COVID-19 Load Impact Analysis

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Load Forecasting & Analysis

September 1, 2020

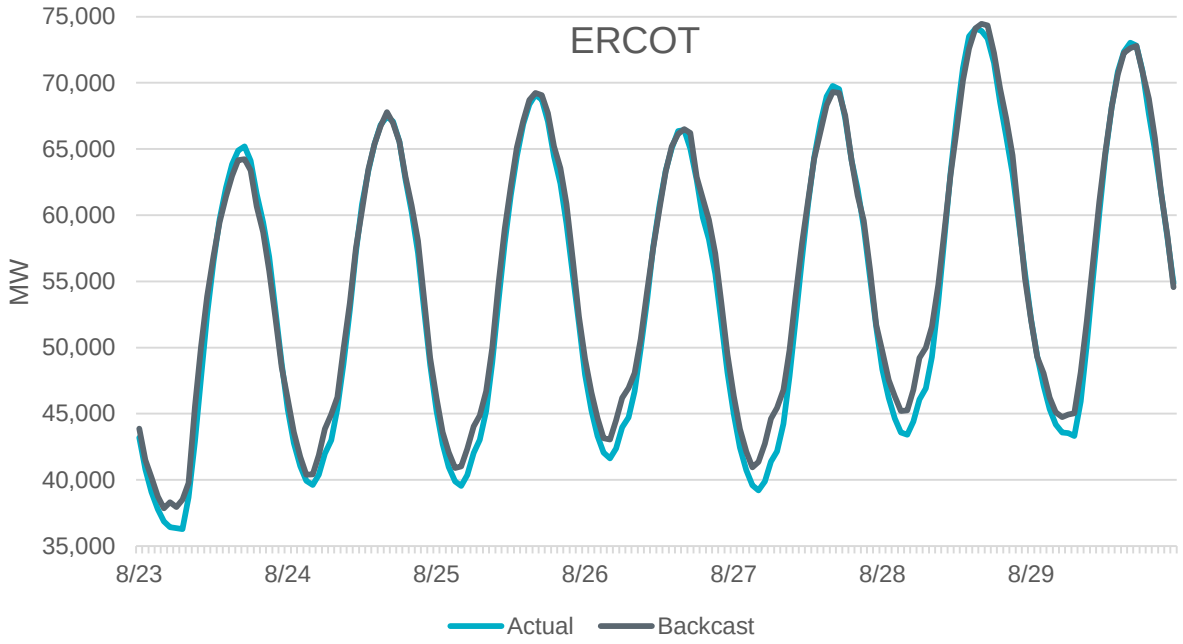
Methodology for Measuring Load Impacts

- ERCOT is using a backcast model, which compares model results using actual weather versus actual hourly load.
- The difference between what actually occurs and what the model shows is referred to as a model error, and there is a normal range for model errors.
- The model was last updated in January.
  - As a result, the model used does not reflect the COVID-19 impact.
  - It is considered a “pure model” for analyzing the difference between the model and actual outcomes.
- COVID-19 is a component of the model error.

Observations for Week Beginning 8/23

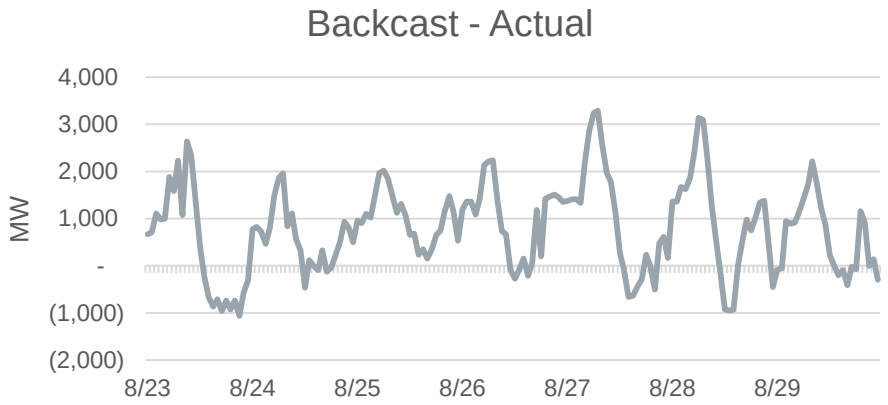
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Load reduction primarily during the early morning hours between 6 and 10 a.m.

Week Beginning 8/23

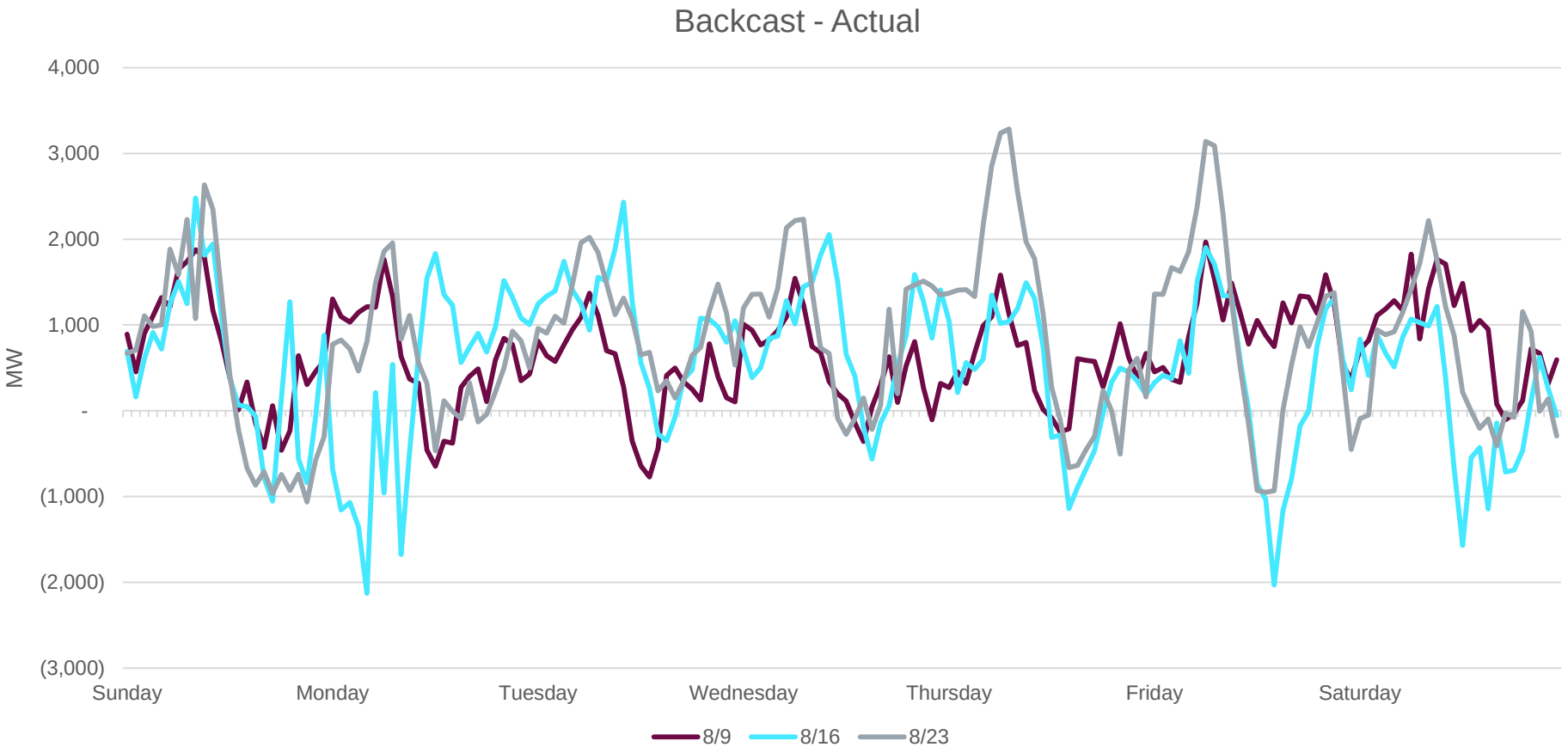


- No impact on daily peaks
- 4CP impacts this week

- Errors were somewhat larger than the previous week during the early morning hours



Weekly Model Error Summary

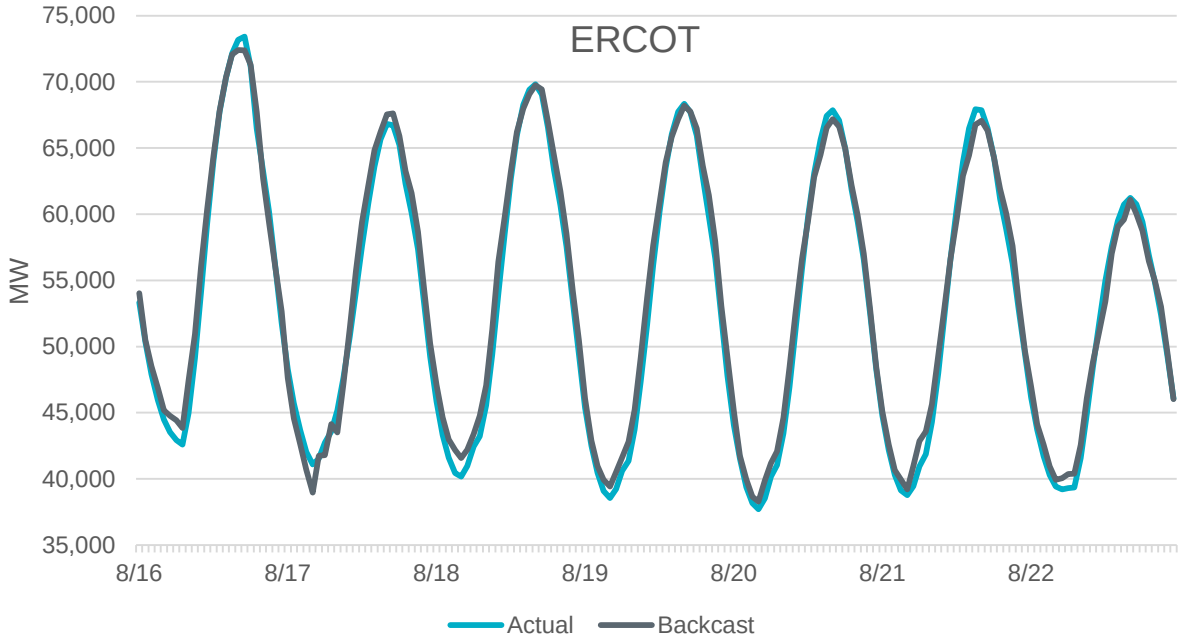


- Errors were slightly larger than the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 8/16

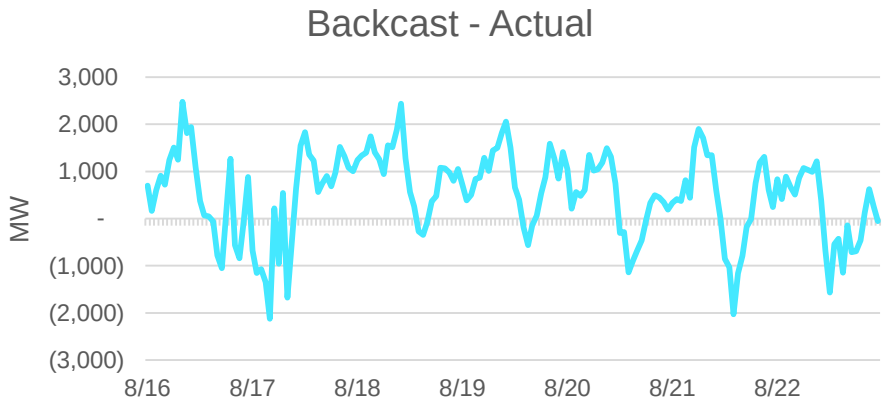
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Load reduction primarily during the early morning hours between 6 and 10 a.m.

Week Beginning 8/16

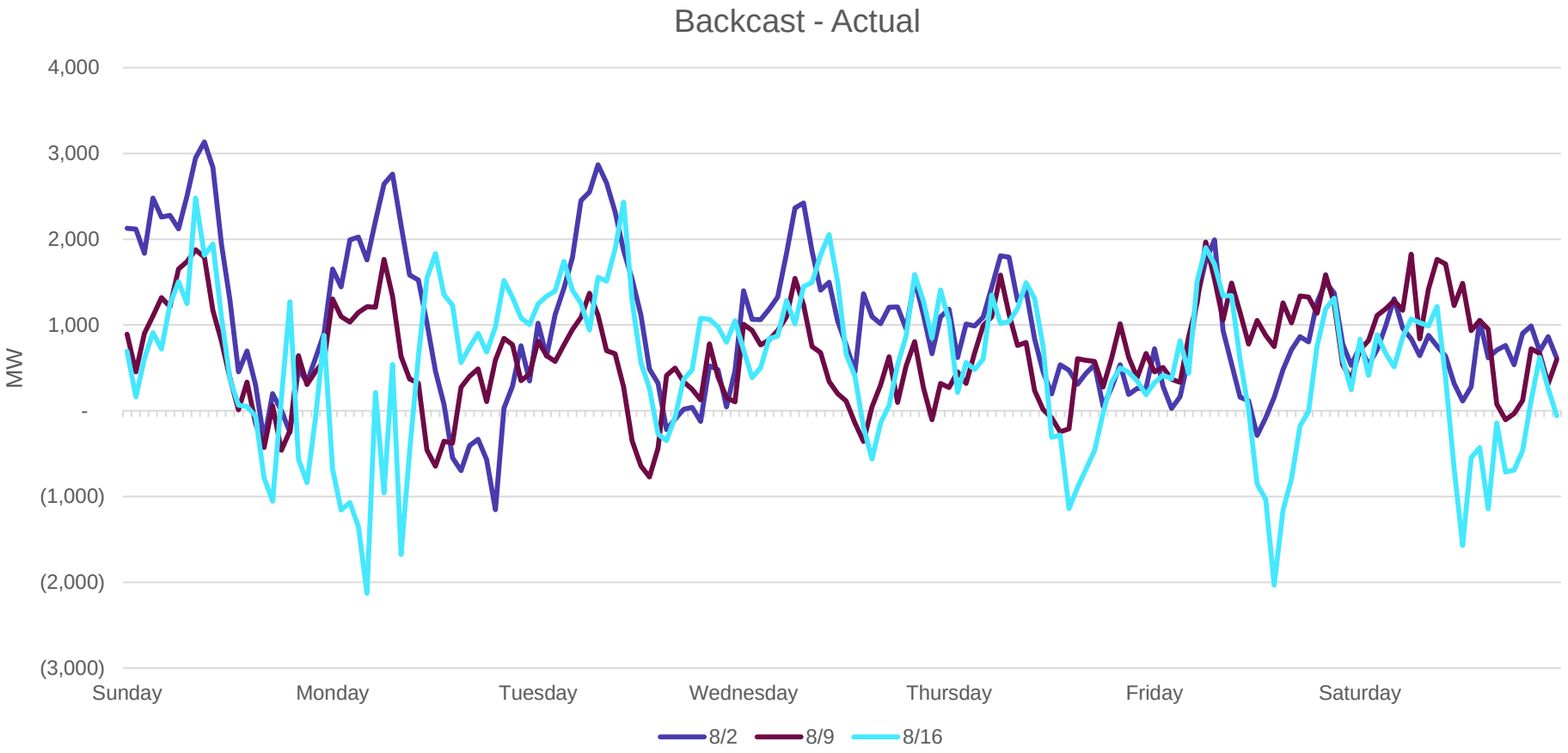


- No impact on daily peaks
- 4CP impacts this week

- Errors were similar to the previous week



Weekly Model Error Summary

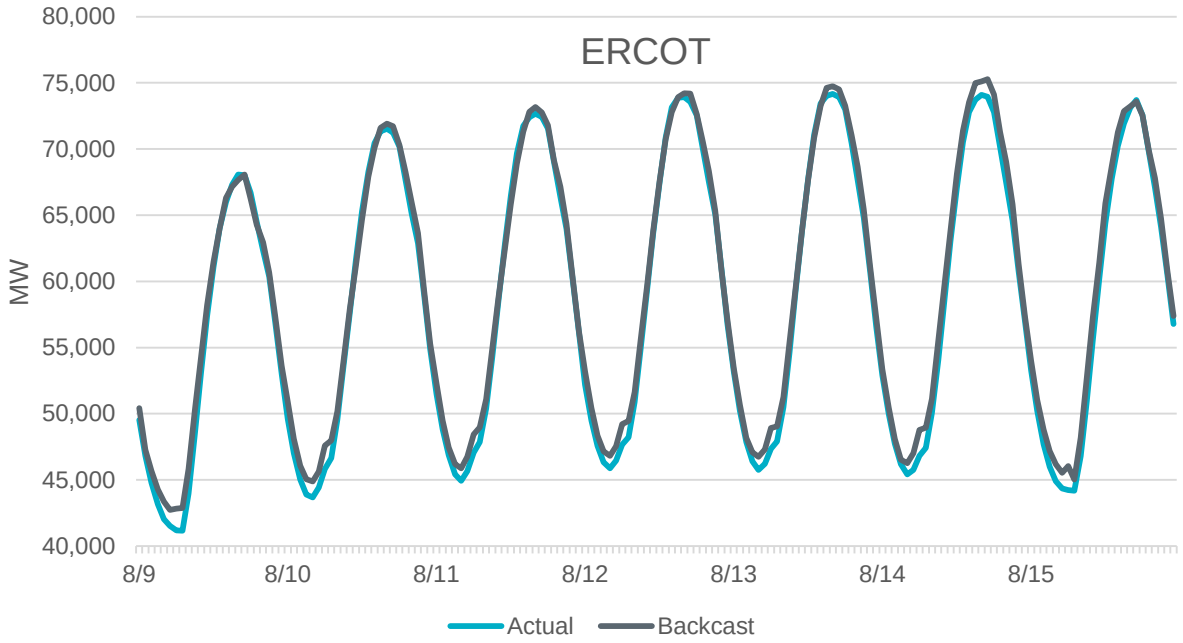


- Errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 8/9

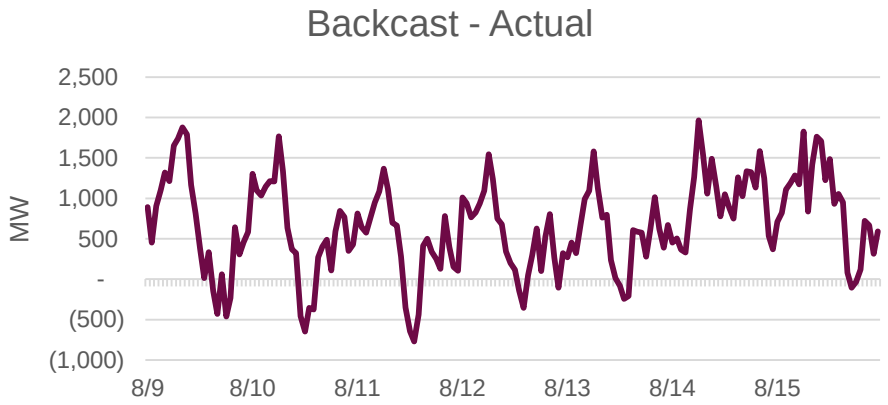
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Load reduction primarily during the early morning hours between 6 and 10 a.m.

Week Beginning 8/9

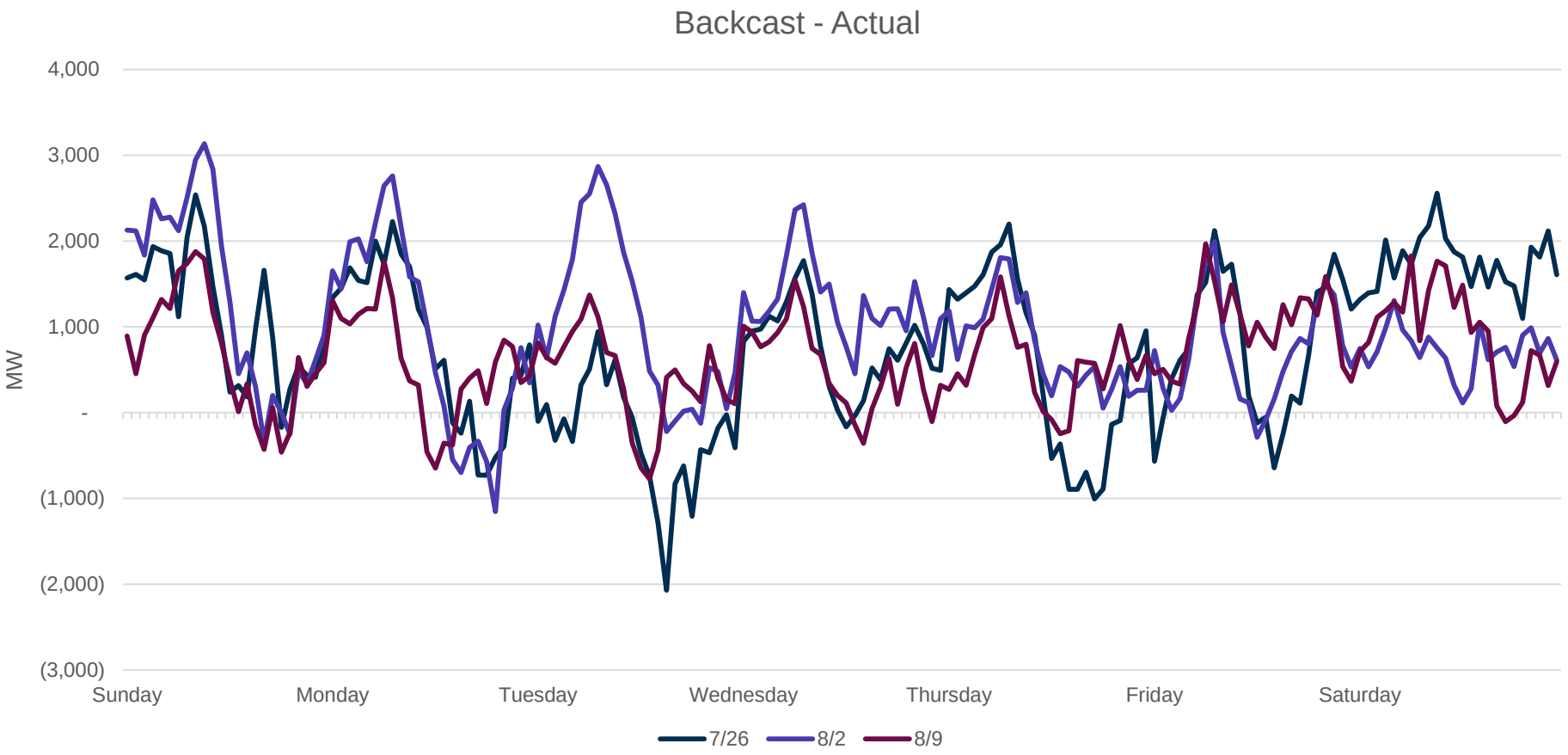


- No impact on daily peaks
- 4CP impacts this week

- Errors were similar to the previous week



Weekly Model Error Summary

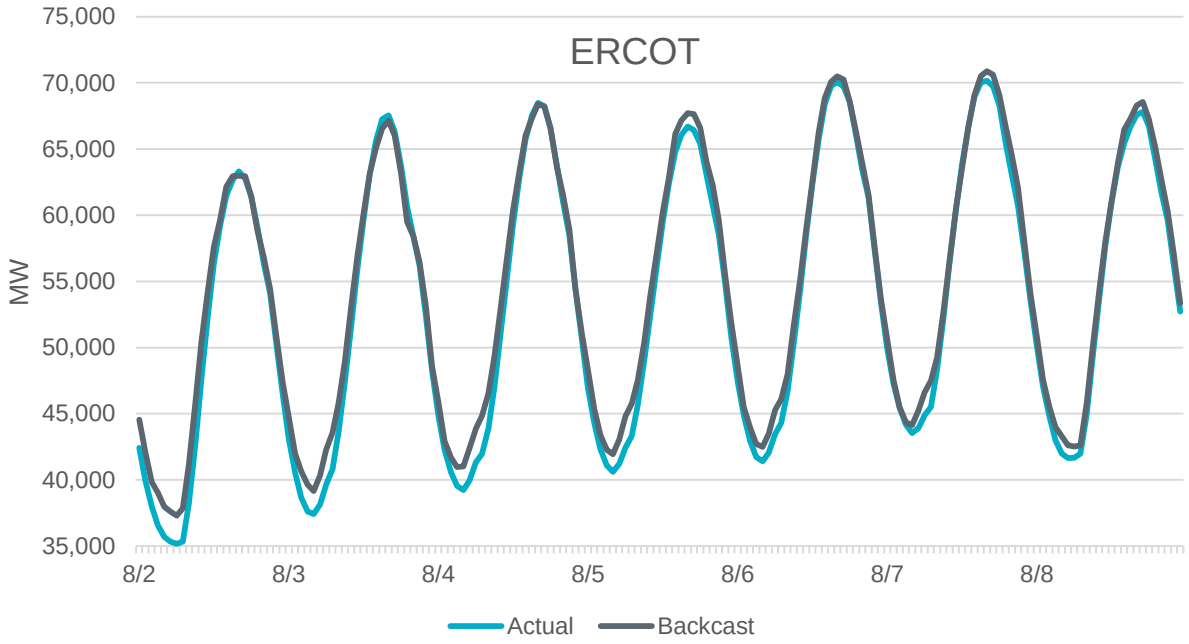


- Errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 8/2

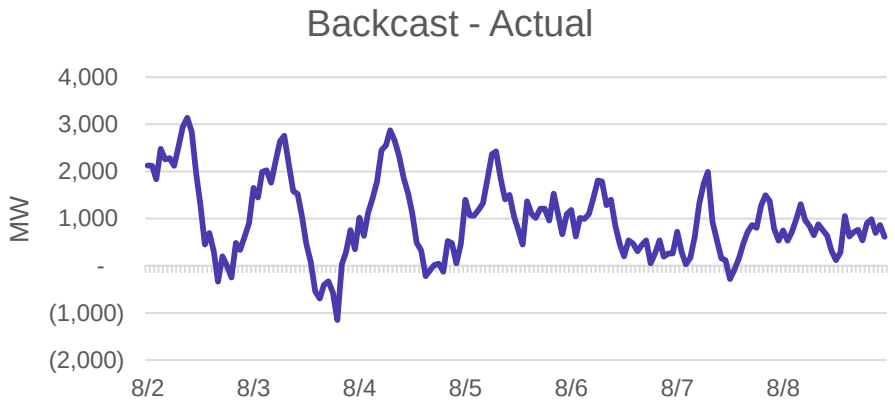
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Load reduction primarily during the early morning hours between 6 and 10 a.m.

