

Morningstar ERCOT Model Results for 2020

U.S. Power and Gas Weekly

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Data Sources Used in This Publication
Morningstar C&E Research

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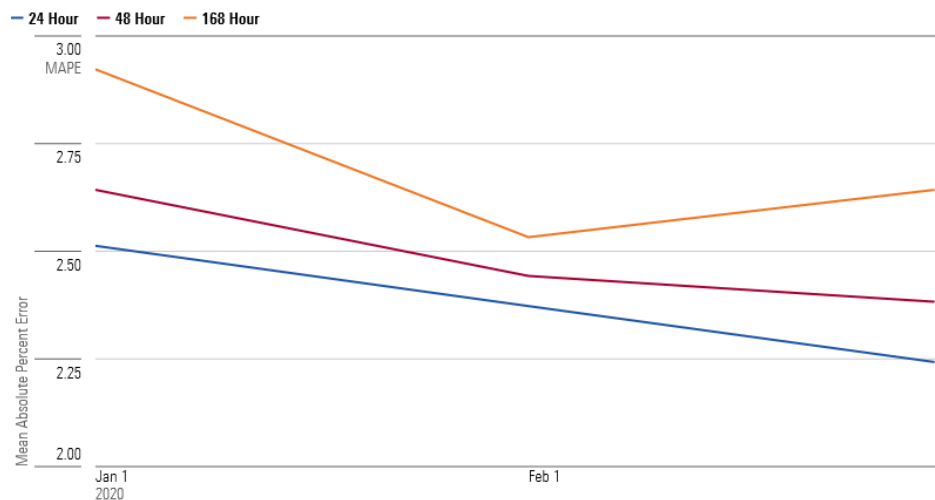
Morningstar Power Forecast

Over the past year and a half, Morningstar has worked diligently to improve our forecast for short-term load and price in ERCOT. One of the principles in the team's effort is a forecast solution that maintains a high level of transparency to enhance interpretation. In March, we published our results for 2019 back testing. Now, with recent demand events of COVID-19, we look at the first quarter of 2020 and the last 30 days as demand profiles have shifted under lockdown. This piece reviews the back test and live results.

2020 Load Forecast Results

Our load forecast covers a seven-day, or 168-hour, outlook for short-term load. Recent load forecast back testing shows considerable improvement in the model's accuracy compared with previous versions. Plotting the ERCOT RTO forecast mean absolute percentage error, or MAPE, across three forecasting time frames shows a first-quarter average ranging between 2.24% and 2.92% (Exhibit 1). The first-quarter average MAPEs for the 24-hour, 48-hour, and 168-hour forecasts were 2.37%, 2.49%, and 2.70%, respectively.

Exhibit 1 ERCOT Systemwide Forecast Back Test Monthly Mean Absolute Percentage Error

