1,890,059	1,919,296	1,954,711	2,064,311	2,029,901	1,984,585	2,123,308	2,092,275	2,143,930	2,330,954	2,461,078	2,289,604	2,284,926	2,337,010

Weely Use vs Expected %	9/27 - 10/3	10/4 - 10/10	10/11 - 10/17	10/18 - 10/24	10/25 - 10/31	11/1 - 11/7	11/8 - 11/14	11/15 - 11/21	11/22 - 11/28	11/29 - 12/5	12/6 - 12/12	12/13 - 12/19	12/20 - 12/26	12/27 - 01/02	01/03 - 01/09
Actual vs Modeled w/Observed Weather	0.8%	0.4%	-0.3%	0.0%	0.5%	1.3%	0.5%	1.0%	1.5%	0.7%	1.0%	1.4%	2.4%	2.7%	1.5%
Actual vs Modeled w/Normal Weather	5.9%	-0.4%	1.7%	2.8%	5.6%	2.9%	-1.0%	1.4%	0.9%	-1.4%	1.9%	4.4%	2.6%	0.9%	-1.1%

Backcast vs Actual Loads (MWh)	01/10 - 01/16	01/17 - 01/23	01/24 - 01/30	01/31 - 02/06	02/07 - 02/13
Modeled w/Observed Weather	2,279,996	2,286,370	2,473,790	2,399,946	2,446,238
Modeled w/Normal Weather	2,299,341	2,341,824	2,353,471	2,353,050	2,375,962
Actual Load	2,309,902	2,309,140	2,521,184	2,457,986	2,531,639

Weely Use vs Expected %	01/10 - 01/16	01/17 - 01/23	01/24 - 01/30	01/31 - 02/06	02/07 - 02/13
Actual vs Modeled w/Observed Weather	1.3%	1.0%	1.9%	2.4%	3.5%
Actual vs Modeled w/Normal Weather	0.5%	-1.4%	7.1%	4.5%	6.6%