Week Beginning 8/2

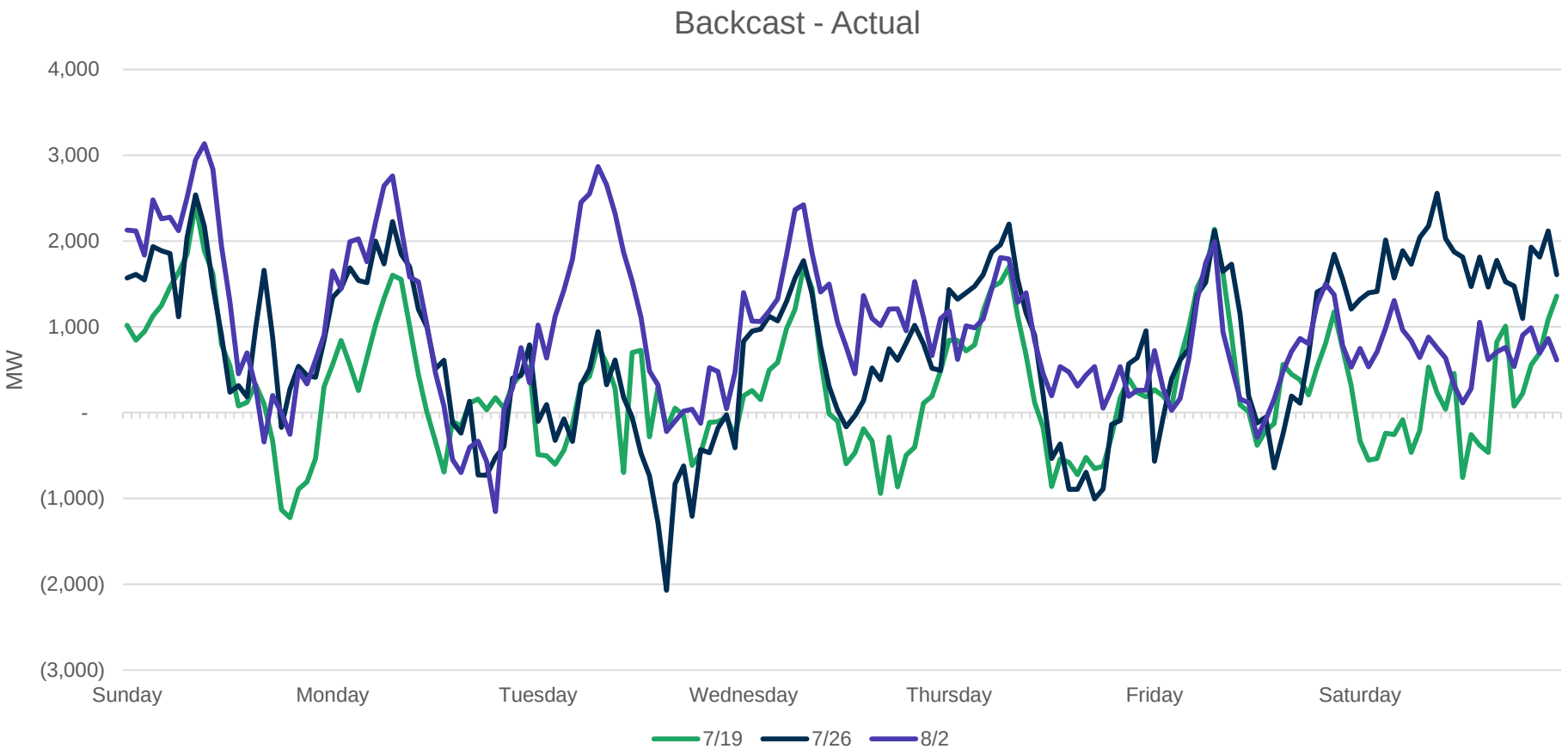


- No impact on daily peaks
- Impacts primarily during the morning hours

- Errors were similar to the previous week



Weekly Model Error Summary

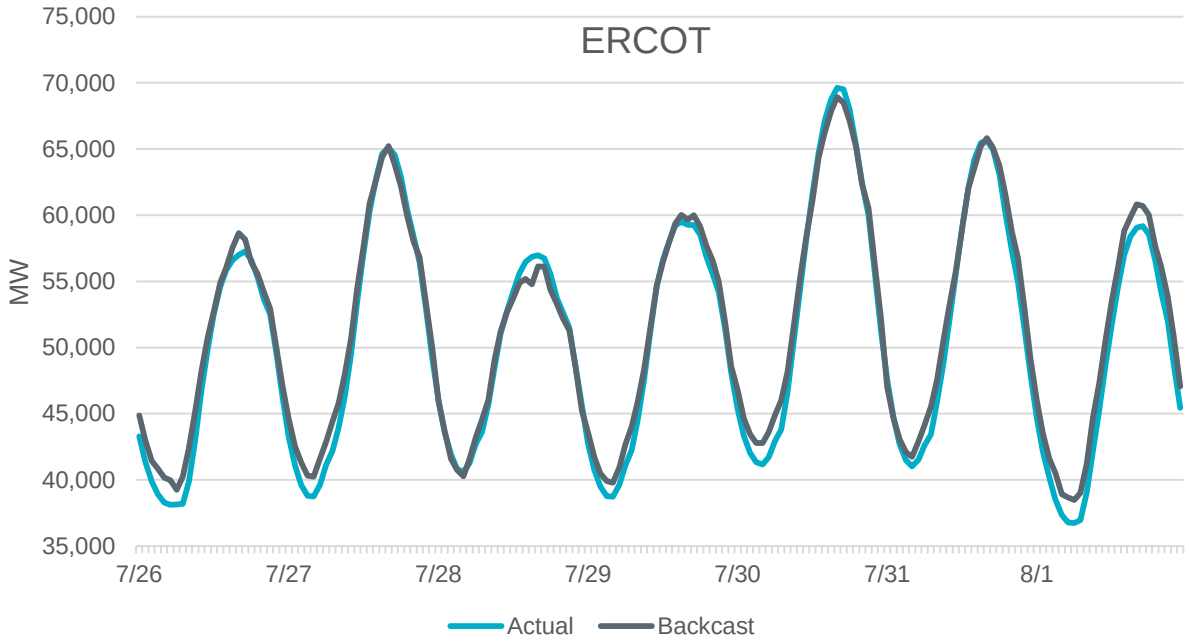


- Errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 7/26

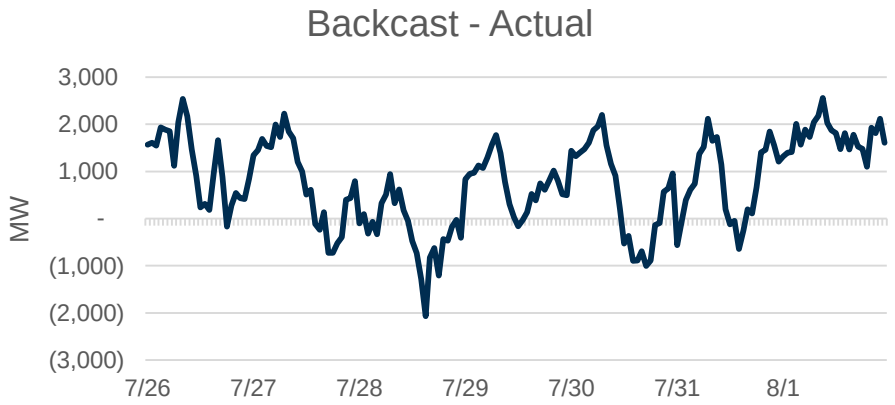
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Load reduction primarily during the early morning hours between 6 and 10 a.m.

Week Beginning 7/26

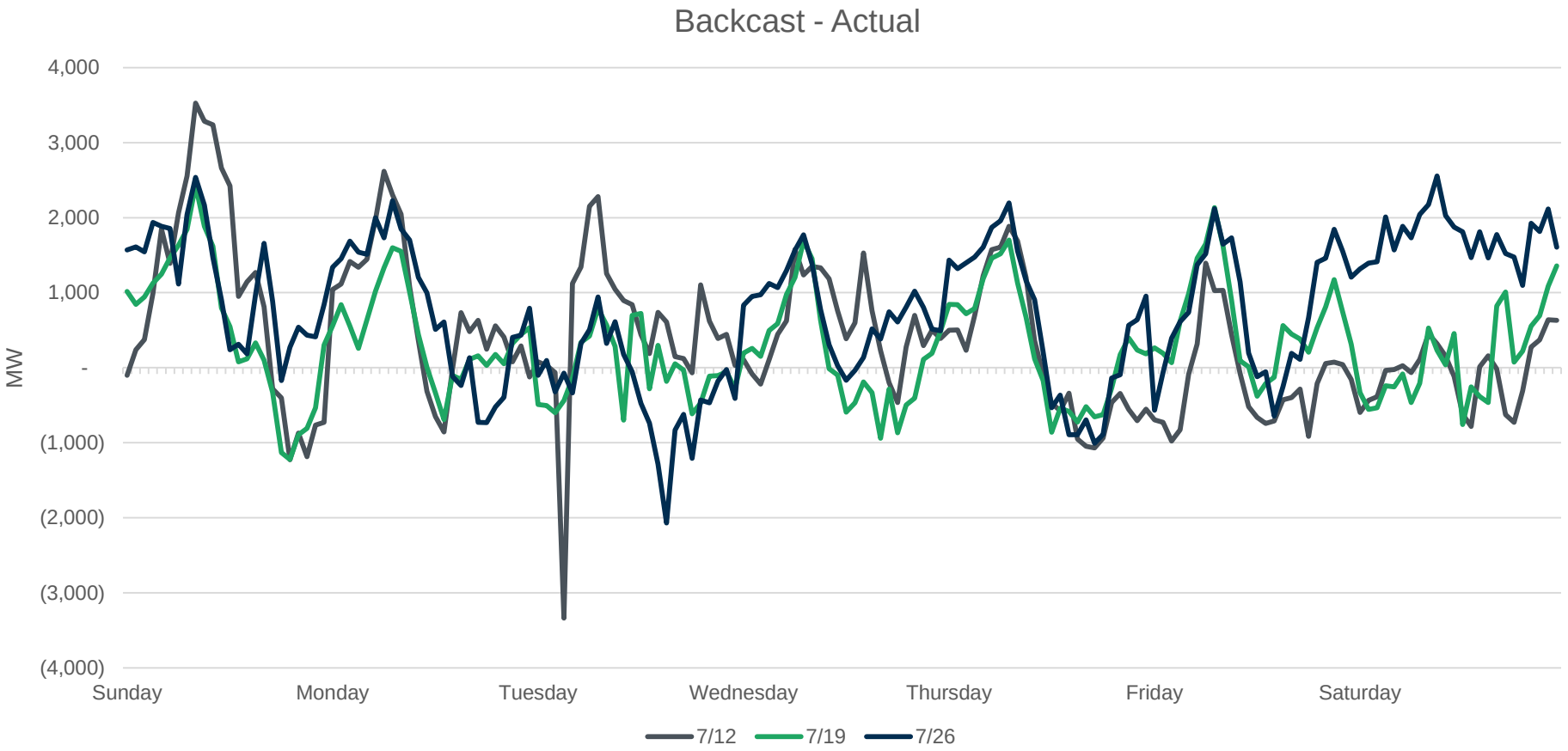


- No impact on daily peaks
- Very few hours showing COVID-19 impacts

- Errors were slightly higher than the previous week (impact from Hurricane Hanna)



Weekly Model Error Summary

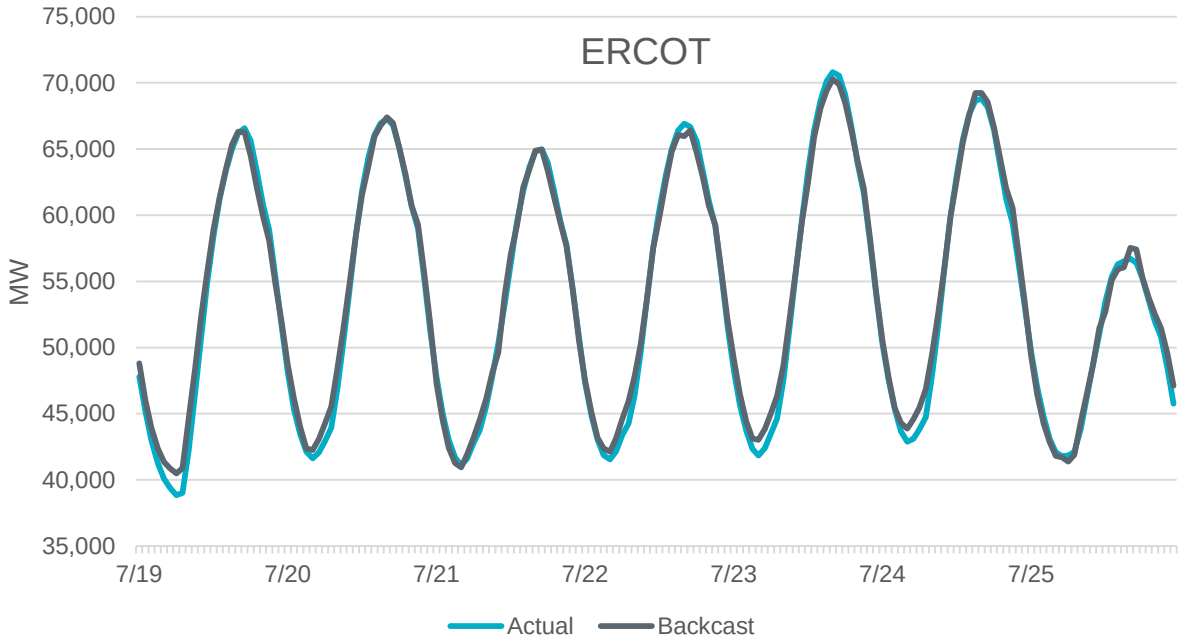


- Errors were slightly more than the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 7/19

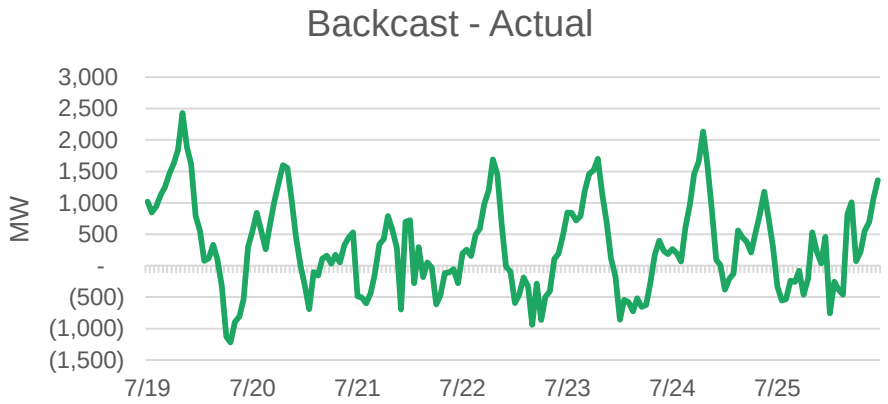
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by less than 1%
- Load reduction during the early morning hours between 6 and 10 a.m. appears to be shrinking

Week Beginning 7/19

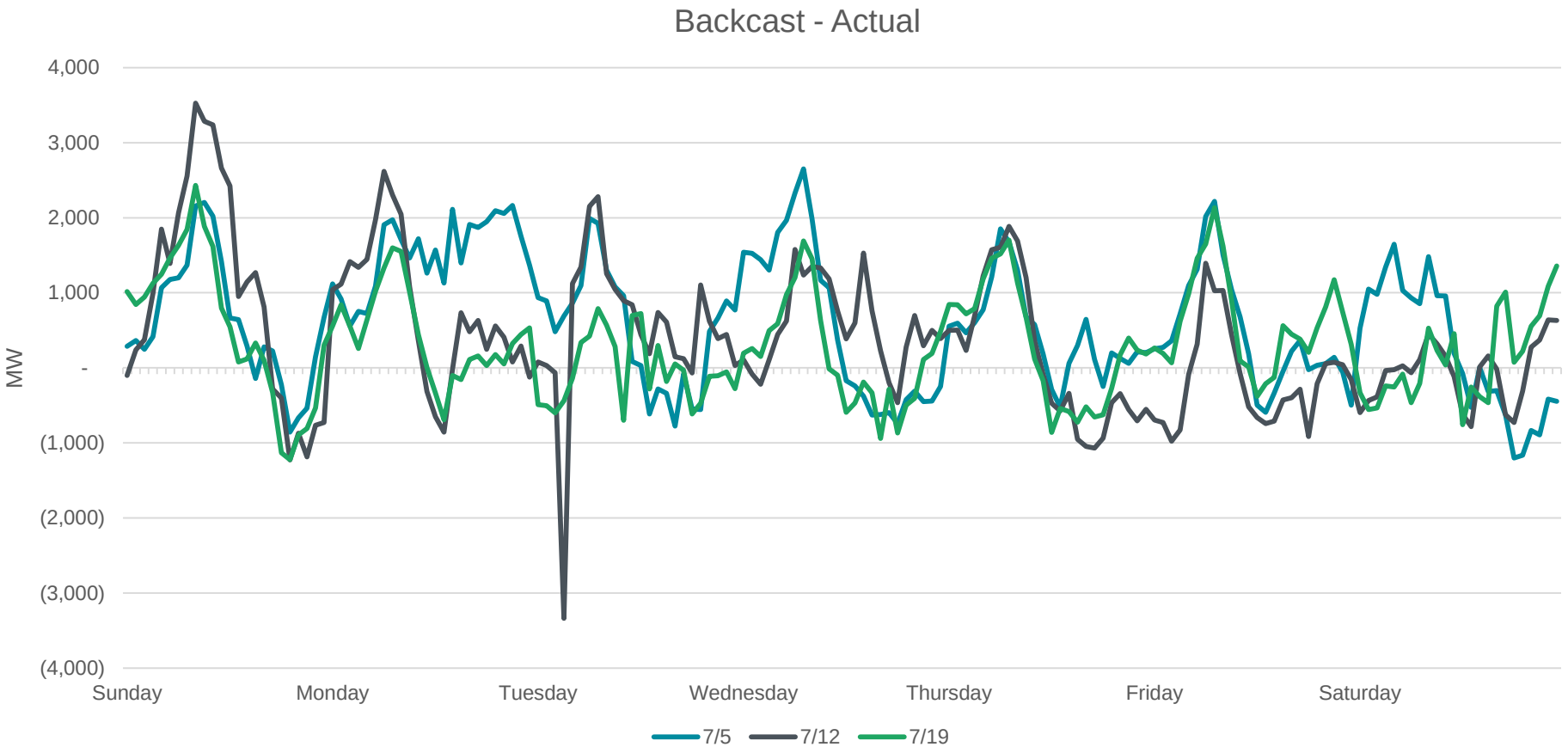


- No impact on daily peaks
- Very few hours showing COVID-19 impacts

- Errors were similar to the previous week



Weekly Model Error Summary

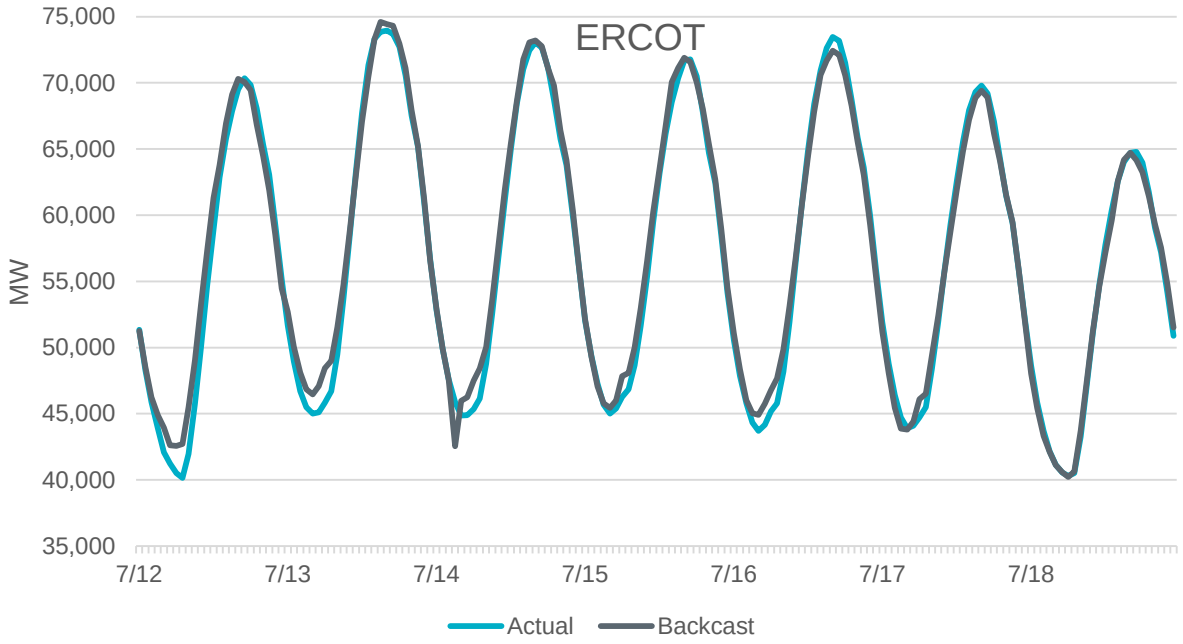


- Largest errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 7/12

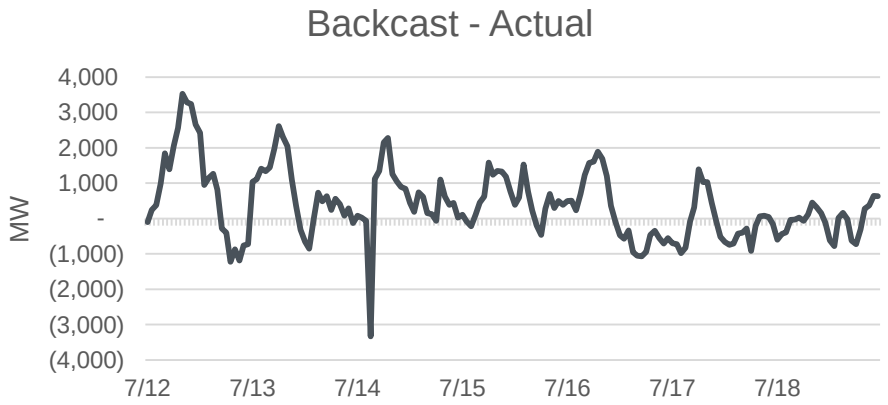
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by less than 1%
- Load reduction during the early morning hours between 6 and 10 a.m. was similar to the previous week

