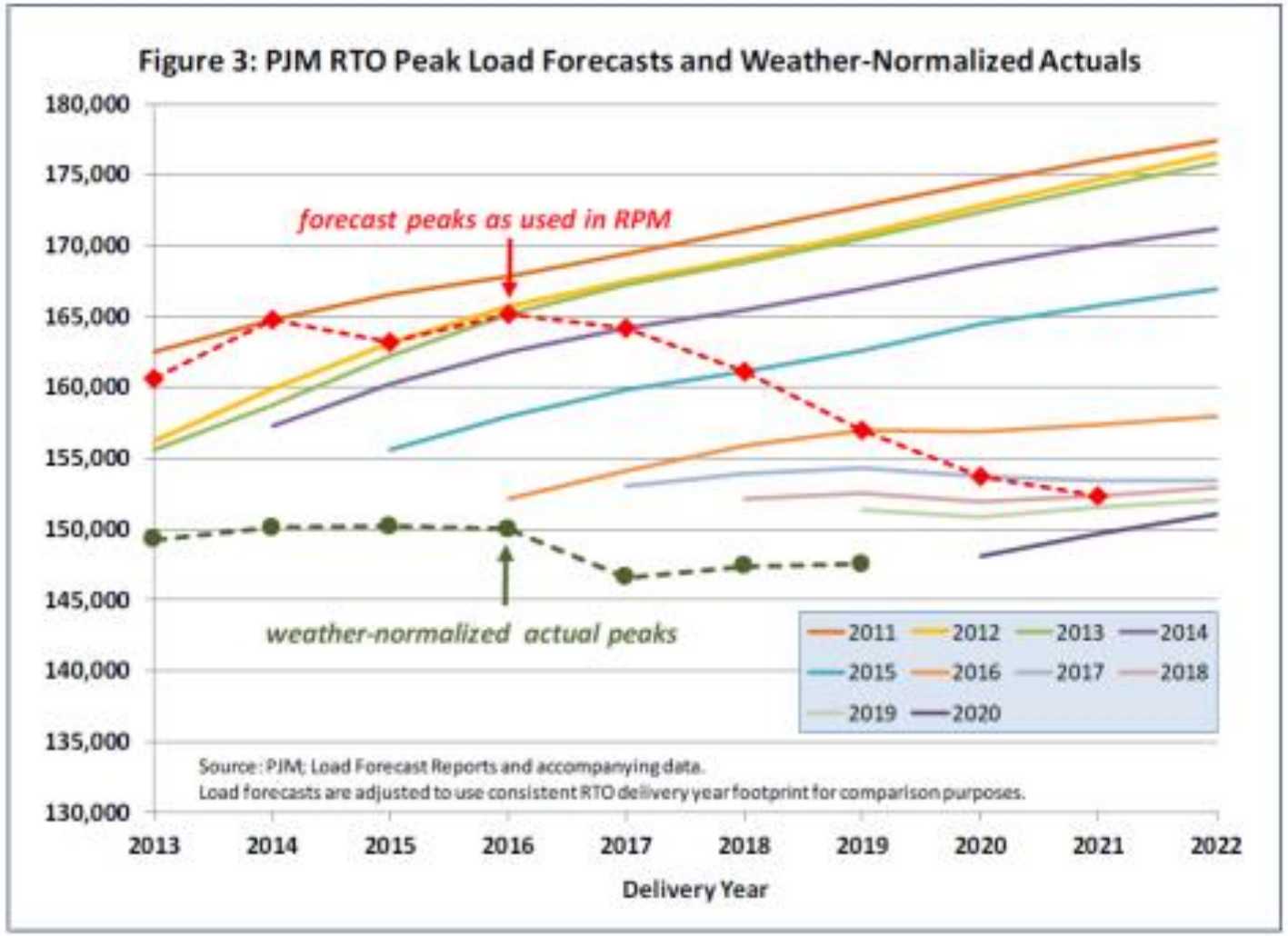
PJM Load Forecast Accuracy

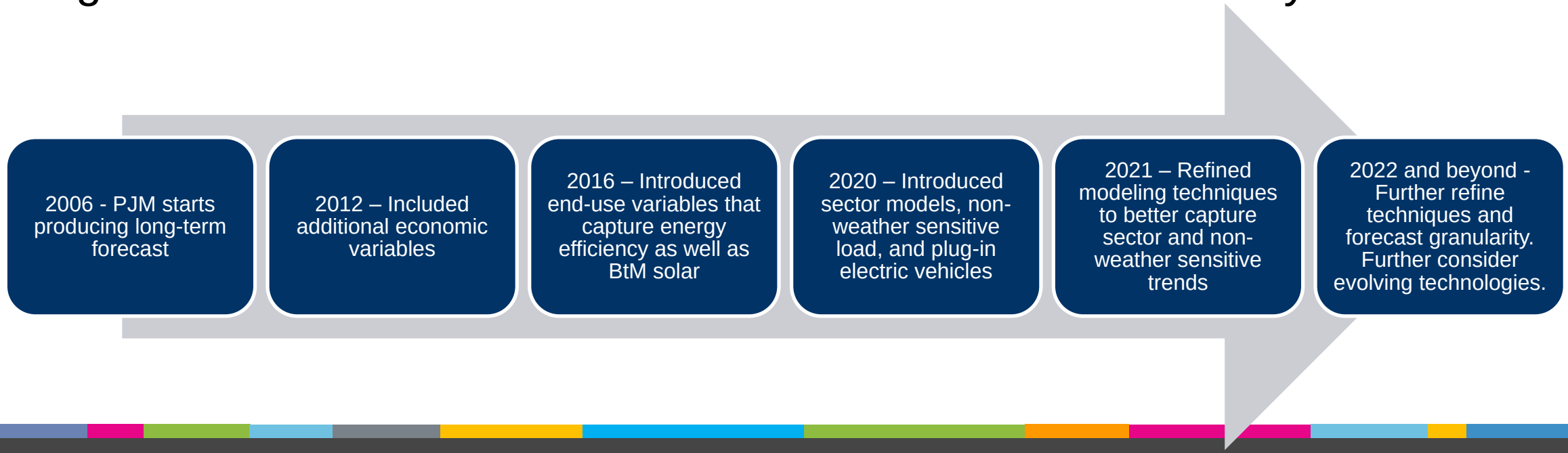
Tom Falin
Resource Adequacy Planning
MIC Special Session
Quadrennial Review
August 27, 2021

E-Cubed Policy Associates – Workshop Session 3



Load Forecast Model Progress

- PJM, in collaboration with our stakeholders, is committed to producing the most accurate load forecast we can.
- All potential model changes are thoroughly vetted through the Load Analysis Subcommittee (LAS) and error metrics are provided.
- Significant model enhancements have been made in recent years.



Model Error

- The error attributed to the forecast model alone
- This is the error that PJM directly controls
- This is the error metric used to assess potential model changes