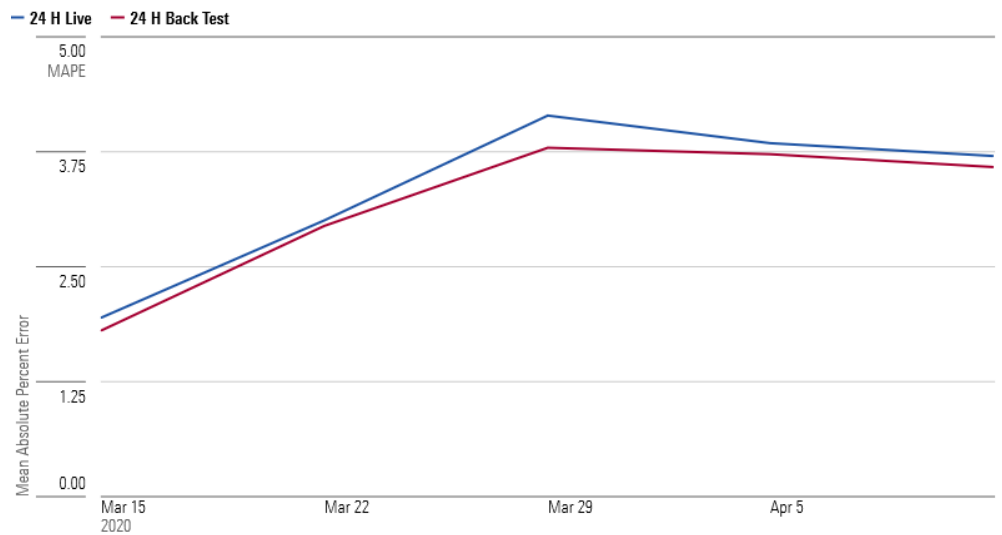


Source: Morningstar.

These results reflect continued model improvements since January. For example, our 2019 first-quarter back testing showed average MAPEs between 4.30% and 6.10%, meaning that we've reduced high-end errors more than 50% this year and continue to see improvement.

In the recent 30-day period from March 15 to April 13, we saw additional error due to two main drivers. Stay-at-home orders in effect, most noticeable starting March 25, drove some shape changes but more so a general drop in load over all hours of the day (Exhibit 2). Shapes were challenging to forecast in this shoulder period when demand shifts from morning peak loads during colder winter profiles to a warmer summer profile as temperatures rise.

Exhibit 2 ERCOT Systemwide Forecast Live Runs vs. Back Test Weekly MAPE

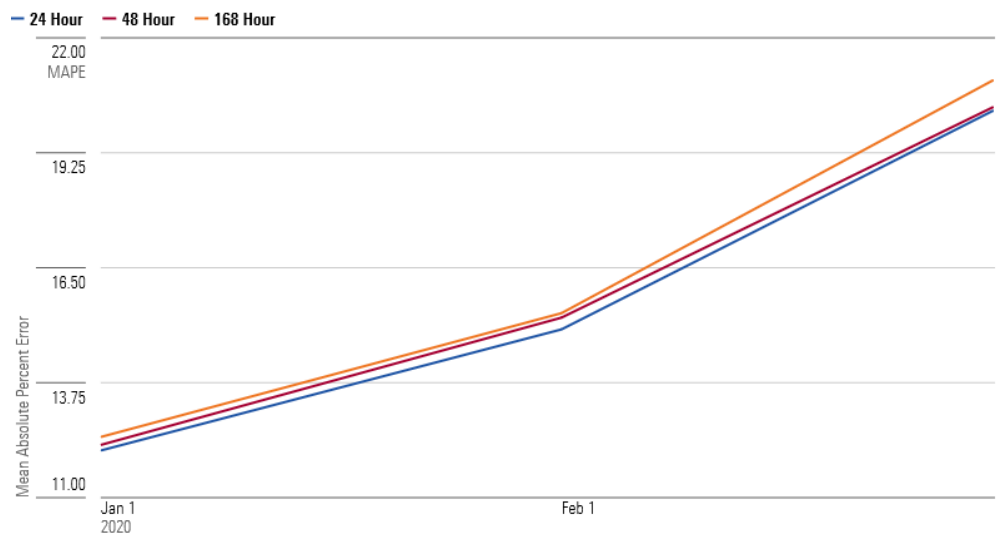


Source: Morningstar.

2020 Price Forecast Results

Our day-ahead price forecast covers the forward six-day, or 144-hour, outlook for short-term load. The price forecast model performed reasonably well in predicting more volatile day-ahead pricing, showing an error rate between 12.42% and 20.96% for the first quarter. Price spikes drove the high 20.96% March error. With no prior price samples in that range for this time of year, our model wasn't able to capture the triple-digit price spikes. The first-quarter average MAPEs for the 24-hour, 48-hour, and 168-hour forecasts were 15.78%, 15.94%, and 16.25%, respectively (Exhibit 3).