Week Beginning 7/12

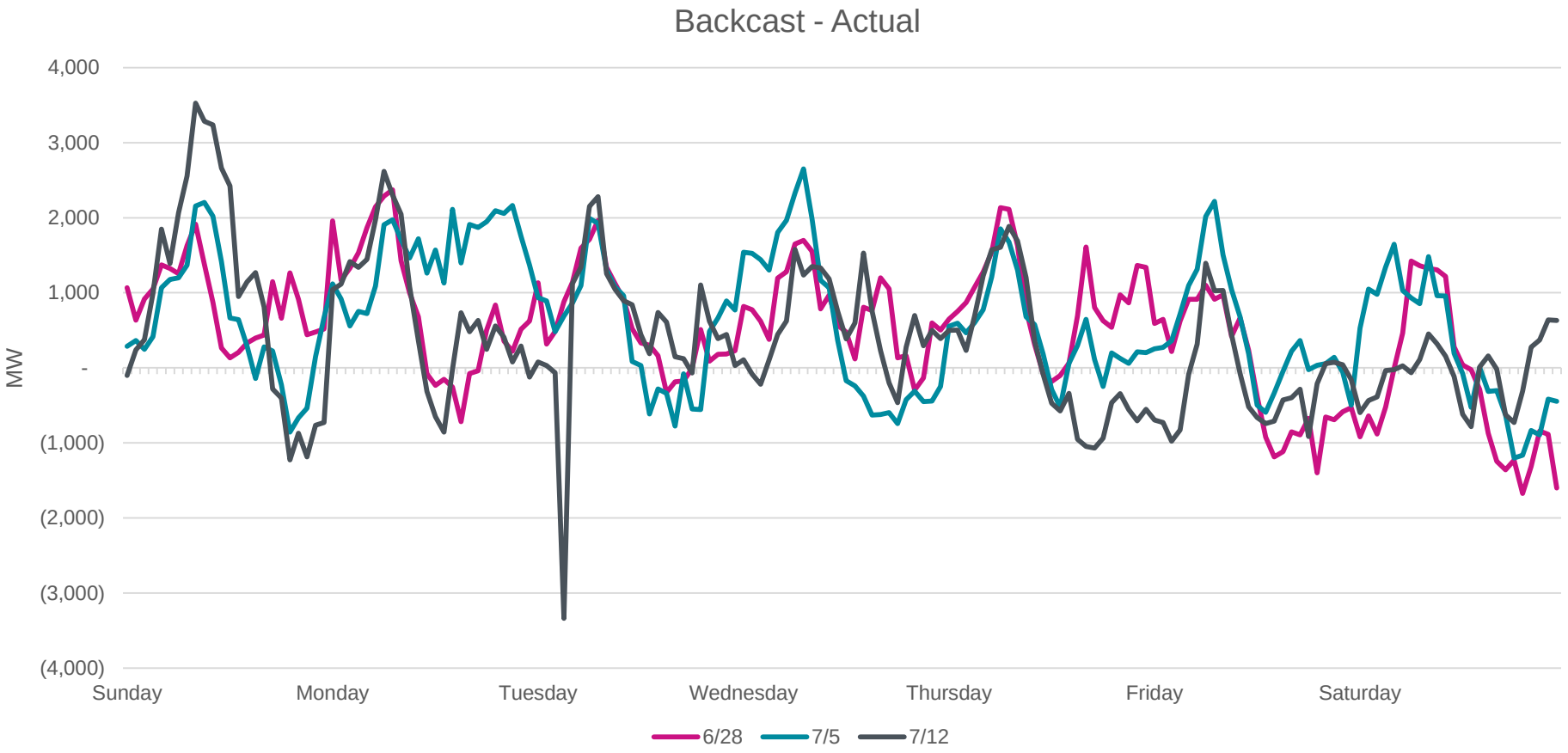


- No impact on daily peaks

- Errors were similar to the previous week



Weekly Model Error Summary

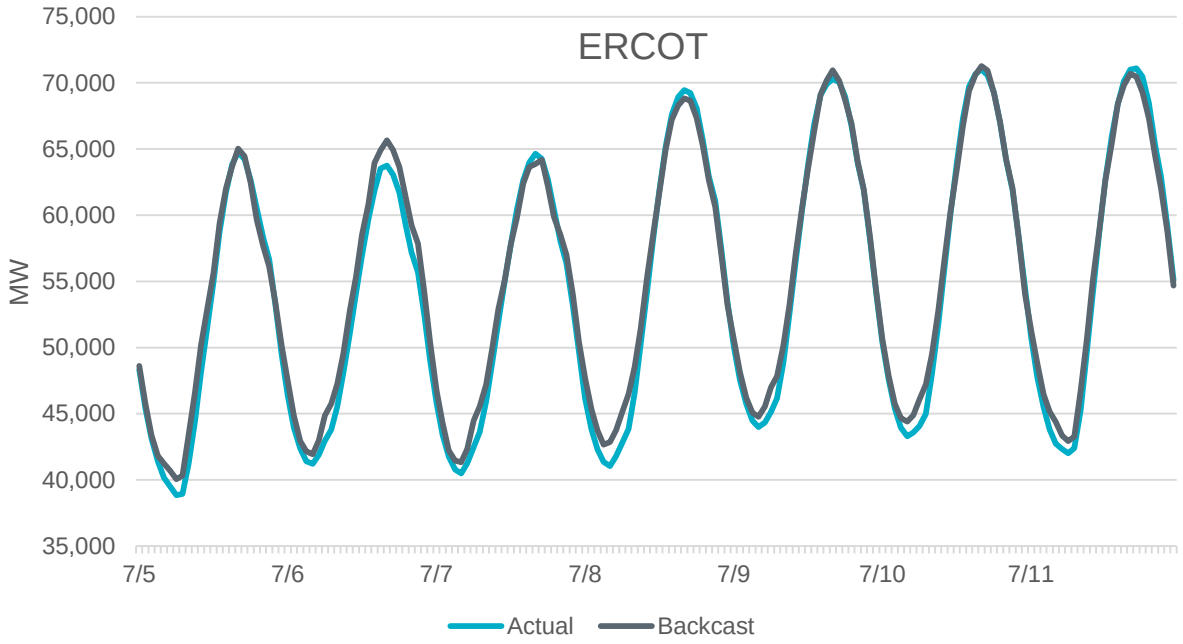


- Largest errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 7/5

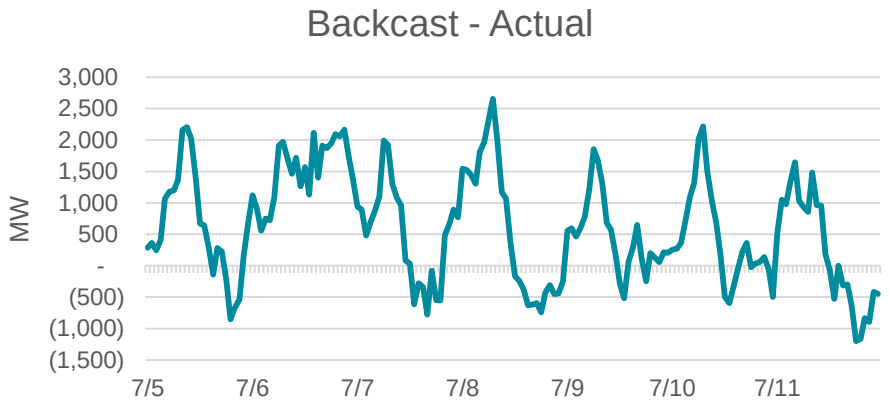
- No COVID-19 impacts on daily peak demand except for 7/6, which was likely due to the July 4th holiday
- Weekly energy use decreased by less than 1%
- Load reduction during the early morning hours between 6 and 10 a.m. was similar to the previous week

Week Beginning 7/5

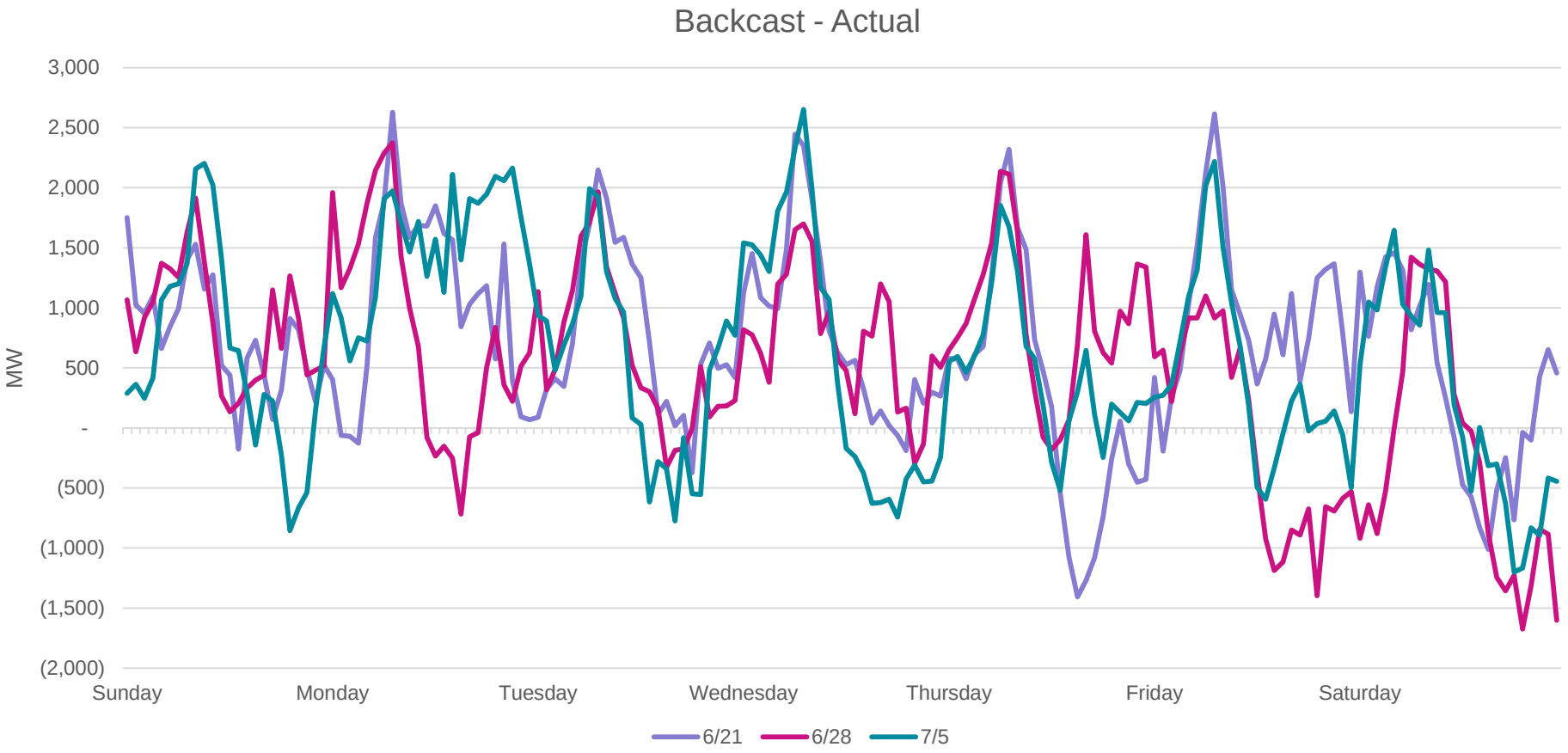


- No impact on daily peaks except for a slight impact on 7/6 (likely due to the holiday)

- Errors were similar to the previous week



Weekly Model Error Summary

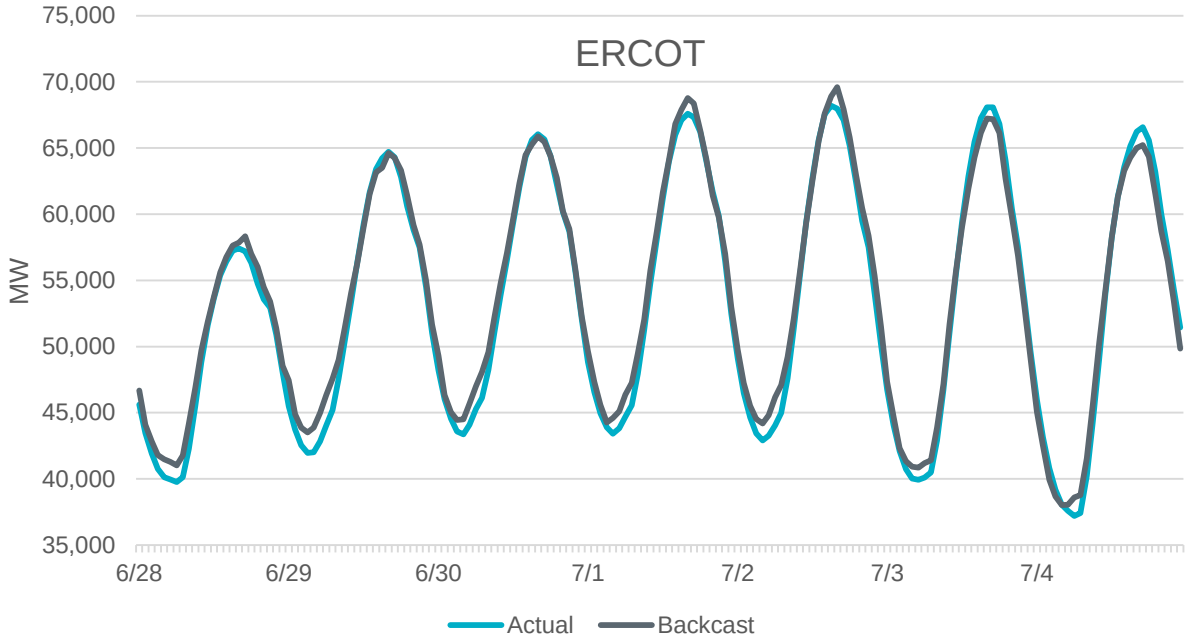


- Largest errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 6/28

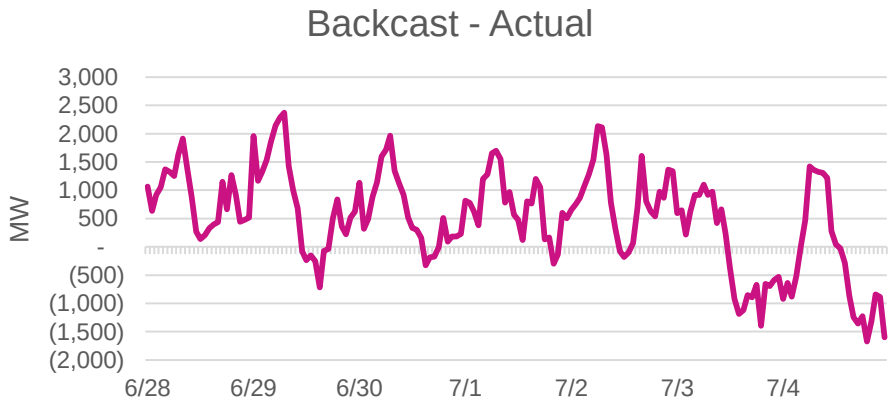
- COVID-19 impacts varied on daily peak demand as the week progressed
- Weekly energy use decreased by less than 1%
- Load reduction during the early morning hours between 6 and 10 a.m. was somewhat less than the previous week (similar to the impact of the week beginning 6/14)

Week Beginning 6/28

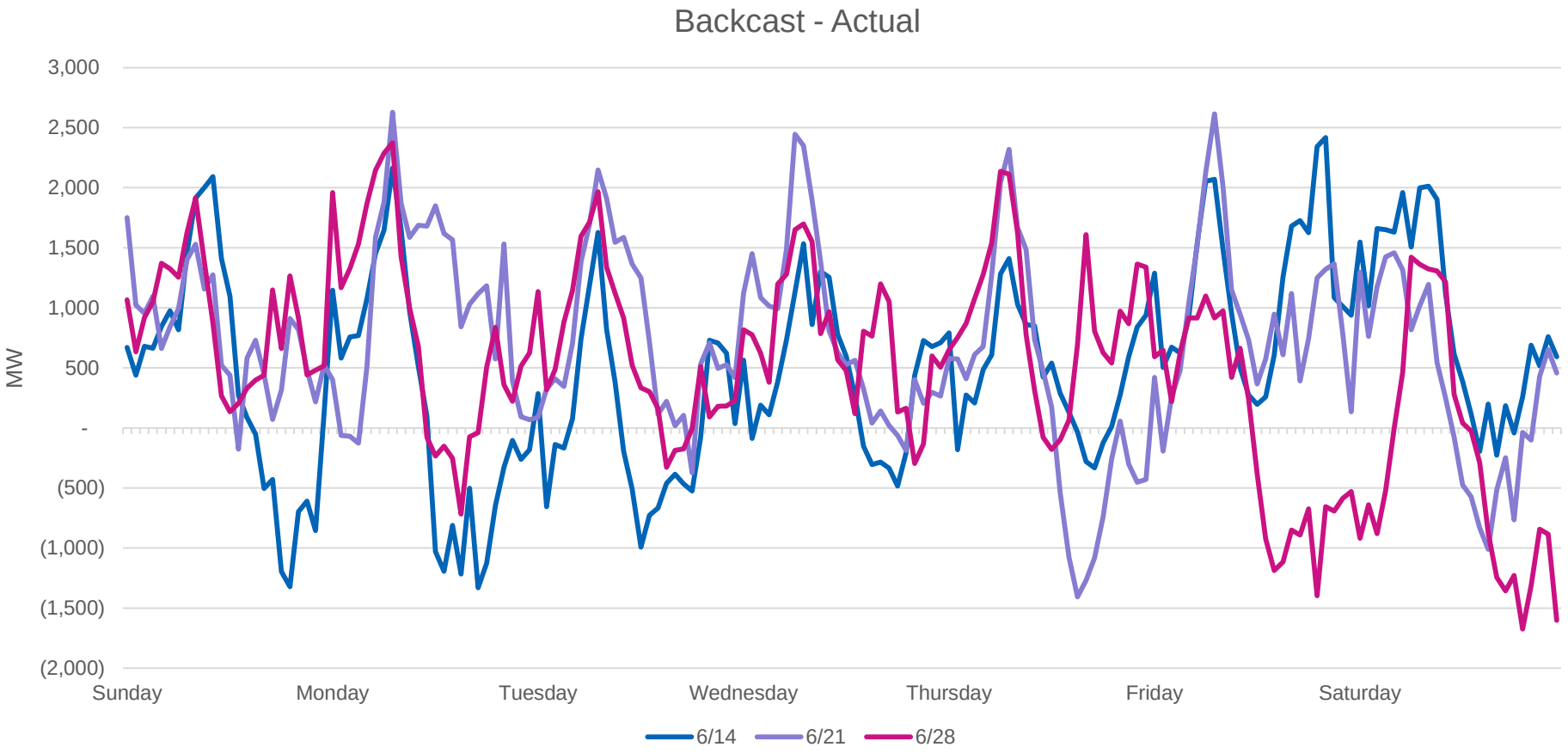


- Daily peaks initially showed no impact, then were slightly lower before the holiday, finishing slightly above the backcast

- Errors were slightly less than the previous week



Weekly Model Error Summary

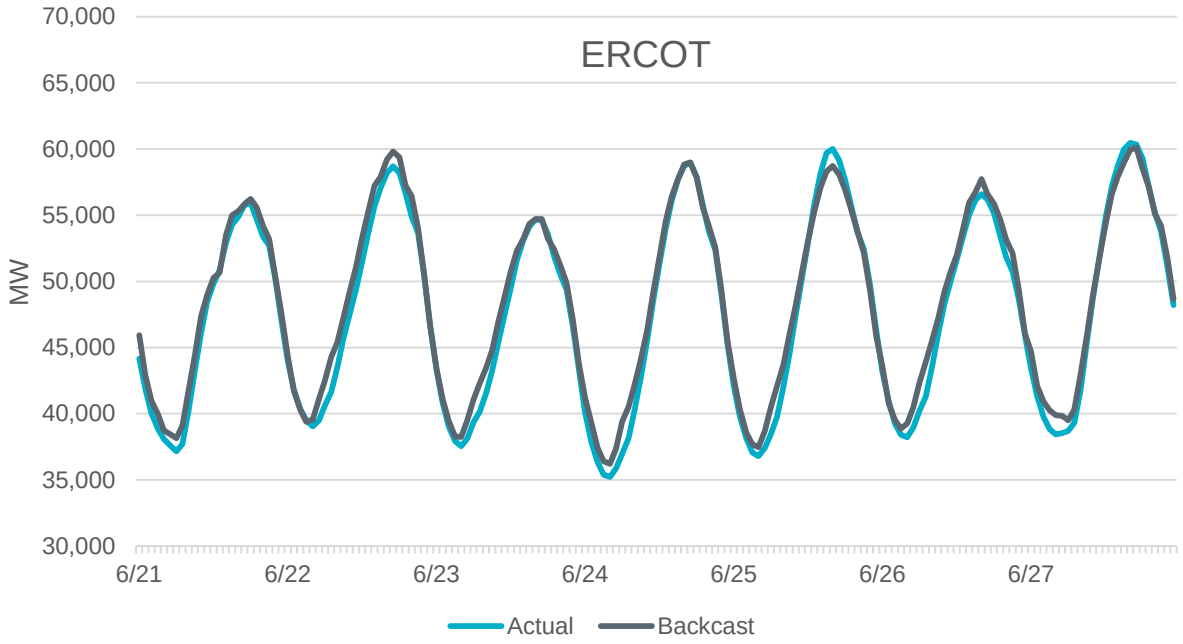


- Largest errors were slightly smaller than the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 6/21

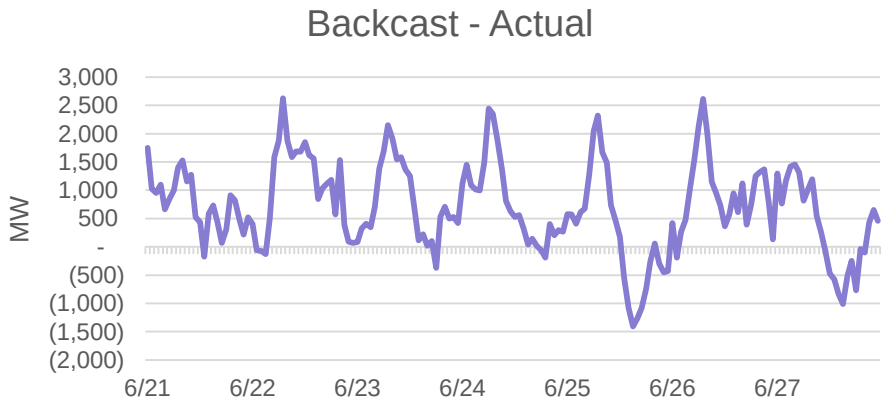
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Slight increase in load reduction during the early morning hours between 6 and 10 a.m.