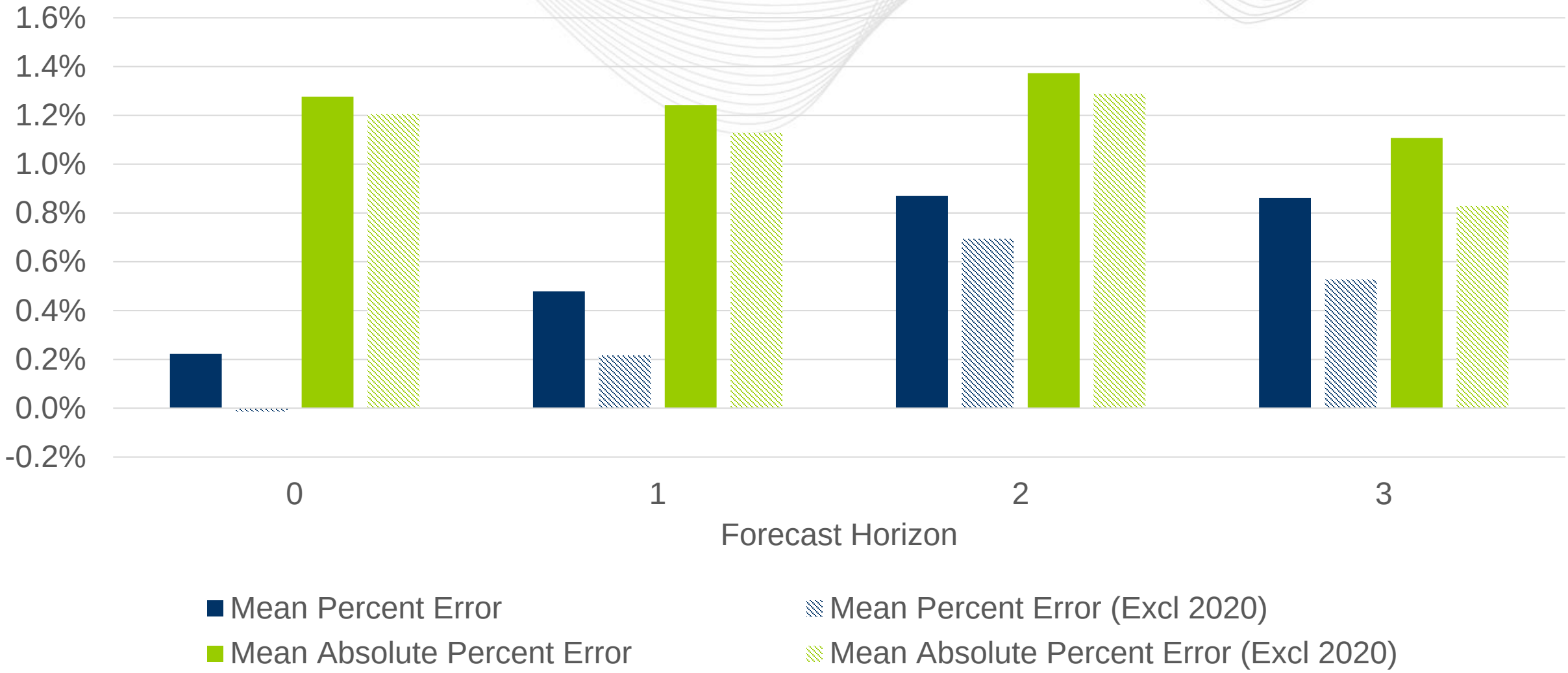
Total Error

- This includes model error and the error associated with the forecast inputs (economics, end use data, BtM solar, PEVs)
- This is the error that matters in RPM

Model Accuracy

- Model accuracy is assessed using “back-casting” techniques to determine how our current model would have performed had we used it in the past (back to the 2015 forecast).
- The 10 CP days from past summers are identified and our current model is run using the *actual* weather and *updated* inputs (economics, end use data, BtM solar, etc.) from each of those 10 CP days.
- The resulting MW forecast is then compared to the actual load from each of those 10 CP days.
  - This ensures the forecast is compared to an actual number, not to an estimated value produced by another model.