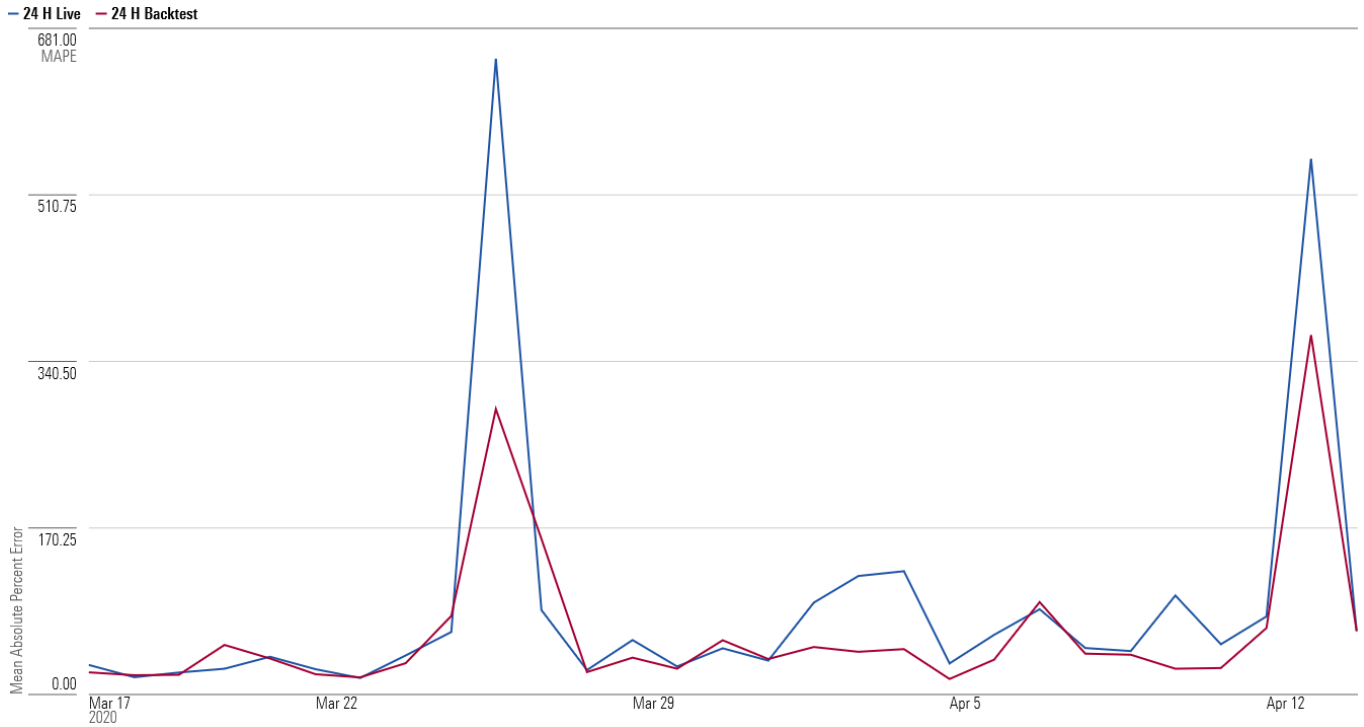
Exhibit 3 ERCOT Day-Ahead HUB North Forecast MAPE



Source: Morningstar.

Our back test results come from our upcoming release, which contains a significant update to price performance. In the same 30-day period we referred to under load forecast above from March 15 to April 13, we saw two major misses caused by triple-digit hourly settles in March (Exhibit 4). However, our latest model version has seen improvement in breaking under the 20% MAPE threshold that older model versions were maintaining by driving closer to single-digit MAPEs for day-ahead price. The model continues to be directionally accurate on price spikes, but we continue to work on precision in higher price regimes to drive down error percentages.

Exhibit 4 ERCOT Day-Ahead HUB West Forecast MAPE



Source: Morningstar.

Conclusion

While the team continues to improve the model's output for both load and day-ahead price, we believe the progress to date forms a robust framework for even better results going forward. The current model version is generating forecasts twice daily. Detailed information on the methodology and back testing results are available upon request as well as trial subscriptions to the intraday output. We are looking for additional partners willing to contribute insight and feedback, so if you're interested please reach out to daniel.grunwald@morningstar.com. ■■

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