Week Beginning 6/21

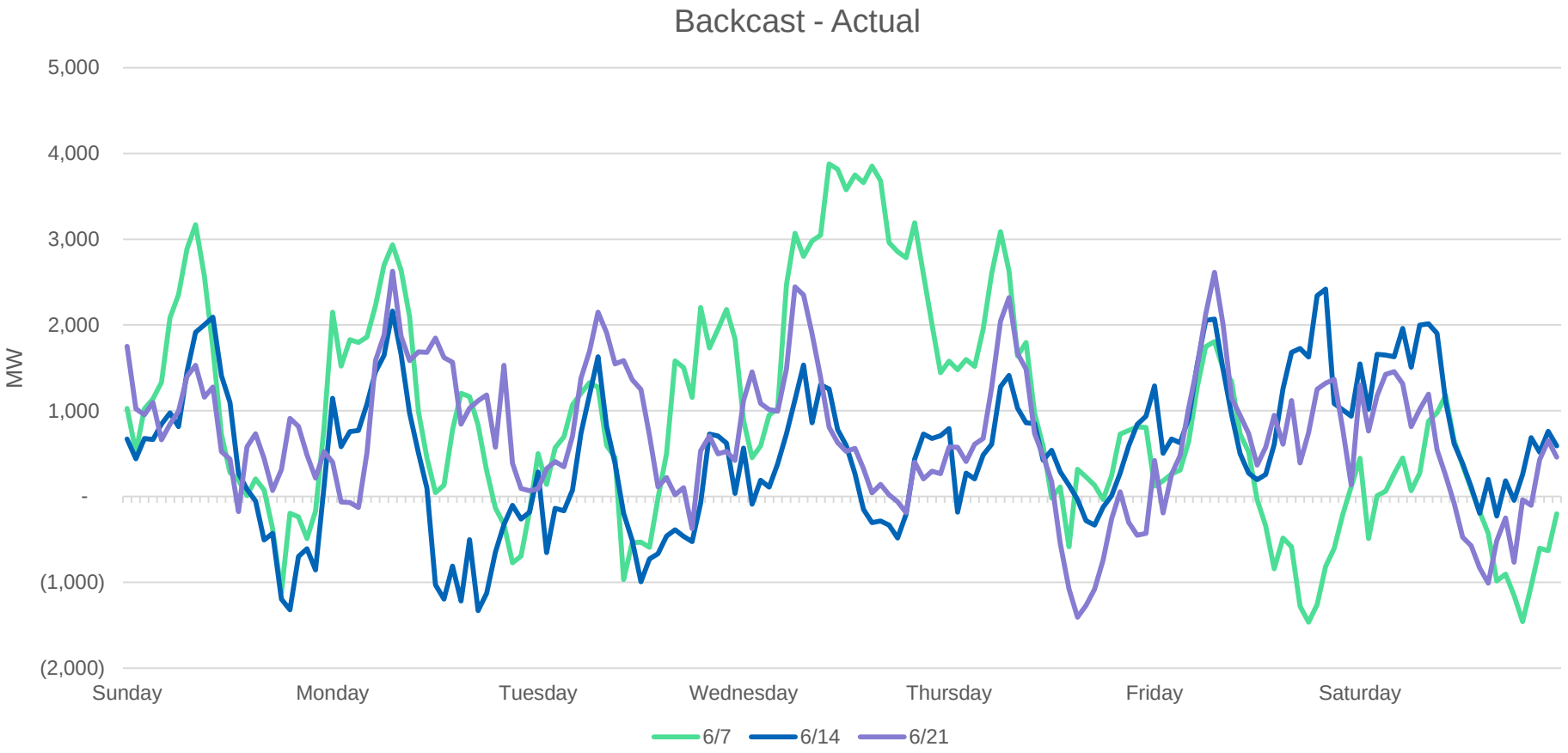


- No impact on daily peaks
- Slight increase in impact on early morning hours

- Errors were slightly more than the previous week



Weekly Model Error Summary

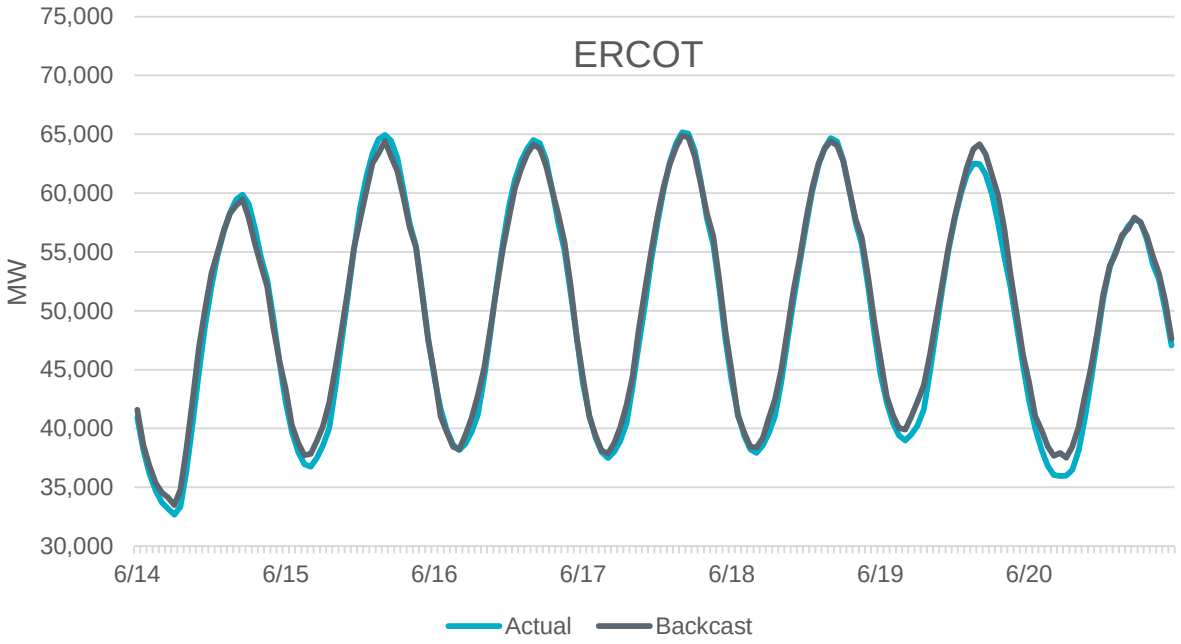


- Largest errors were slightly larger than the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 6/14

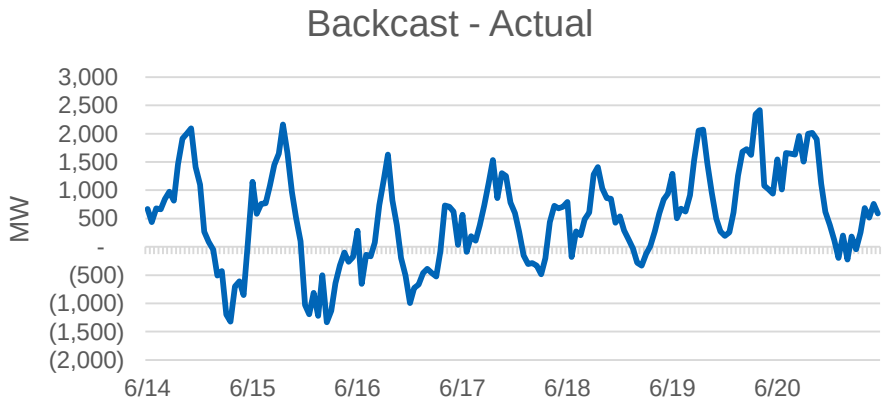
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1%
- Very little load reduction during the early morning hours between 6 and 10 a.m.

Week Beginning 6/14

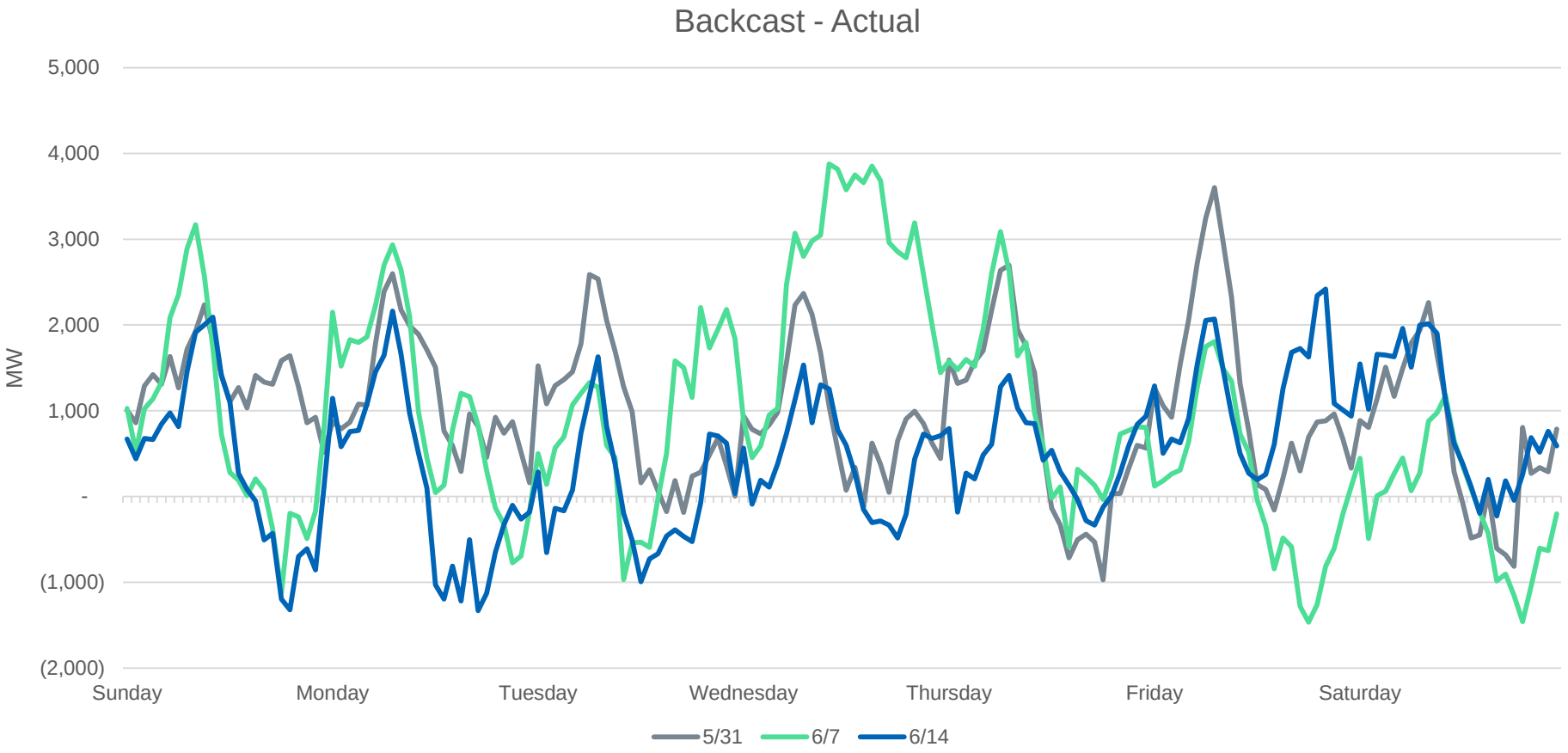


- No impact on daily peaks
- Very little impact on all hours

- Errors were less than the previous week



Weekly Model Error Summary

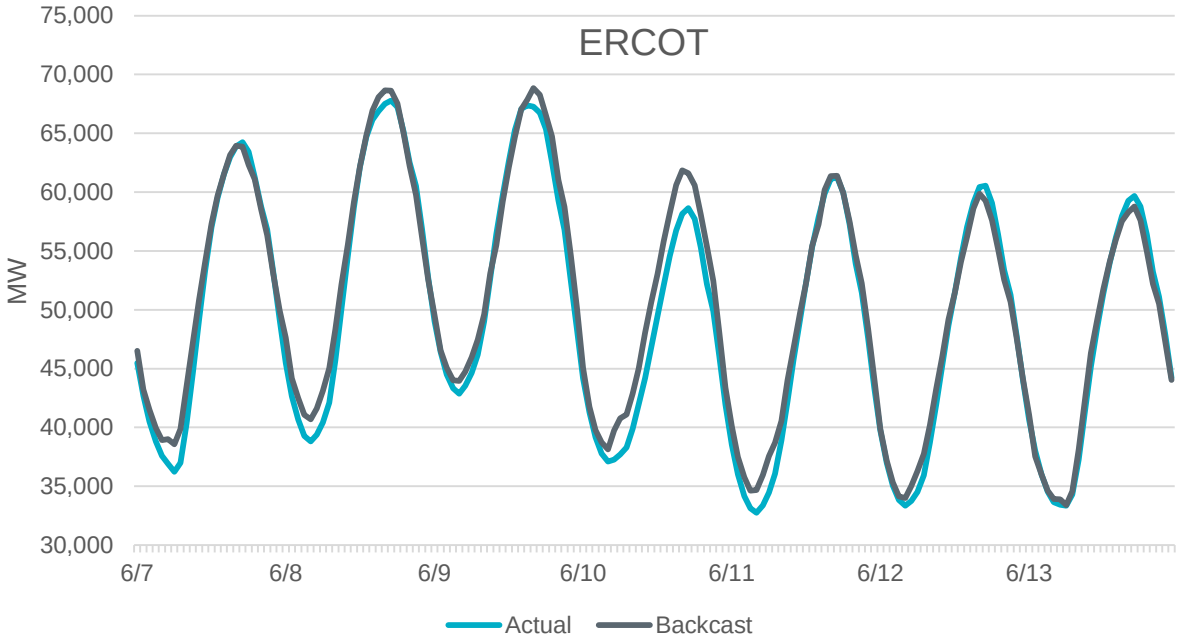


- Largest errors were smaller than the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 6/7

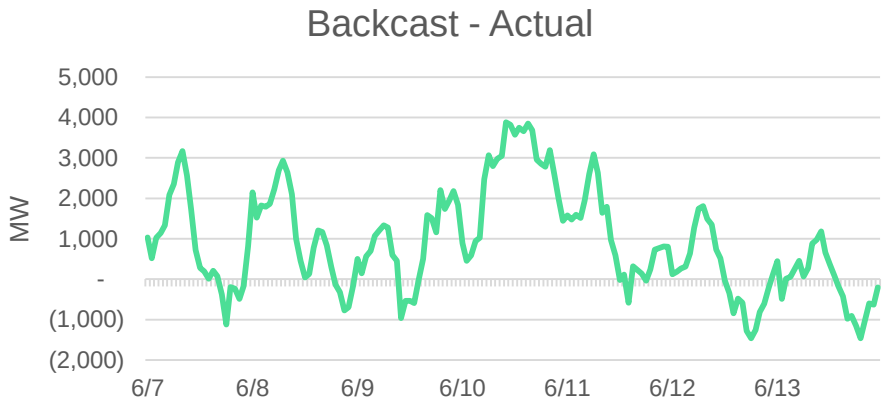
- No COVID-19 impacts on daily peak demand
- 6/8 and 6/9 loads were likely reduced due to 4CP
- Weekly energy use decreased by 1%
- Load reduction was noticeably less lower during the early morning hours between 6 and 10 a.m. It appears there is less COVID-19 impact across all hours now.

Week Beginning 6/7

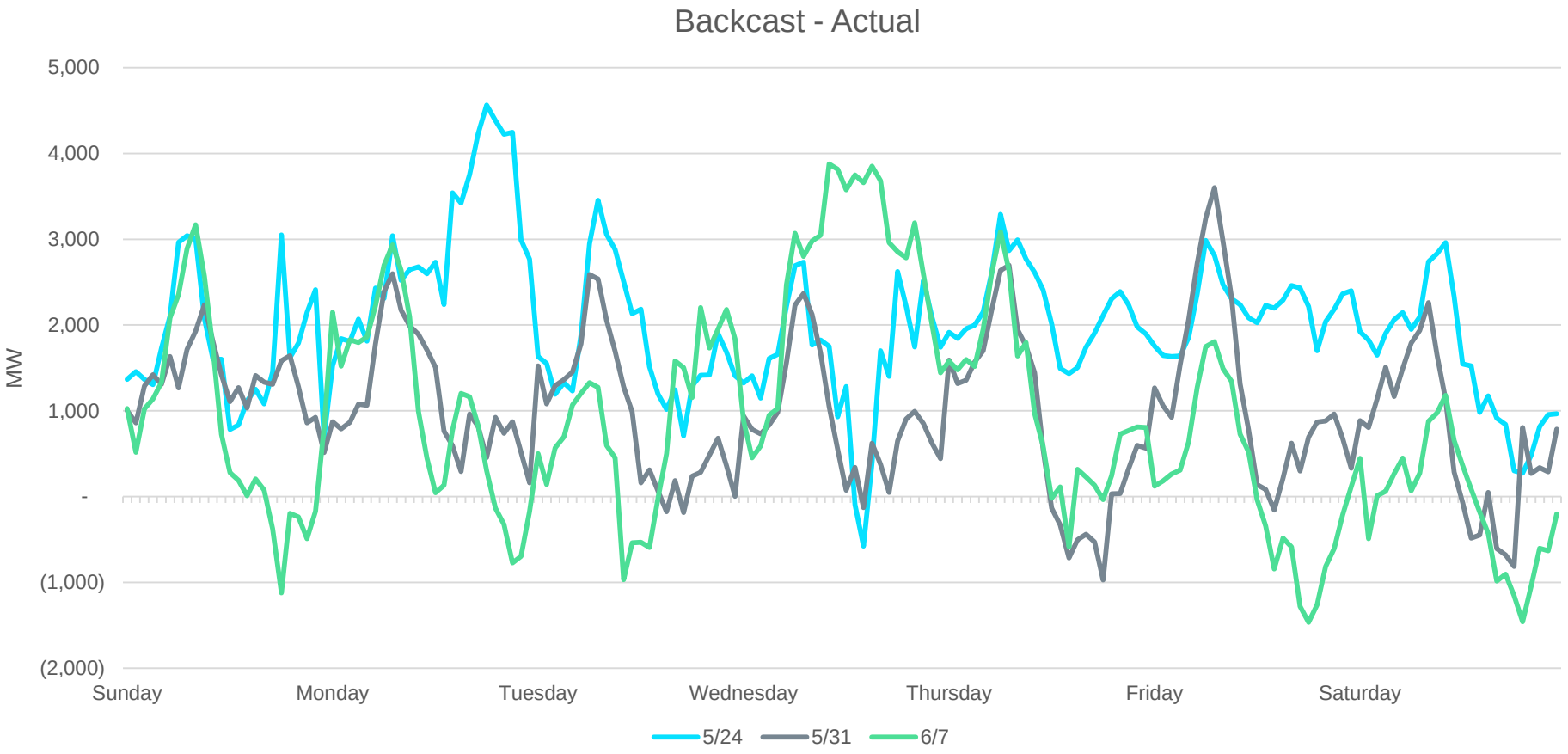


- No impact on daily peaks
- 6/8 and 6/9 indicated likely 4CP load reductions

- Errors were similar to the previous week



Weekly Model Error Summary

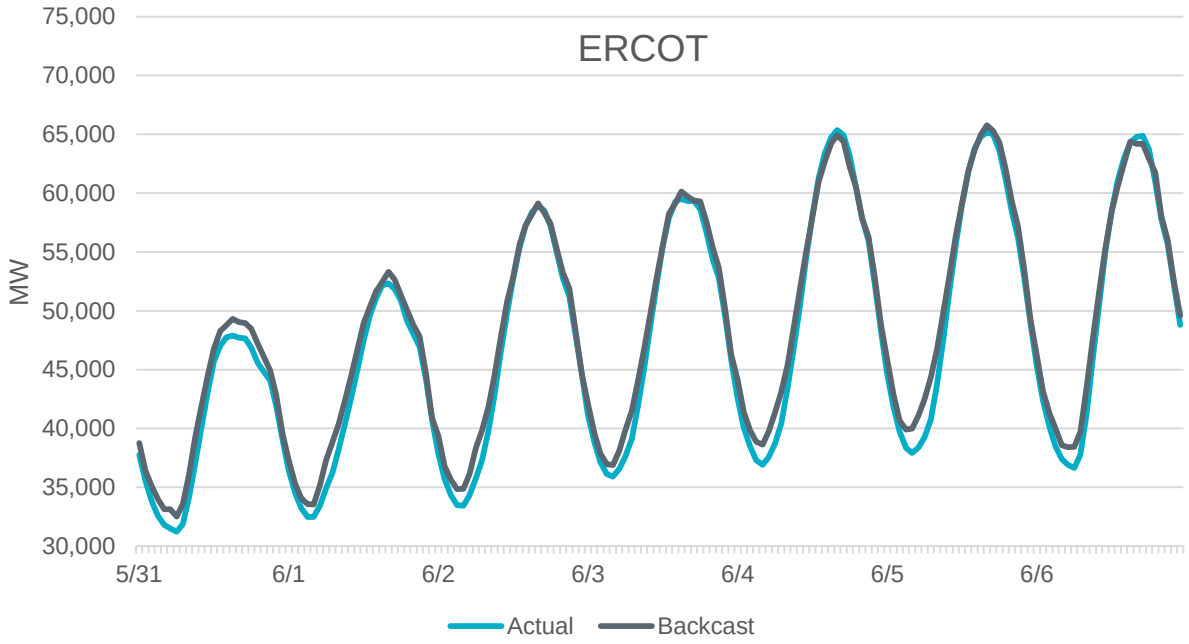


- Largest errors were similar to the previous week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 5/31

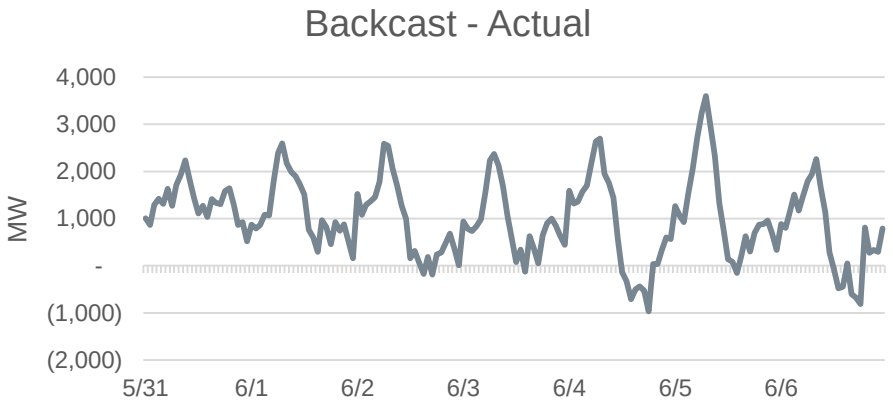
- No COVID-19 impacts on daily peak demand
- Weekly energy use decreased by 1 to 2%
  - This represents a significant reduction in COVID-19 impacts (~50% less than in previous weeks).
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 4 to 8% lower than what the model would normally predict after accounting for typical model errors.
  - There was 50% less COVID-19 impact during these hours.

Week Beginning 5/31

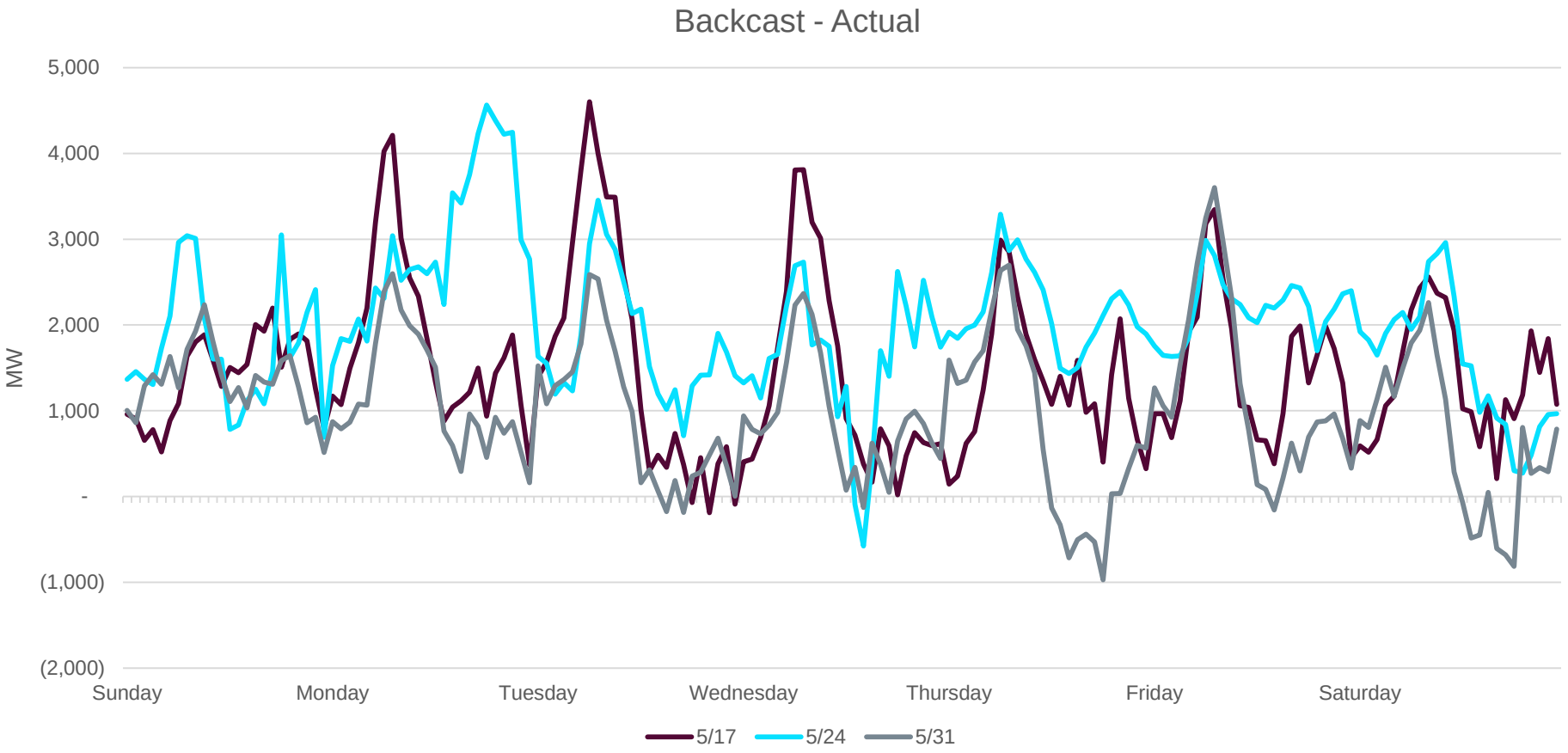


- No impact on daily peaks

- Errors were 50% less than previous weeks



Weekly Model Error Summary

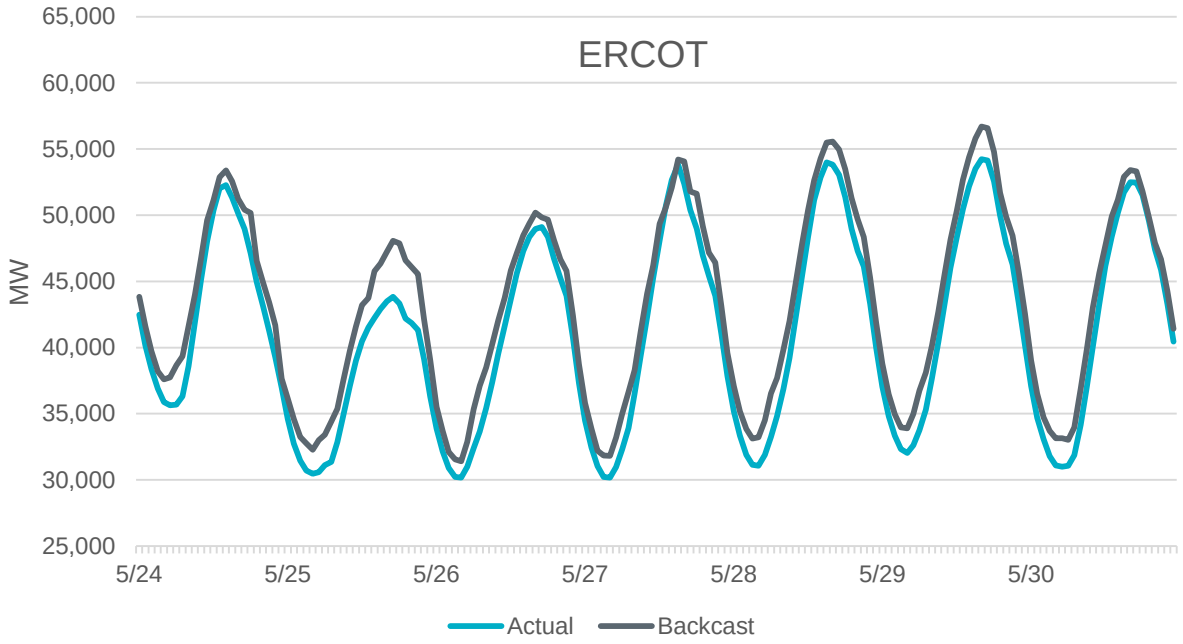


- Largest errors were significantly smaller than in previous weeks
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 5/24

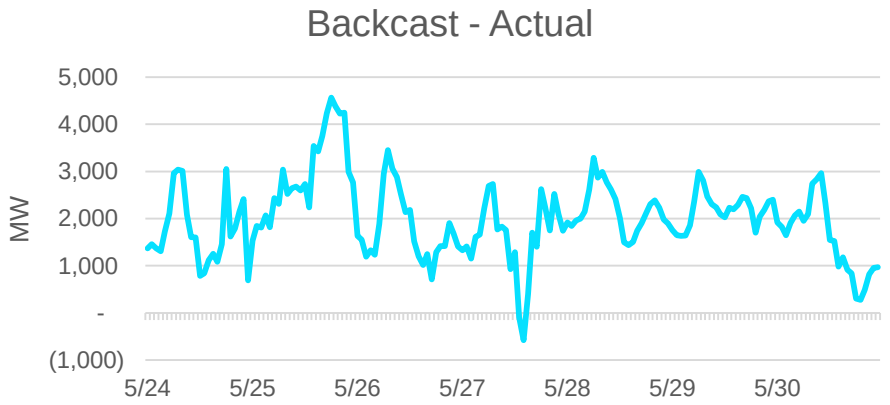
- Overall, COVID-19 impacts have been similar since May 1
- Weekday and weekend peaks were 1 to 4% lower
- Weekly energy use decreased by 3 to 4%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 12% lower than what the model would normally predict after accounting for typical model errors.
  - This reflects a slight increase in COVID-19 impacts during these hours.

Week Beginning 5/24

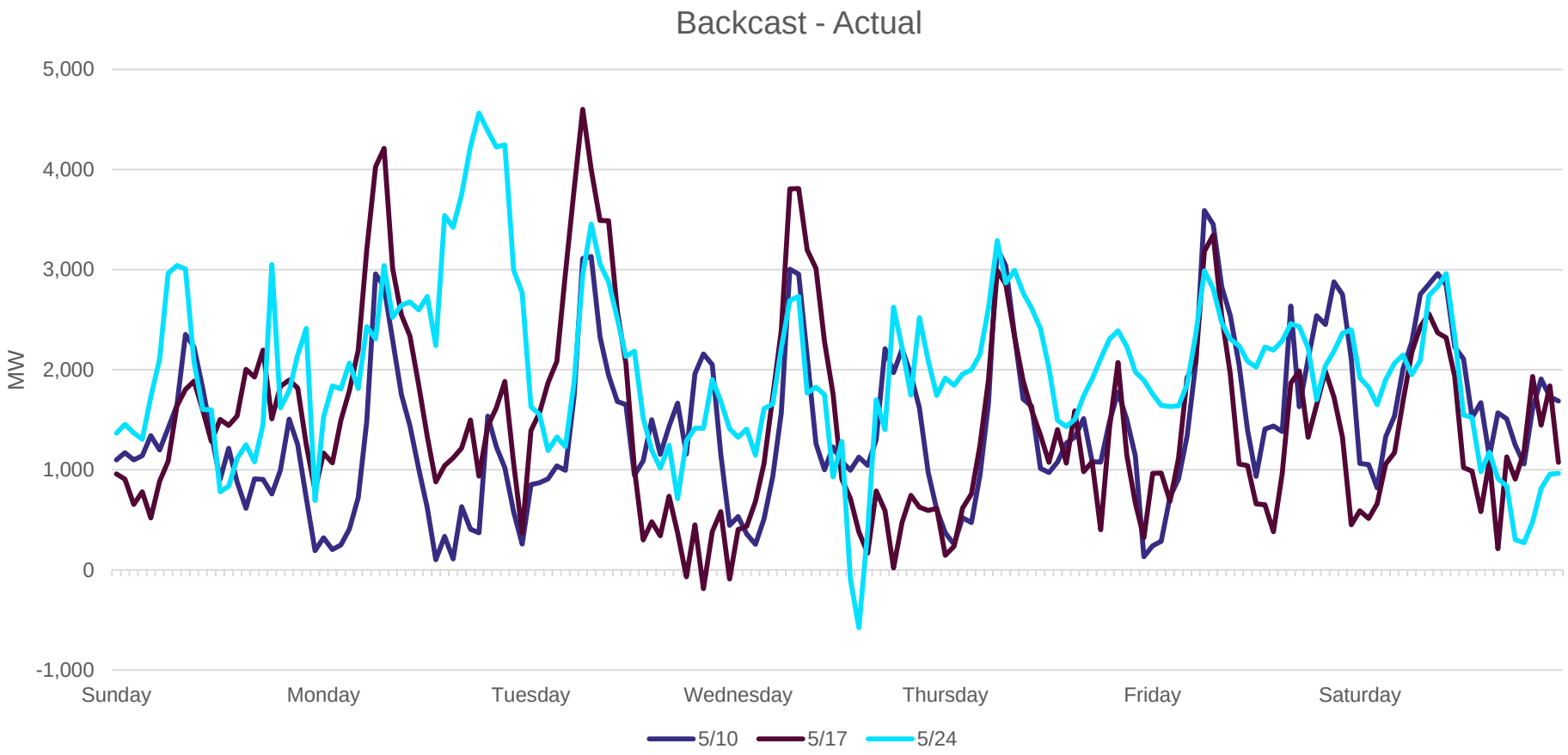


- Daily peaks 1 to 4% lower than forecast
- Memorial Day had a larger reduction

- Errors were similar to previous weeks



Weekly Model Error Summary

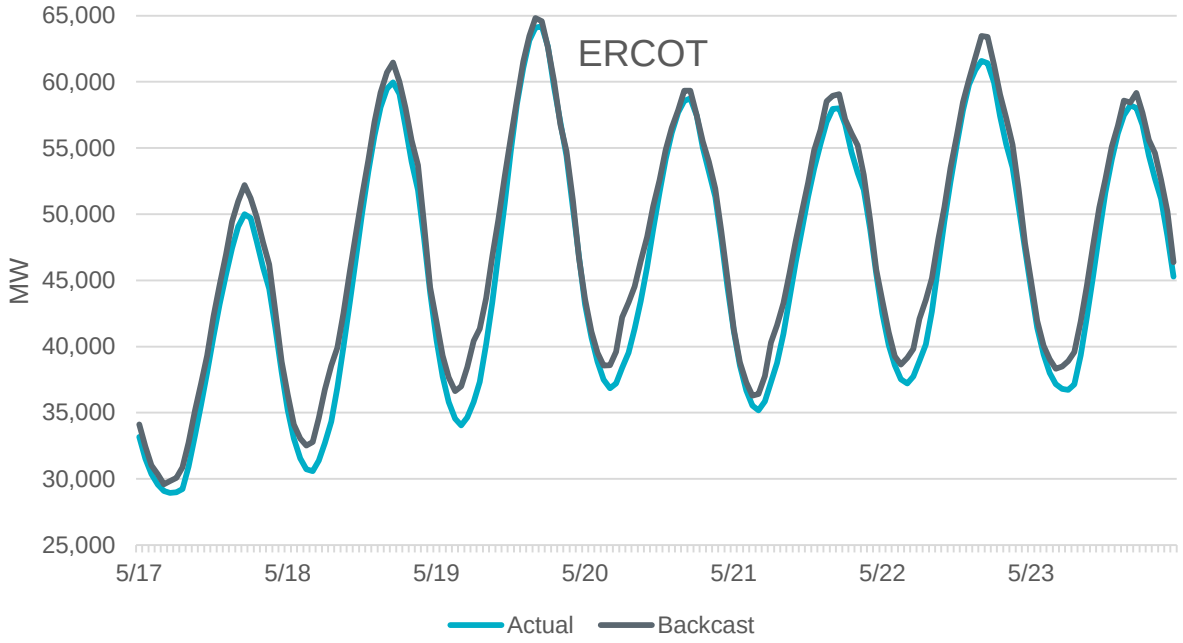


- Largest errors similar to previous weeks in size and timing
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 5/17

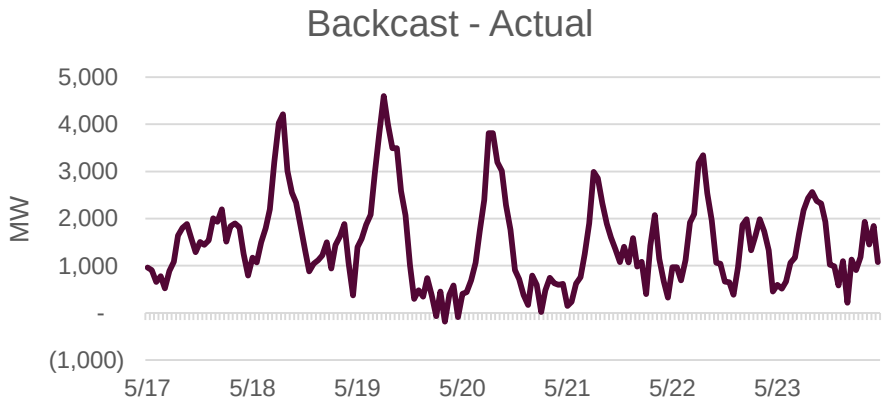
- Overall, COVID-19 impacts have been similar since May 1
- Weekday and weekend peaks were 1 to 4% lower
- Weekly energy use decreased by 3 to 4%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 12% lower than what the model would normally predict after accounting for typical model errors.
  - This reflects a slight increase in COVID-19 impacts during these hours.

Week Beginning 5/17

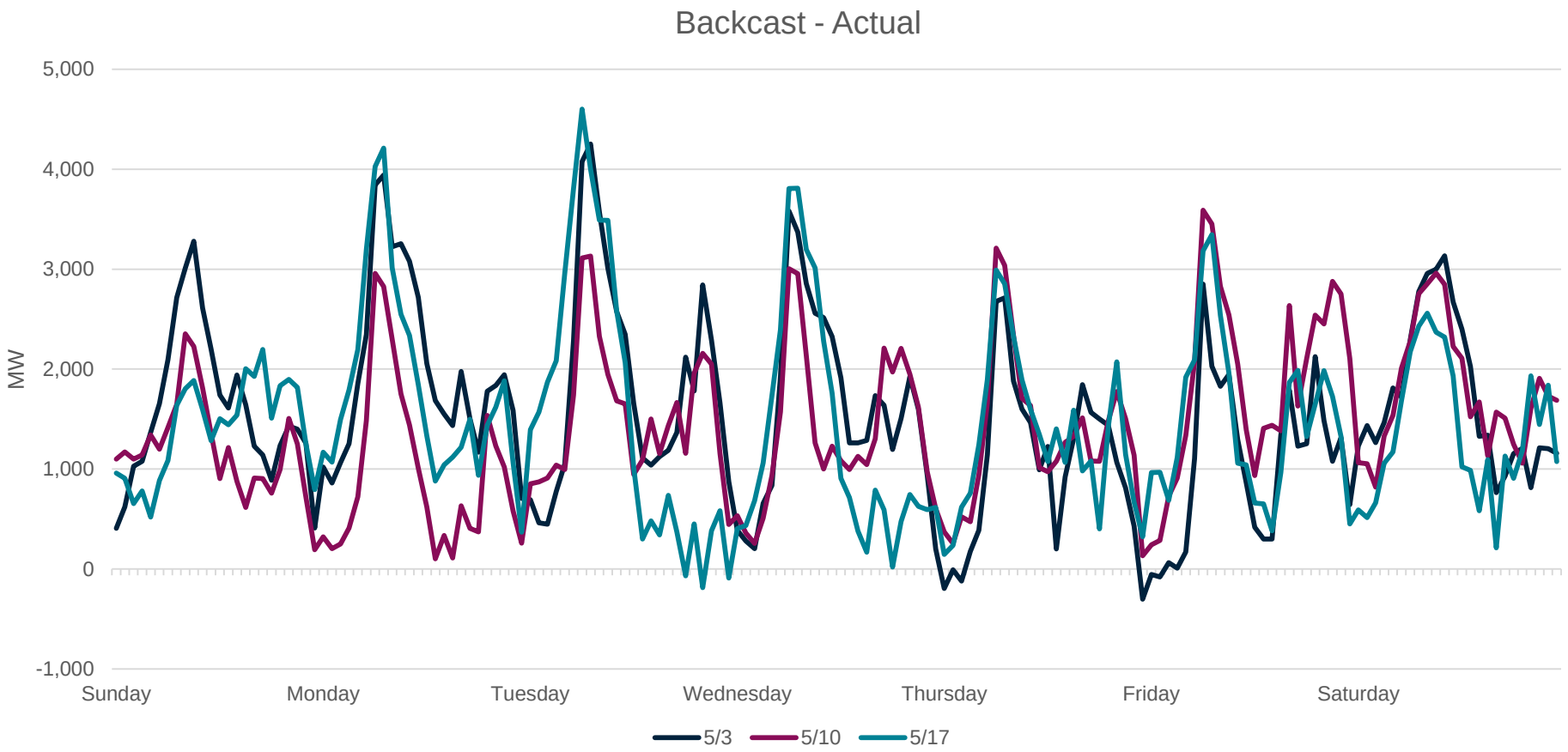


- Daily peaks consistently 1 to 4% lower than forecast

- Errors were similar to previous weeks



Weekly Model Error Summary

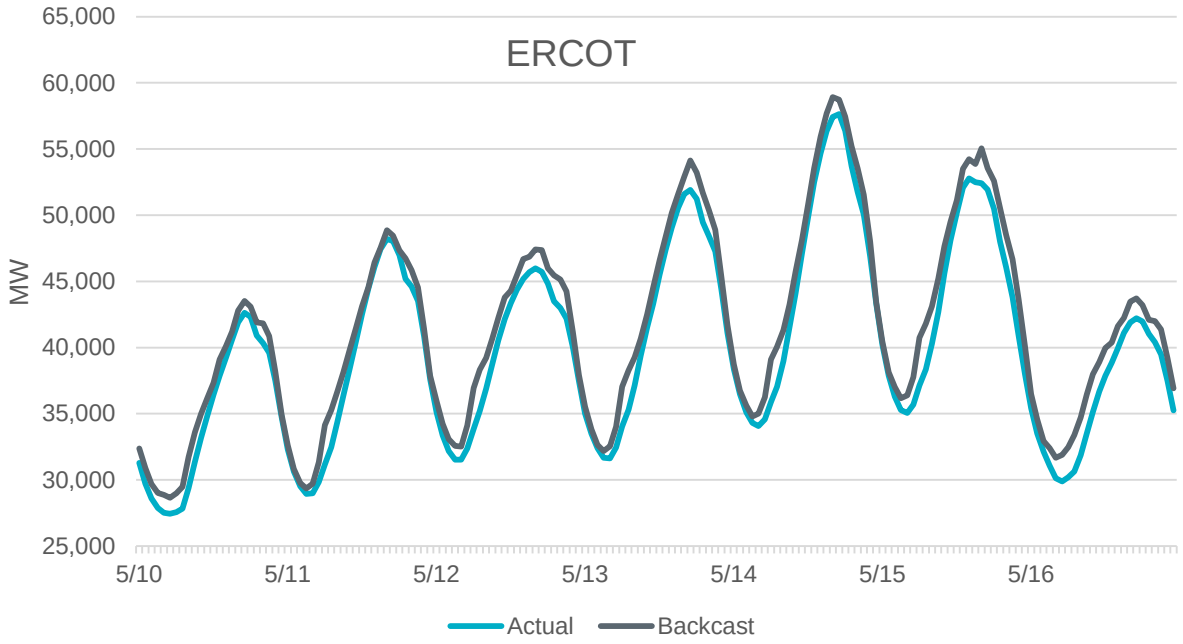


- Largest errors similar to previous weeks in size and timing
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 5/10

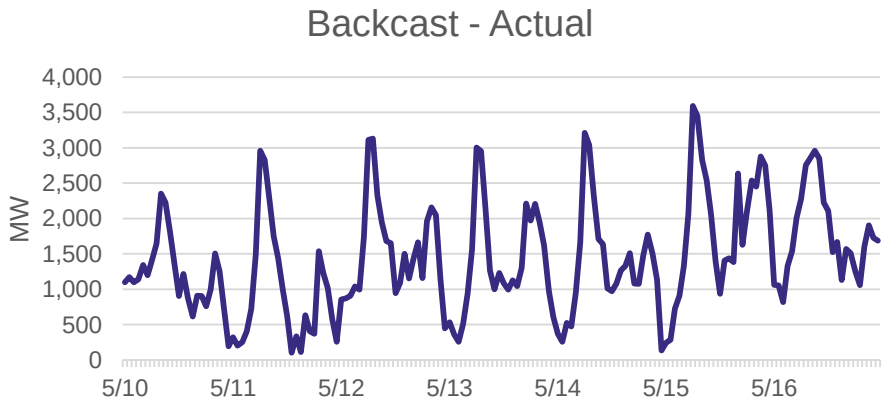
- Overall, COVID-19 impacts have been similar since May 1
- Weekday and weekend peaks were 2 to 3% lower
- Weekly energy use decreased by 3 to 4%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 5 to 9% lower than what the model would normally predict after accounting for typical model errors.
  - This reflects a slight reduction in COVID-19 impacts during these hours.

Week Beginning 5/10

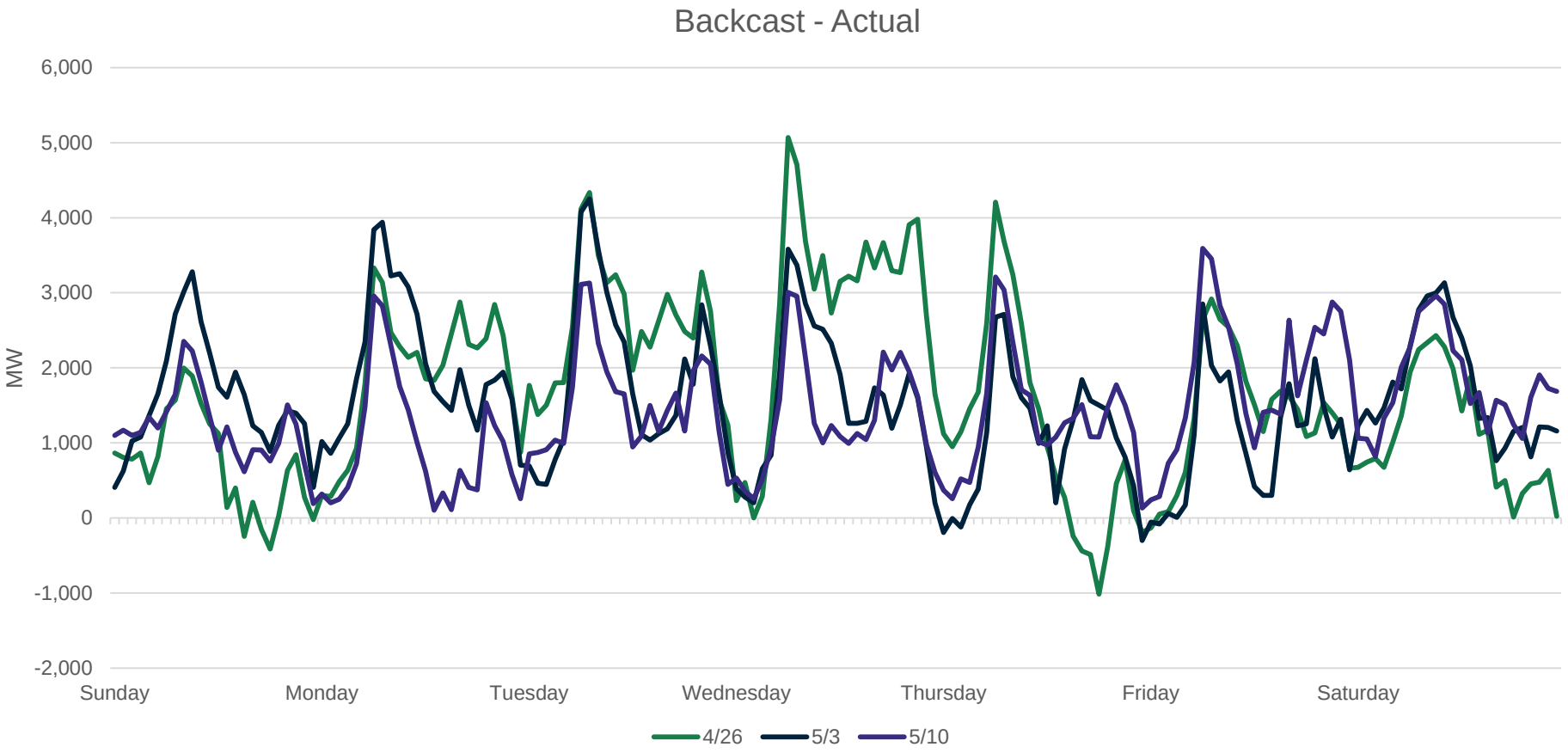


- Daily peaks consistently 2 to 3% lower

- The largest errors were back to levels not seen since 3/29. Reopening the economy is slowly bringing load back up.



Weekly Model Error Summary

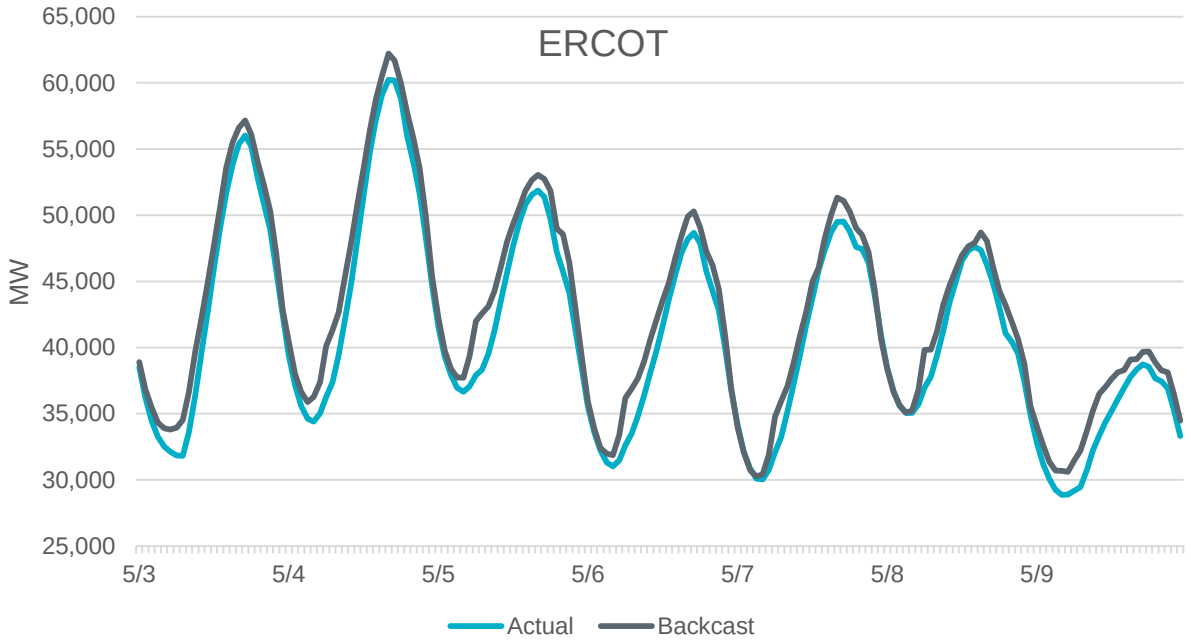


- Lower extreme errors for the most recent week
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 5/3

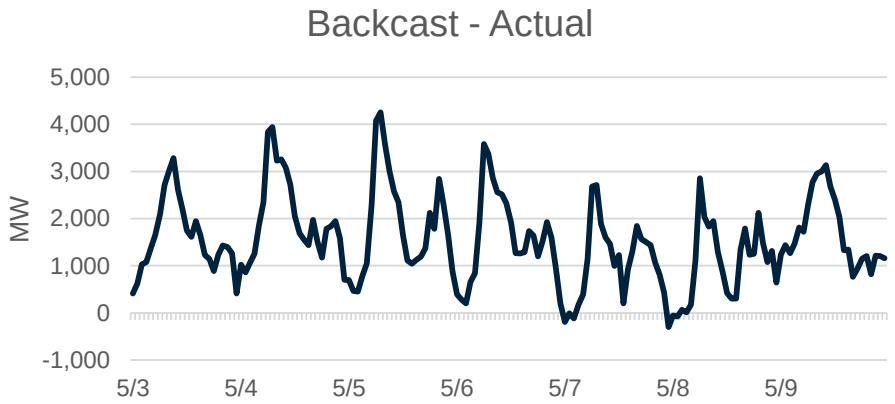
- Overall, COVID-19 impacts have been similar since May 1
- Weekday and weekend peaks were 2 to 3% lower
- Weekly energy use decreased by 3 to 4%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 10% lower than what the model would normally predict after accounting for typical model errors.

Week Beginning 5/3

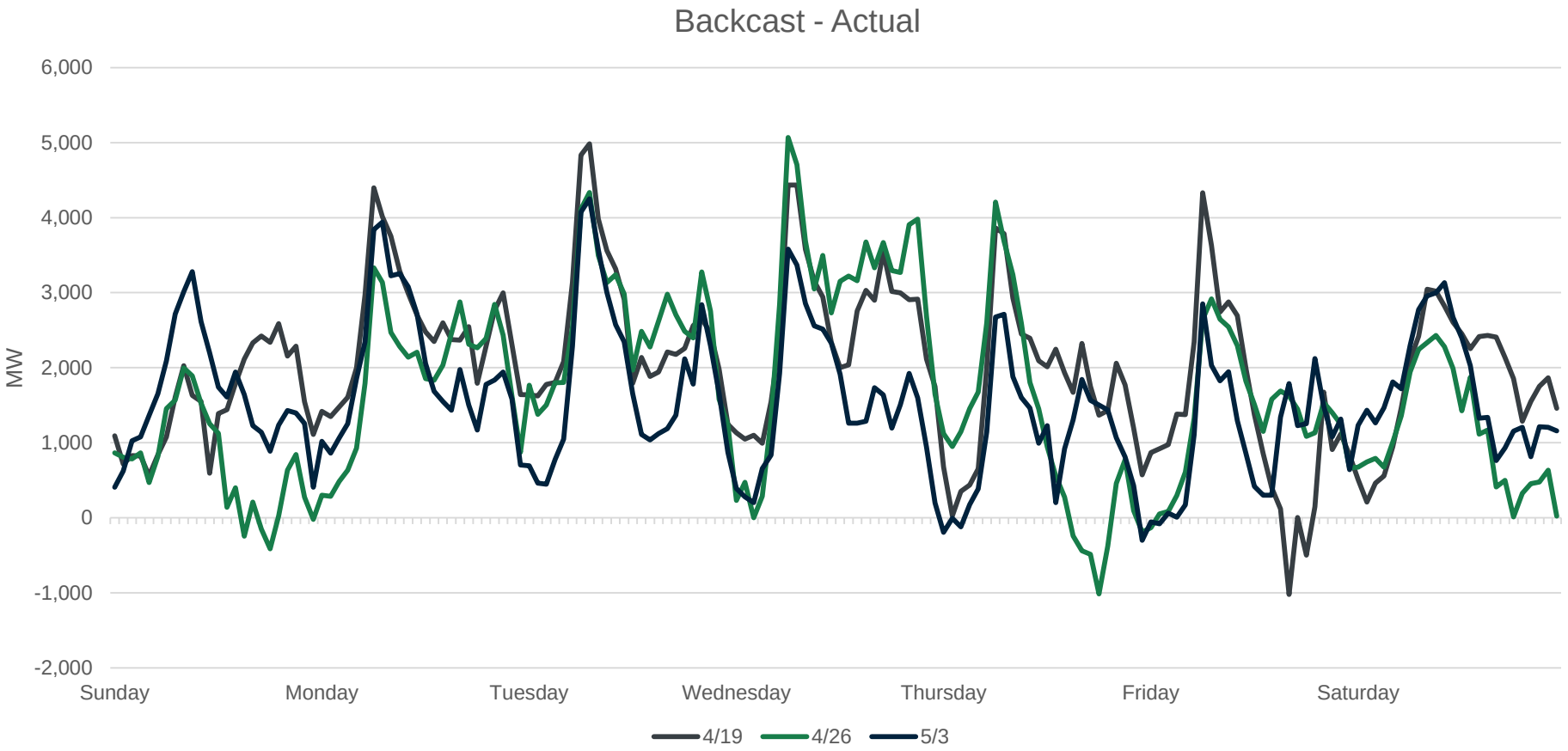


- Daily peaks consistently 2 to 3% lower

- Errors were similar to previous week



Weekly Model Error Summary

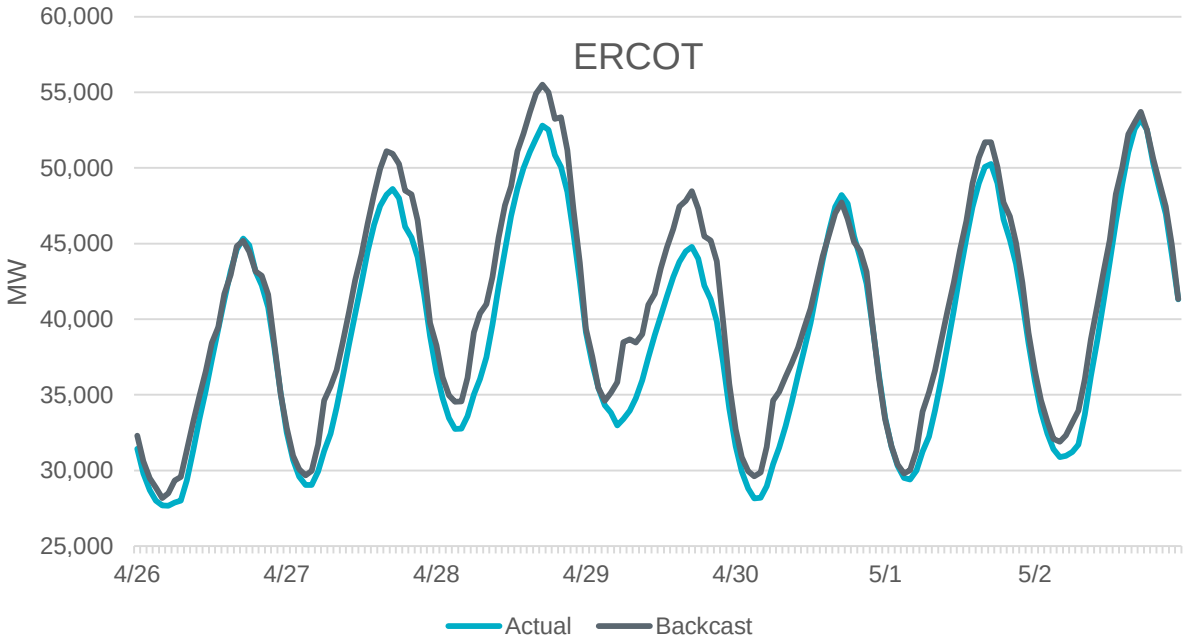


- Similar model error the past three weeks
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 4/26

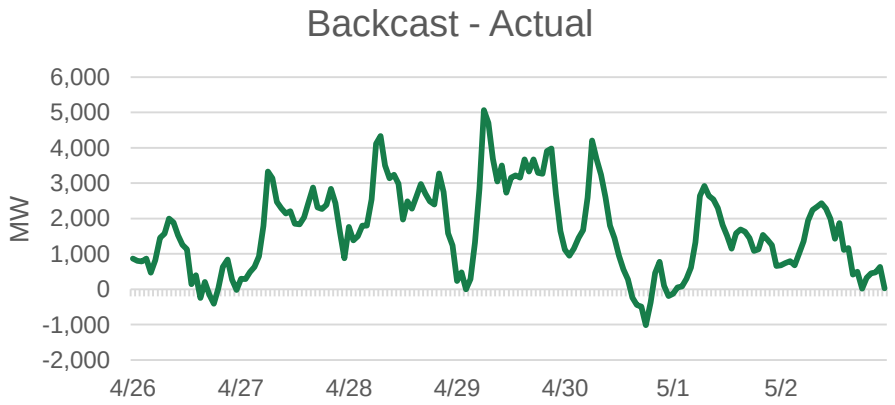
- Overall, COVID-19 impacts were lower than the previous week; impacts were higher the first part of the week and lower the latter part of the week
- Weekday peaks were 4 to 5% lower April 27-29 and 2% lower April 30 and May 1
- Weekend peaks were back to pre-COVID levels
- Weekly energy use decreased by 3 to 4%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 10% lower than what the model would normally predict after accounting for typical model errors.

Week Beginning 4/26

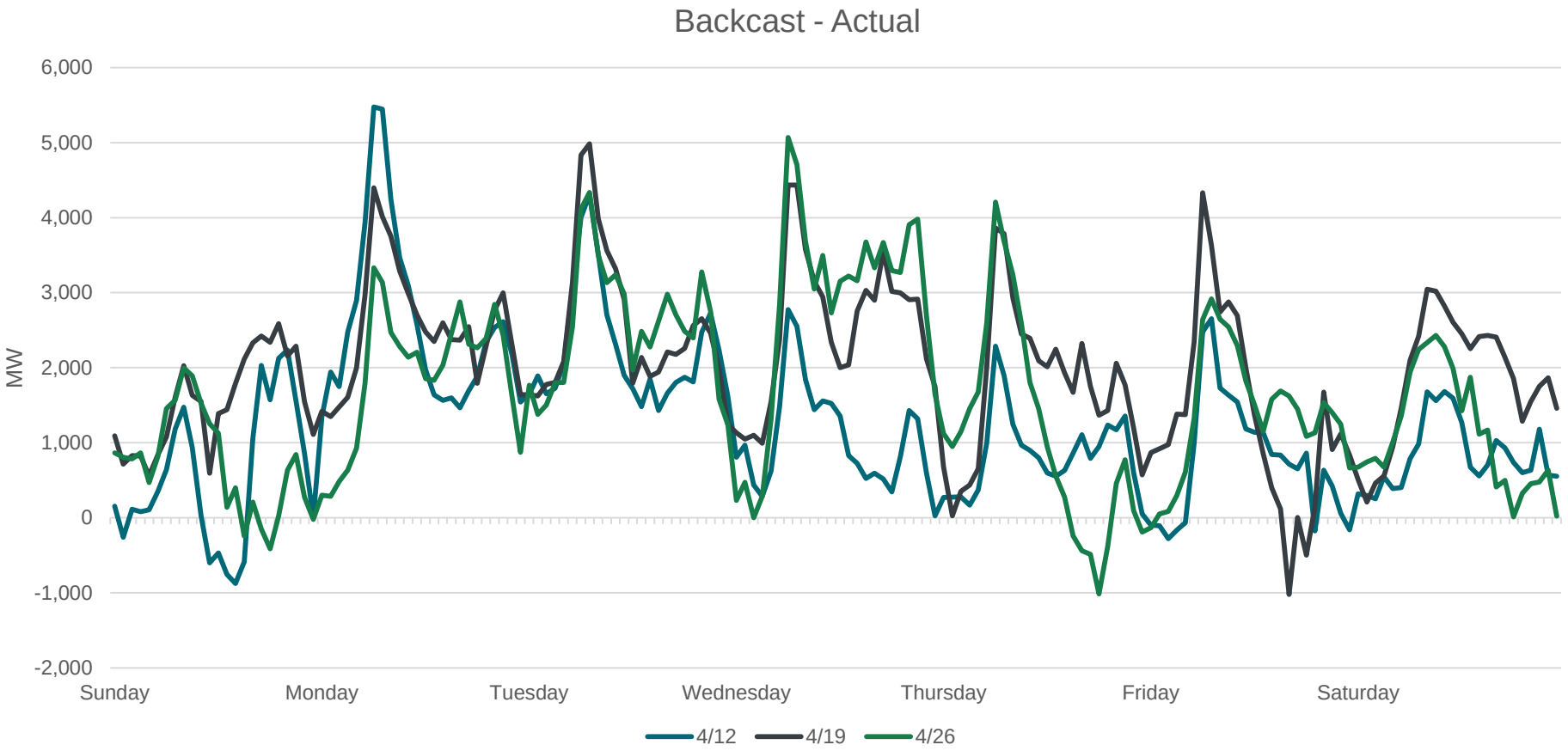


- Less impact on daily peaks late in the week

- Errors were smaller this week



Weekly Model Error Summary

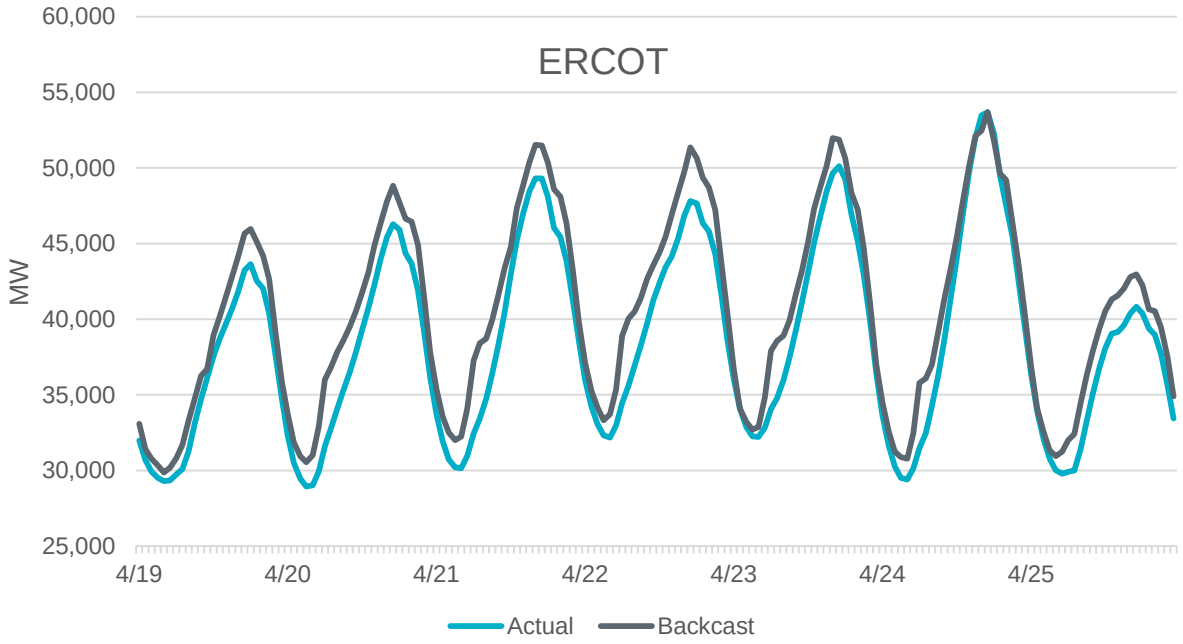


- Similar model error the past three weeks
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 4/19

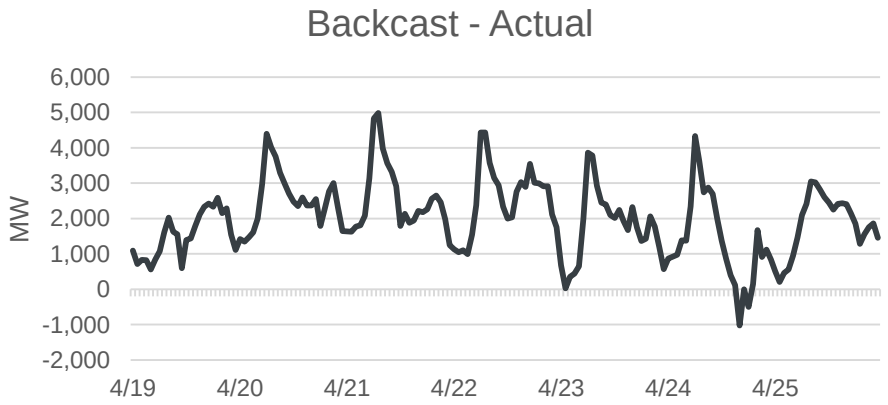
- COVID-19 impacts continue to lower daily peaks, while energy use appears to be the same as last week
- Daily peaks decreased by 4 to 5%, except on 4/24, which was the hottest day
- Weekly energy use decreased by 4 to 5%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 10% lower than what the model would normally predict after accounting for typical model errors.

Week Beginning 4/19

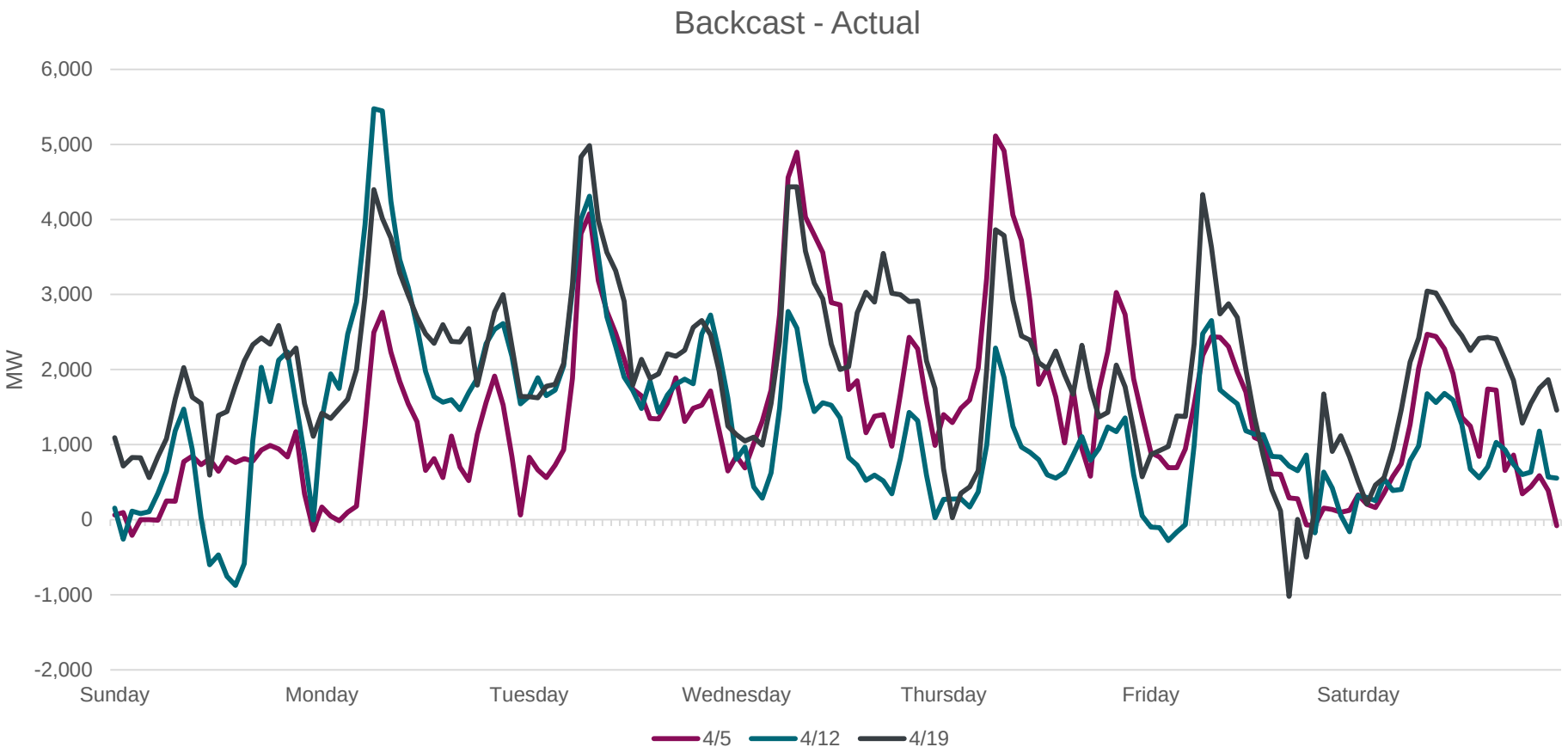


- Daily peaks were 4 to 5% lower
- 4/24 was the exception and also the hottest day of the week

- Similar errors to the previous week



Weekly Model Error Summary

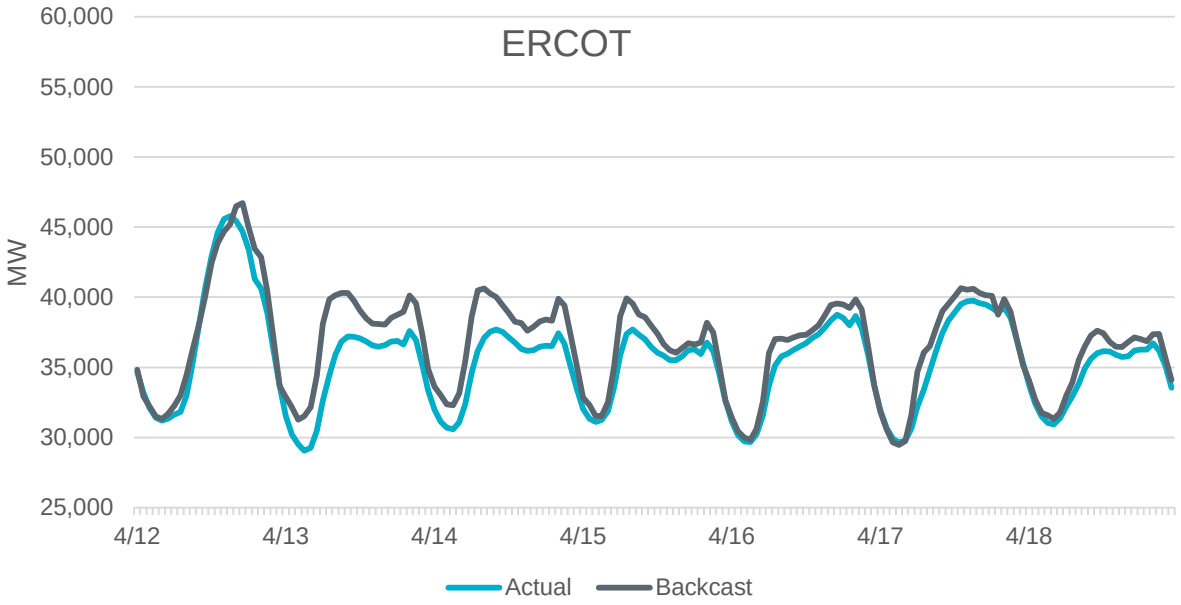


- Similar model error the past three weeks
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 4/12

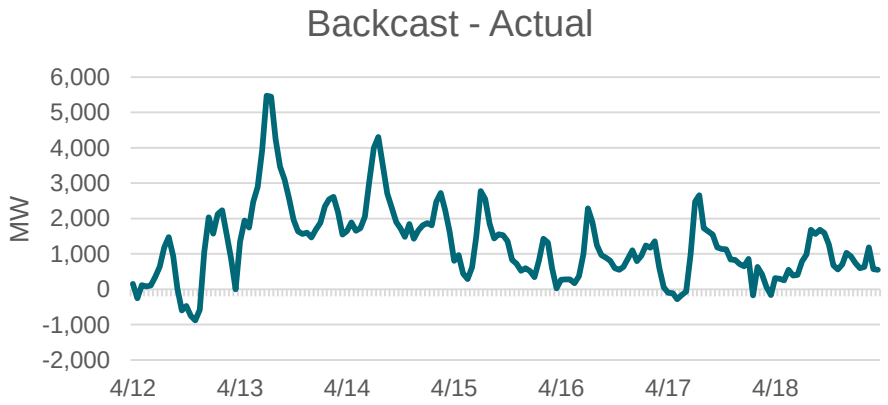
- COVID-19 impacts appear to be the same as last week
- Daily peaks decreased by 2%
- Weekly energy use decreased by 4 to 5%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 10% lower than what the model would normally predict after accounting for typical model errors.

Week Beginning 4/12

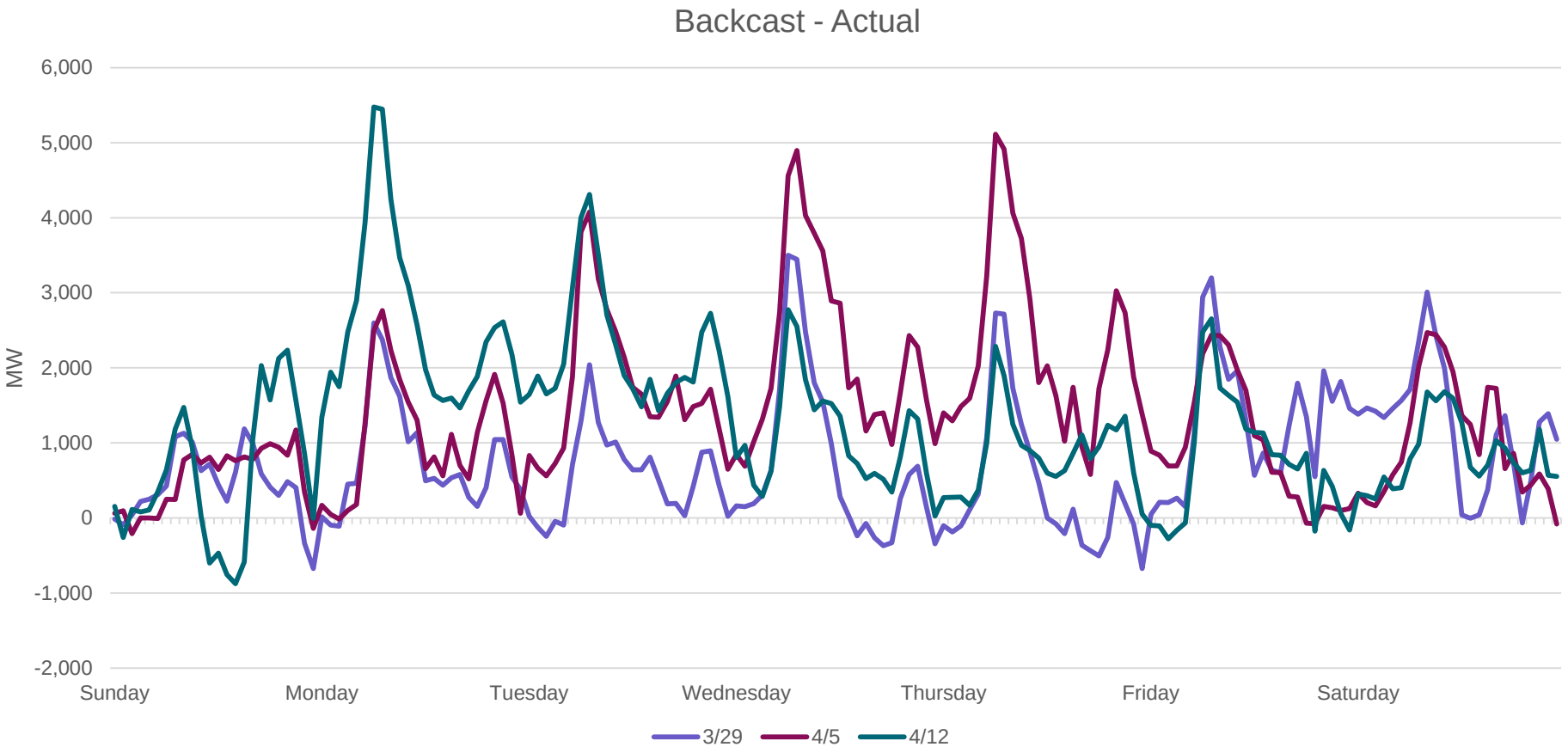


- Most load values, including daily peaks, are consistently lower
- Sunday was the exception

- Similar errors to the previous week
- Indicates COVID-19 load impacts may be stabilizing



Weekly Model Error Summary

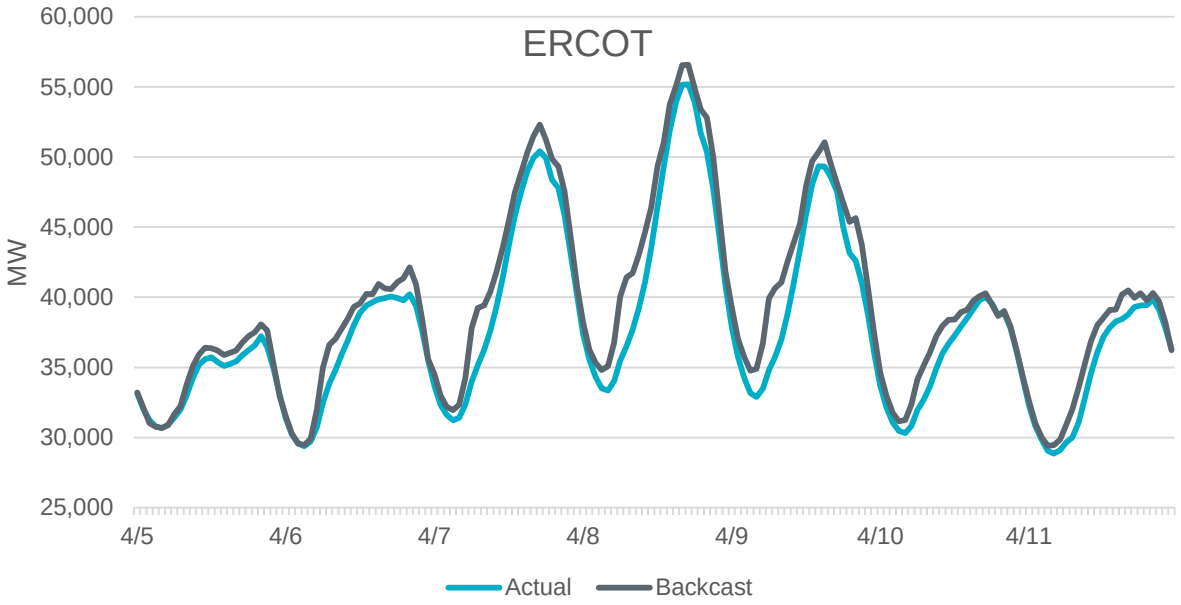


- Model error similar the past two weeks, implying that COVID-19 load impacts appear to be stabilizing
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 4/5

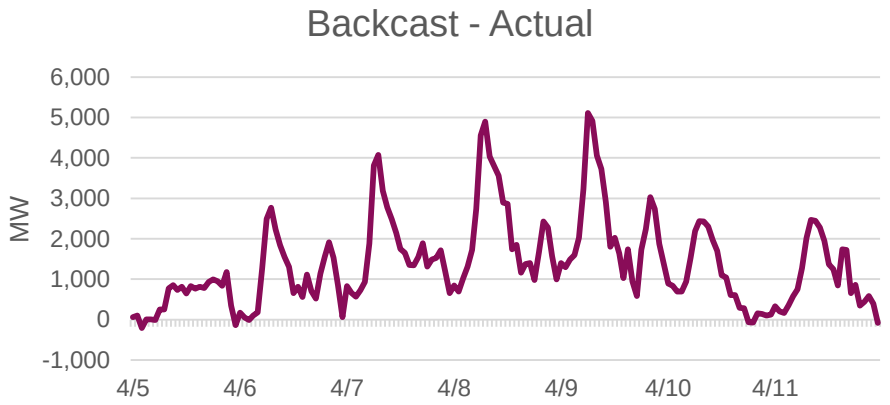
- COVID-19 impacts appear to be increasing in the ERCOT region
- Daily peaks decreased by 2%
- Weekly energy use decreased by 4 to 5%
- Load remains consistently lower during the early morning hours between 6 and 10 a.m.
  - These loads are currently 6 to 10% lower than what the model would normally predict after accounting for typical model errors.

Week Beginning 4/5

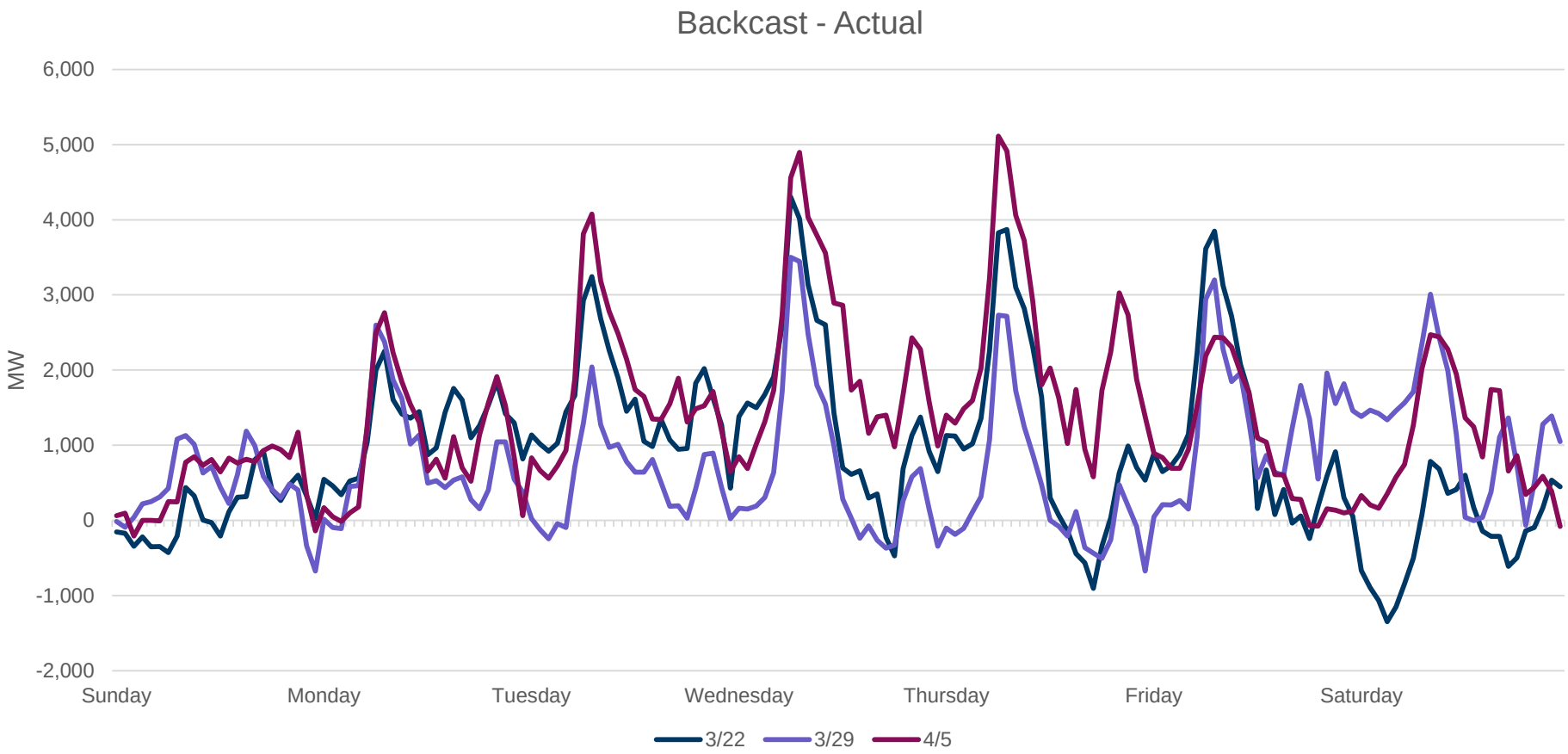


- First week where daily peak values are consistently lower
- Several hot days this week

- Largest errors to date
- Indicates that COVID-19 load impacts have increased



Weekly Model Error Summary

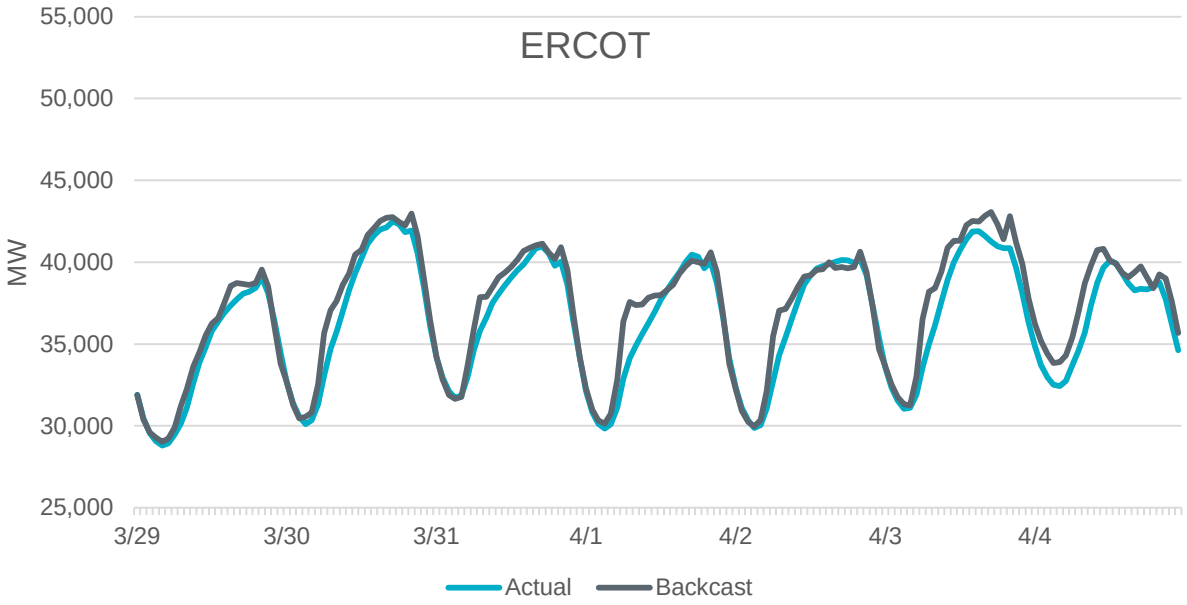


- Model error increased last week implying that COVID-19 load impacts are increasing
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Week Beginning 3/29

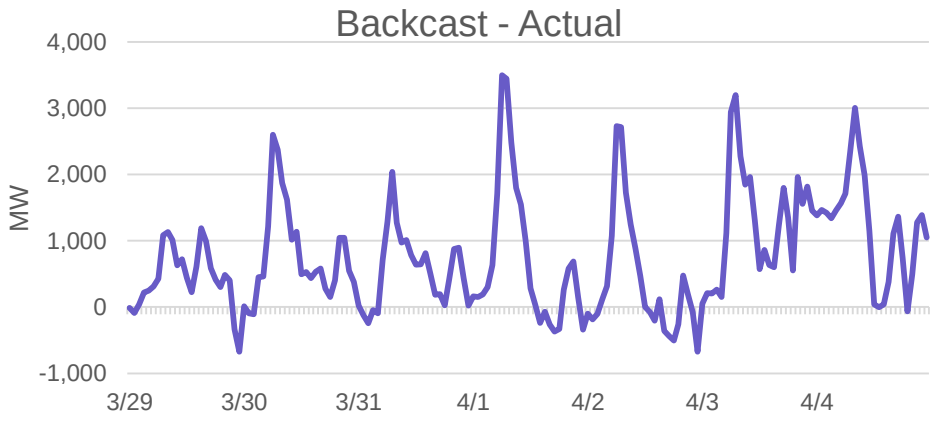
- There has been little impact to the daily peaks.
- Load remains consistently lower during the early morning hours between 6 and 10 a.m. These loads are currently 6 to 10% lower than what the model would normally predict after accounting for typical model errors.
- Based on data from the previous two weeks, weekly energy use has decreased by 2%.

Week Beginning 3/29

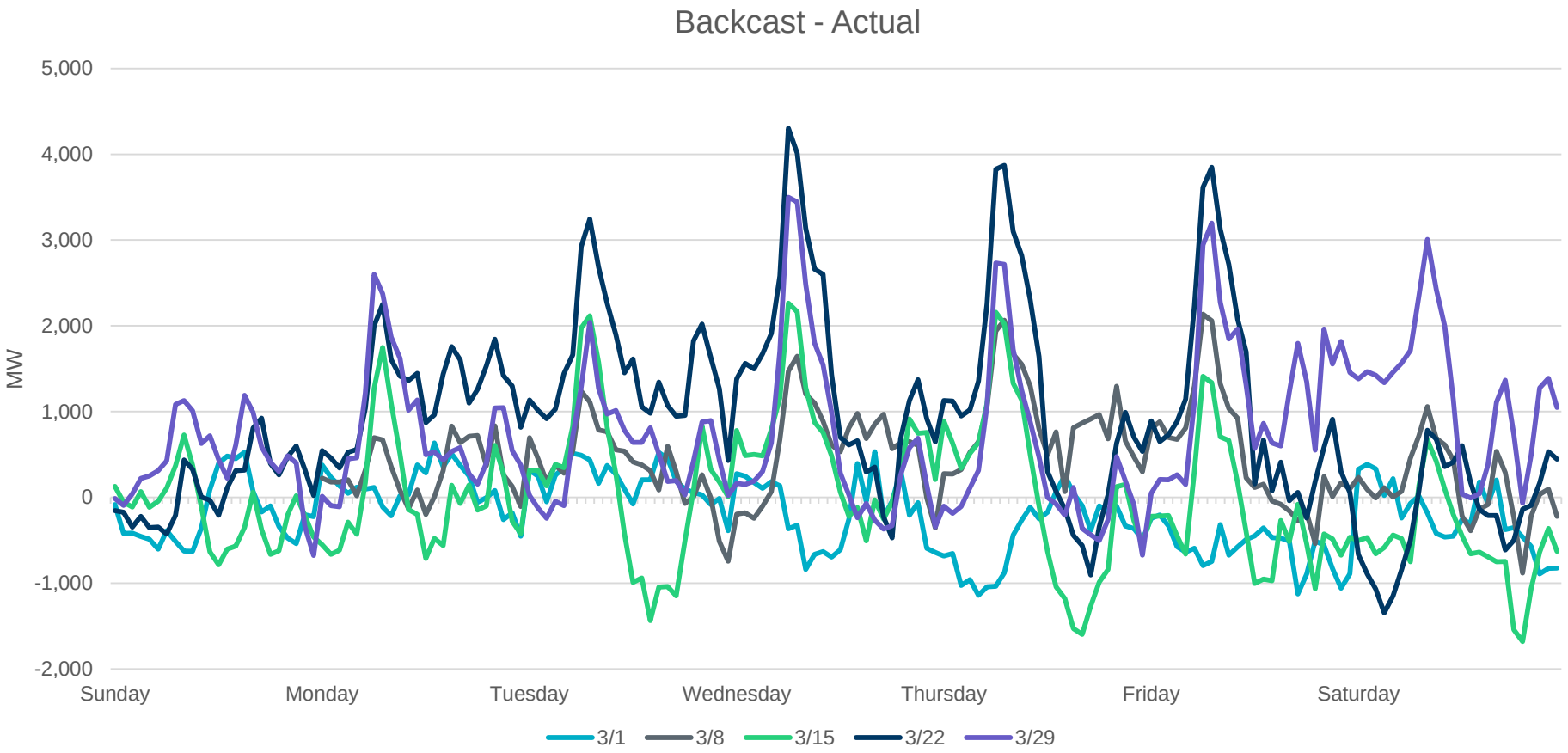


Milder weather conditions during this week

- Similar errors to previous week
- Indicates that COVID-19 load impact was similar to the previous week and does not appear to be increasing



Weekly Model Error Summary

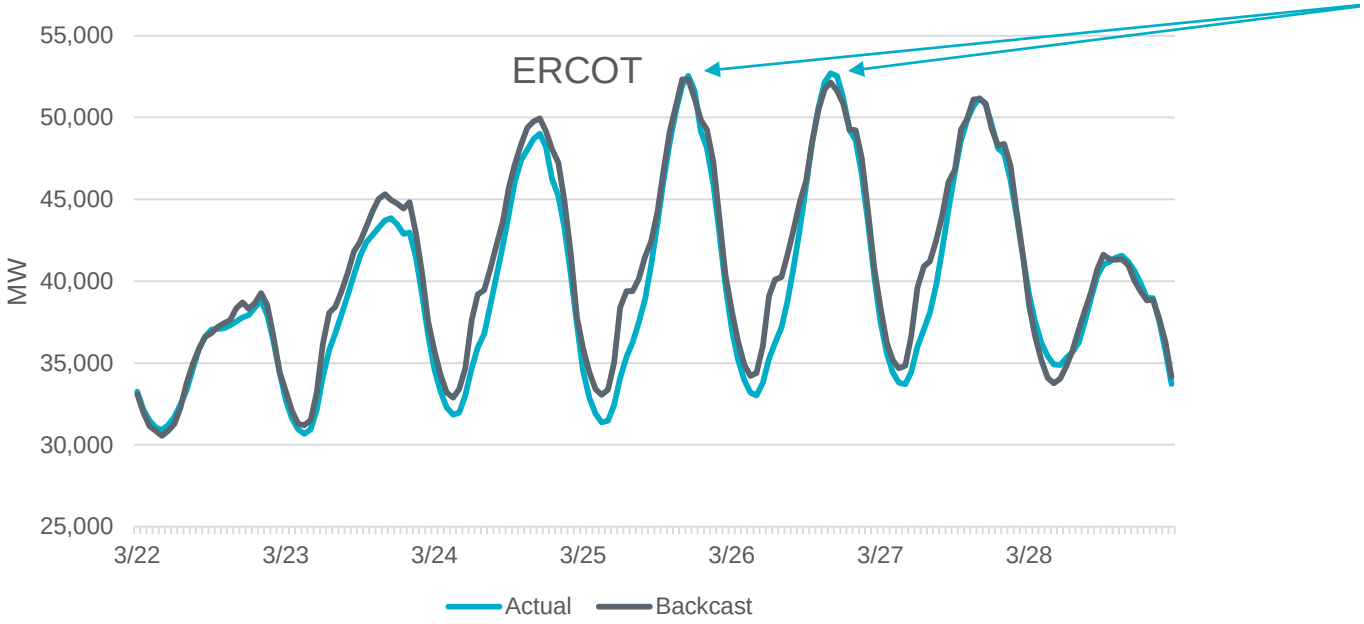


- Model error was similar the past two weeks, implying that COVID-19 load impacts are no longer increasing
- Largest errors have been occurring at 7 and 8 a.m.

Observations for Weeks 3/1, 3/8, 3/15, 3/22

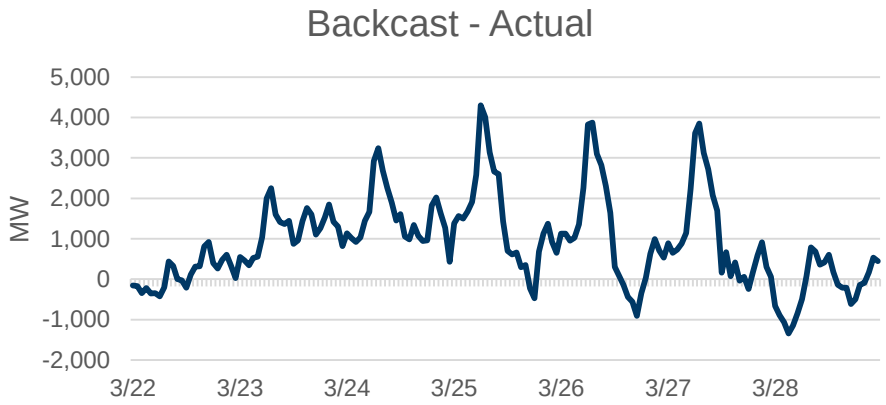
- There has been little impact to ERCOT's daily peaks.
- Load has been consistently lower during the early morning hours between 6 and 10 a.m. These load values have been decreasing over the past 3 weeks and are currently 10% lower than what the model would predict after accounting for typical model error.
- Based on data analyzed for the week beginning March 22, weekly energy use has decreased by 2%.

Week Beginning 3/22

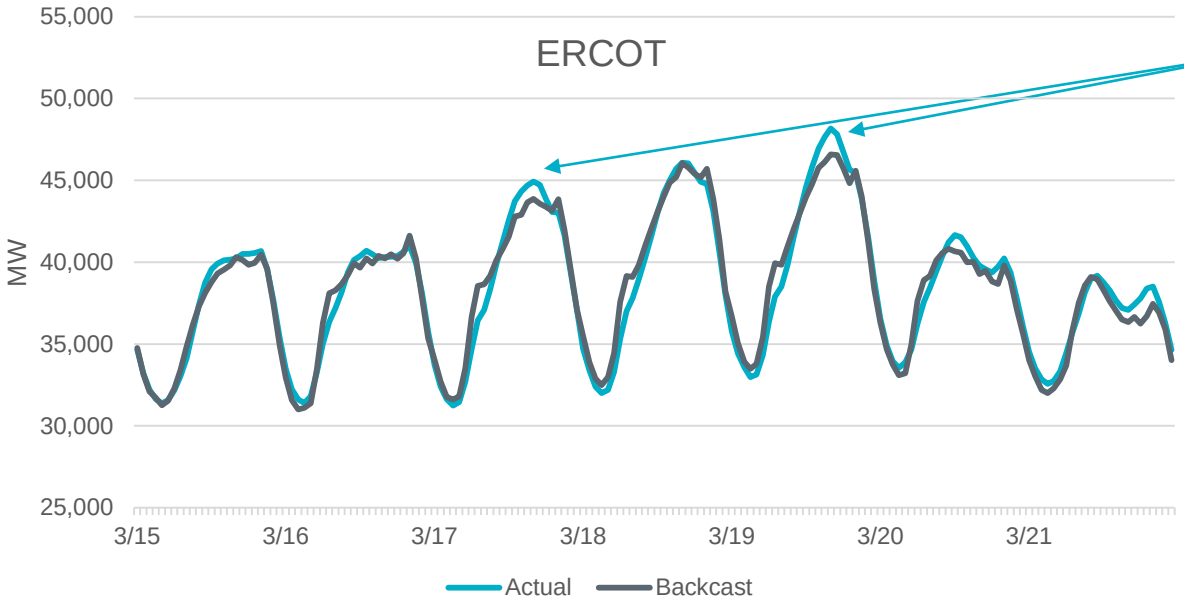


Model appears very accurate at daily peak during these hotter days. This implies little COVID-19 impact during daily peak.

- Errors are increasing with an average value of >1,000 MW
- Reflects remote work and business closings

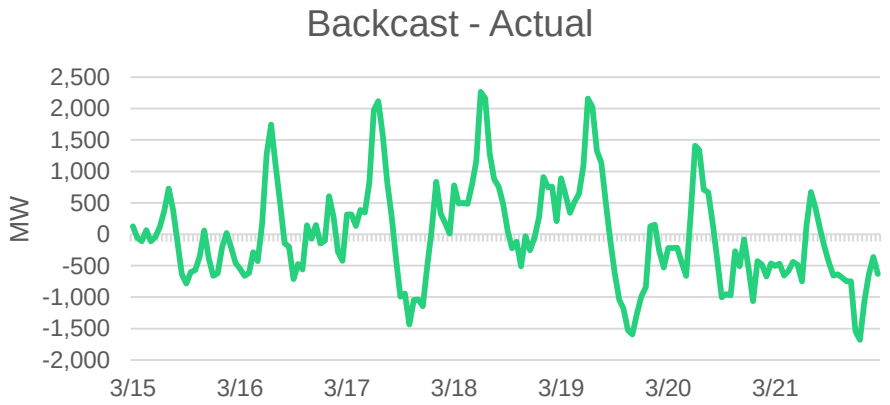


Week Beginning 3/15

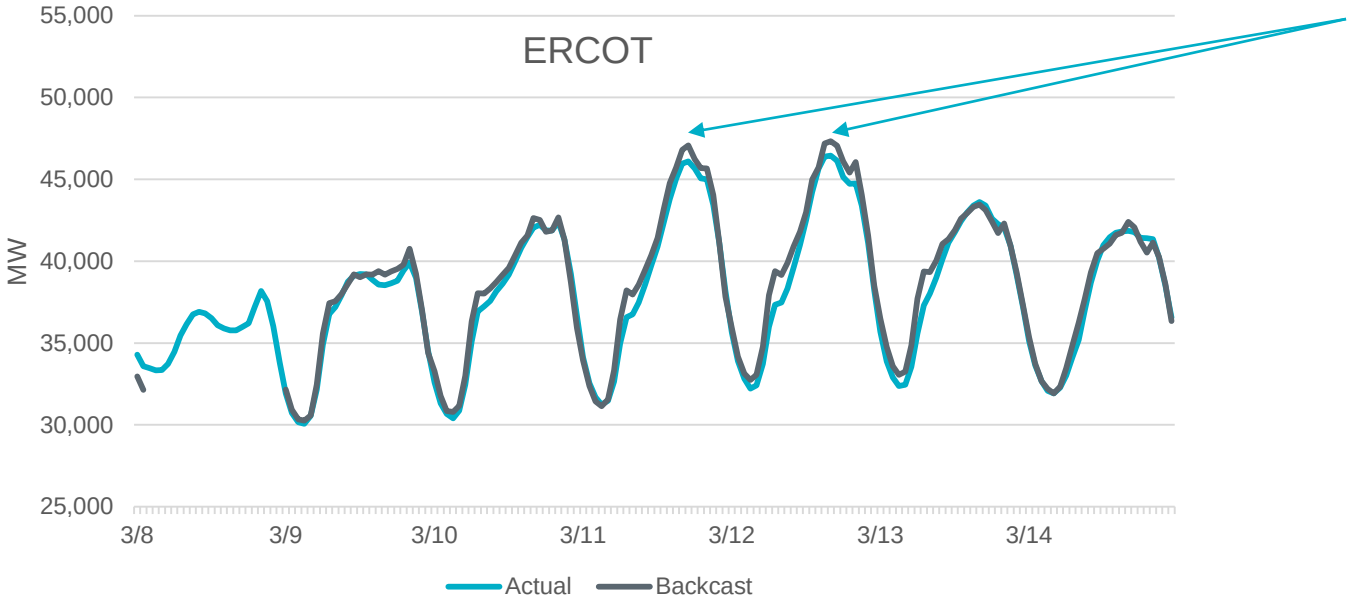


Some variation but no consistent pattern

Similar results to previous week

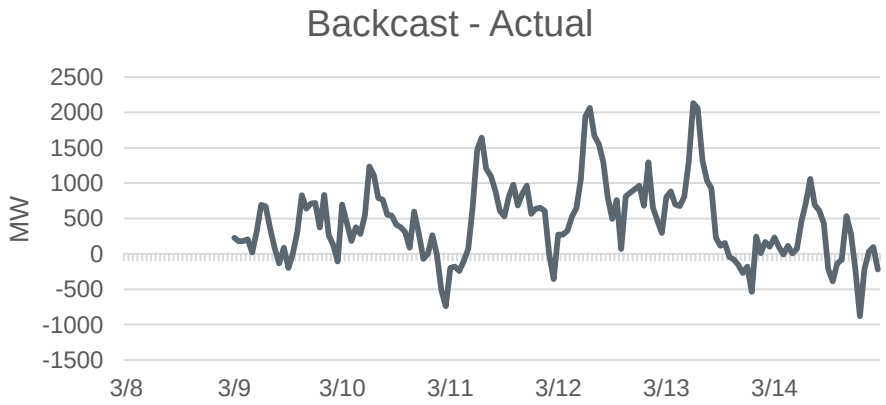


Week Beginning 3/8

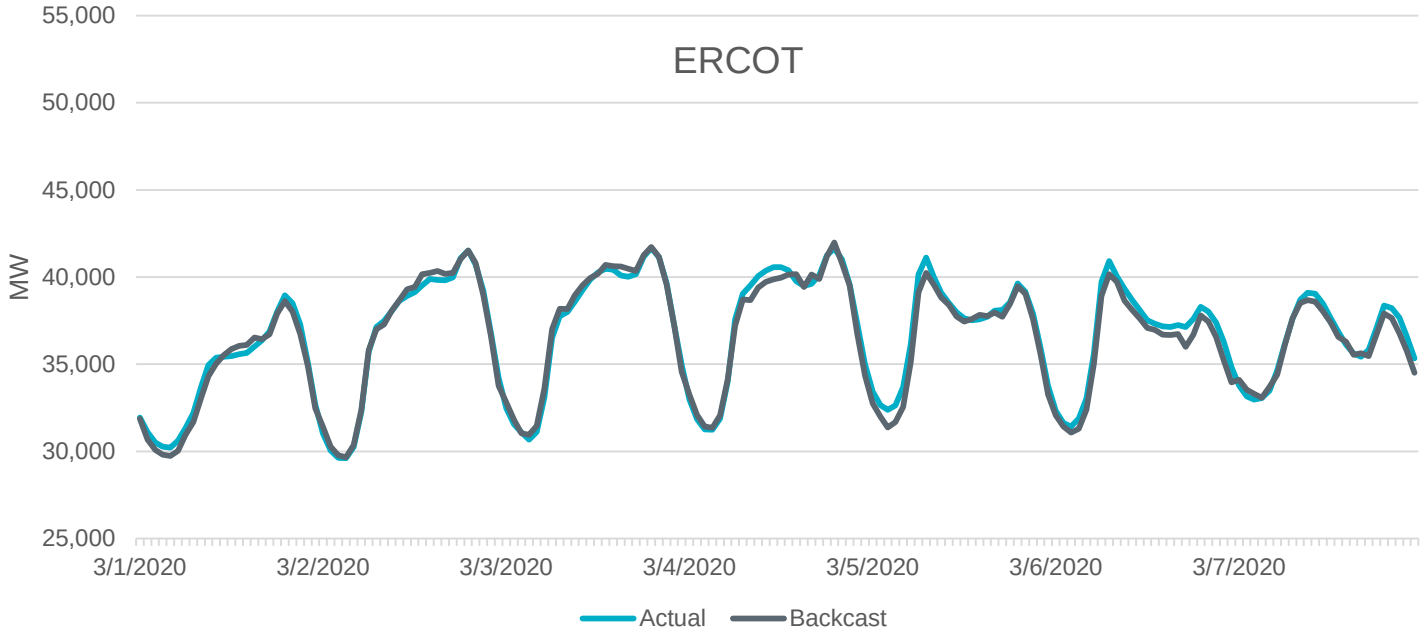


Peaks are slightly lower than the backcast, but they are within the range of normal model error

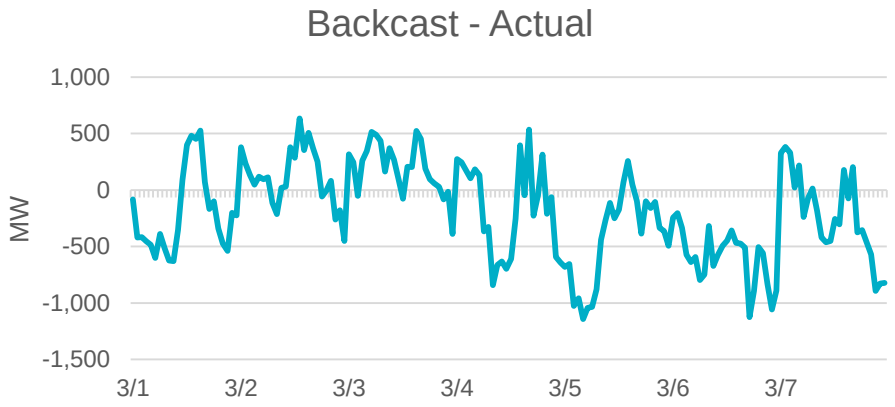
- Software doesn't create backcast for Daylight Saving Time
- Errors are increasing with an average value of >500 MW



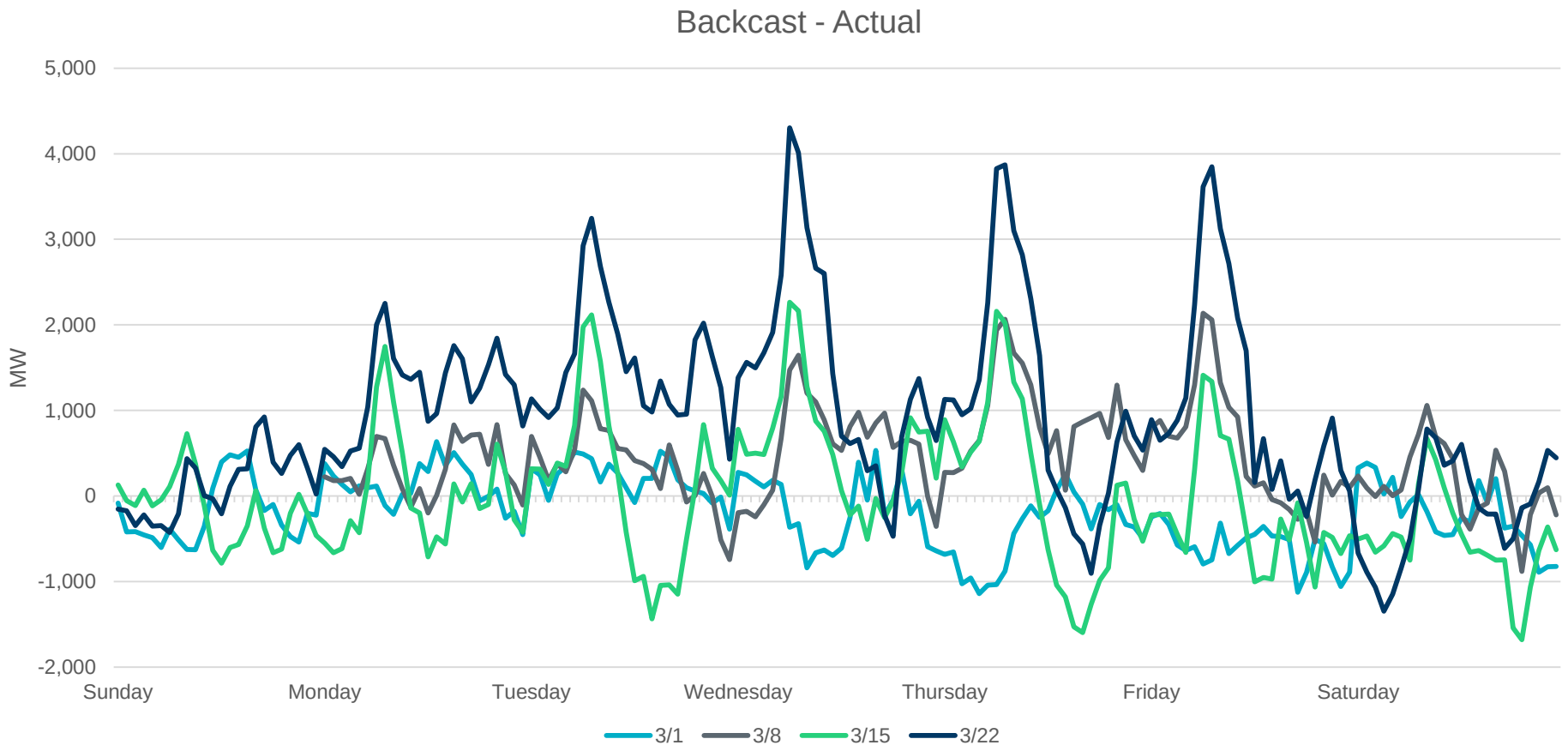
Week Beginning 3/1



- Model performance before COVID-19
- Overall model performs well, though weather is milder
- Expectation is for model error to be centered around 0



Weekly Model Error Summary



- Model error is increasing due to COVID-19 impacts
- Largest errors have been occurring at 7 and 8 a.m.