Summer Summary – Model Accuracy on 10 CPs

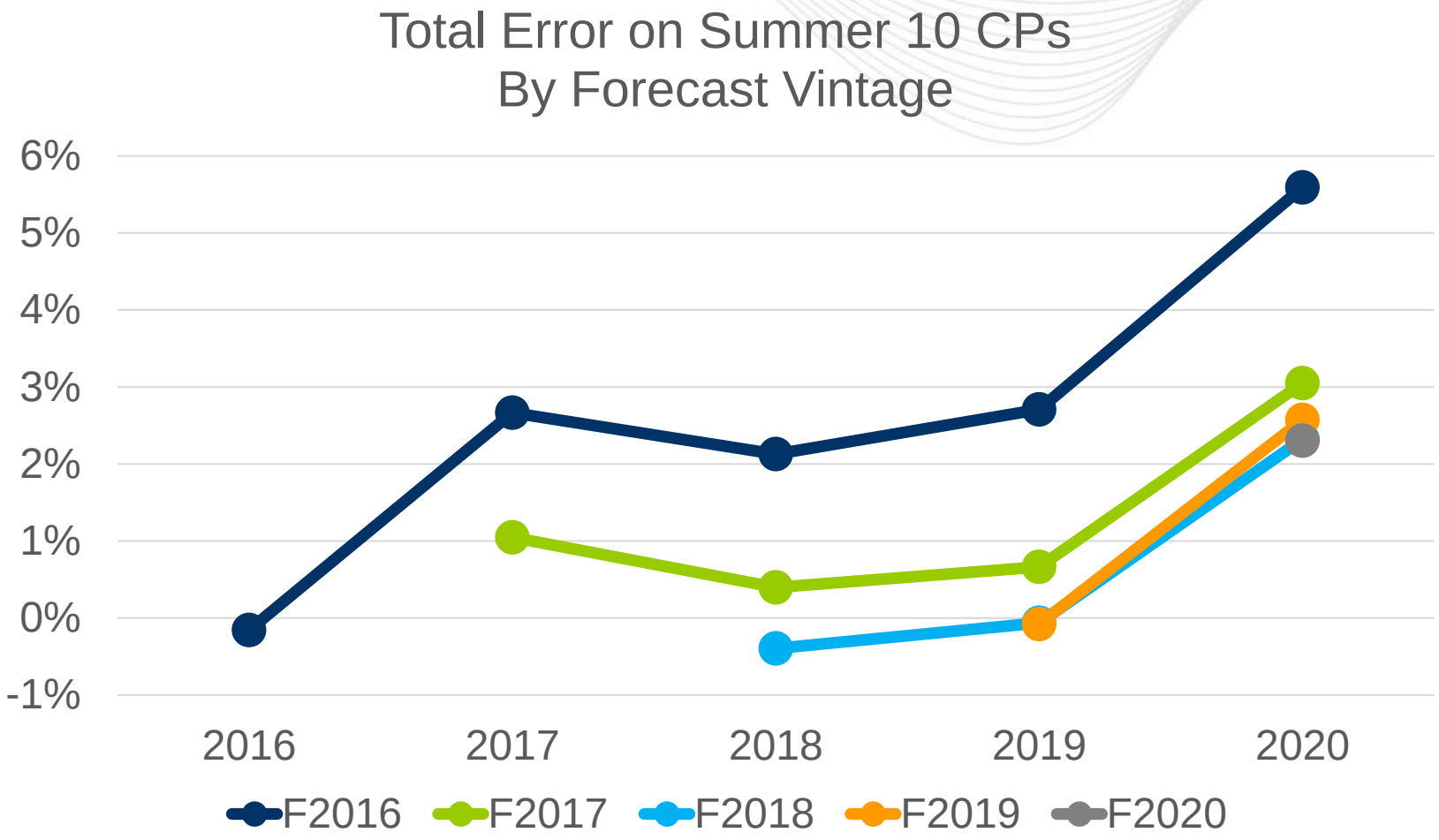


Overview of Total Accuracy

- Using our current model, forecasts for past years were computed using information that was available at the time of the forecast (i.e. load history, economics forecast, efficiency forecast, BtM solar forecast).
  - Only created forecasts for vintage 2016 and beyond as that is the first year for which we have forecasts for all inputs.

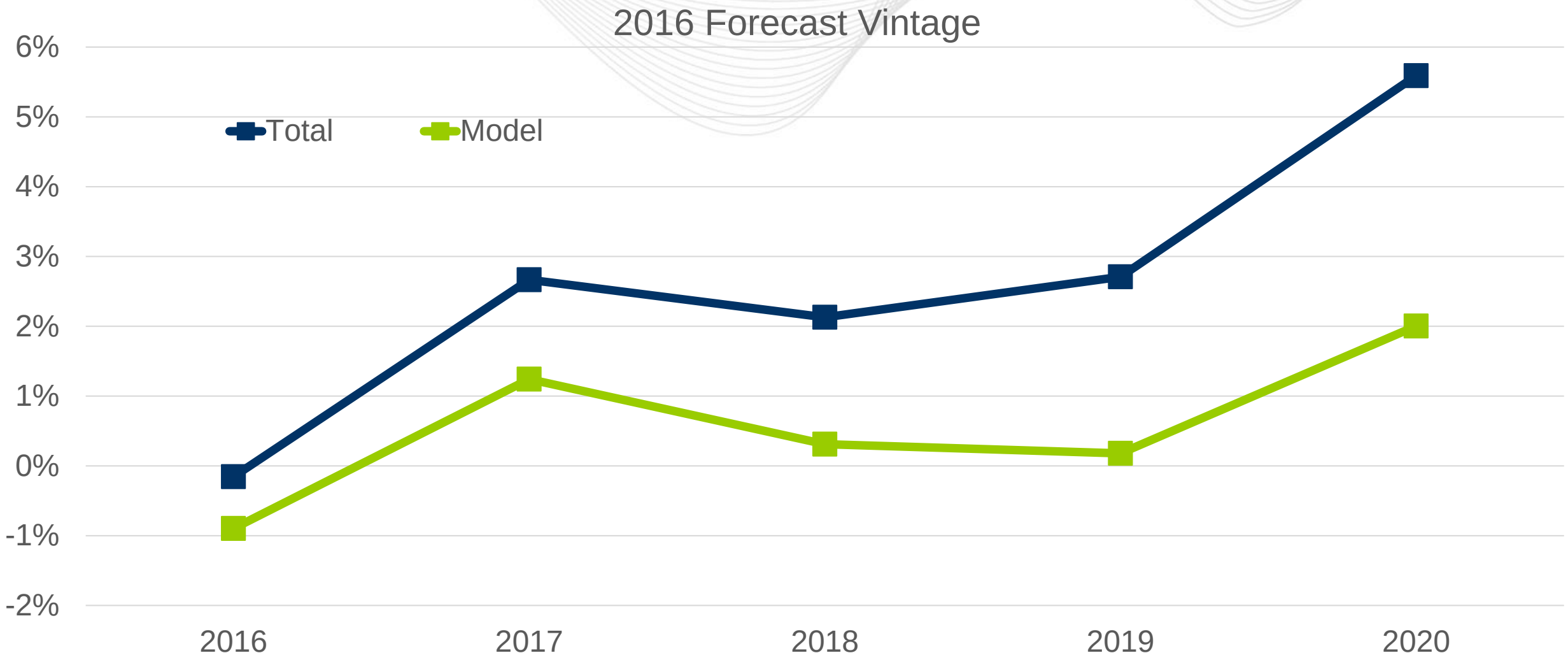
- Results are then solved using actual weather conditions on the 10 CP days of each summer and compared to observed loads.
  - This ensures the forecast is compared to an actual number, not to an estimated value produced by another model.

Total Error (MPE) on Summer 10 CPs

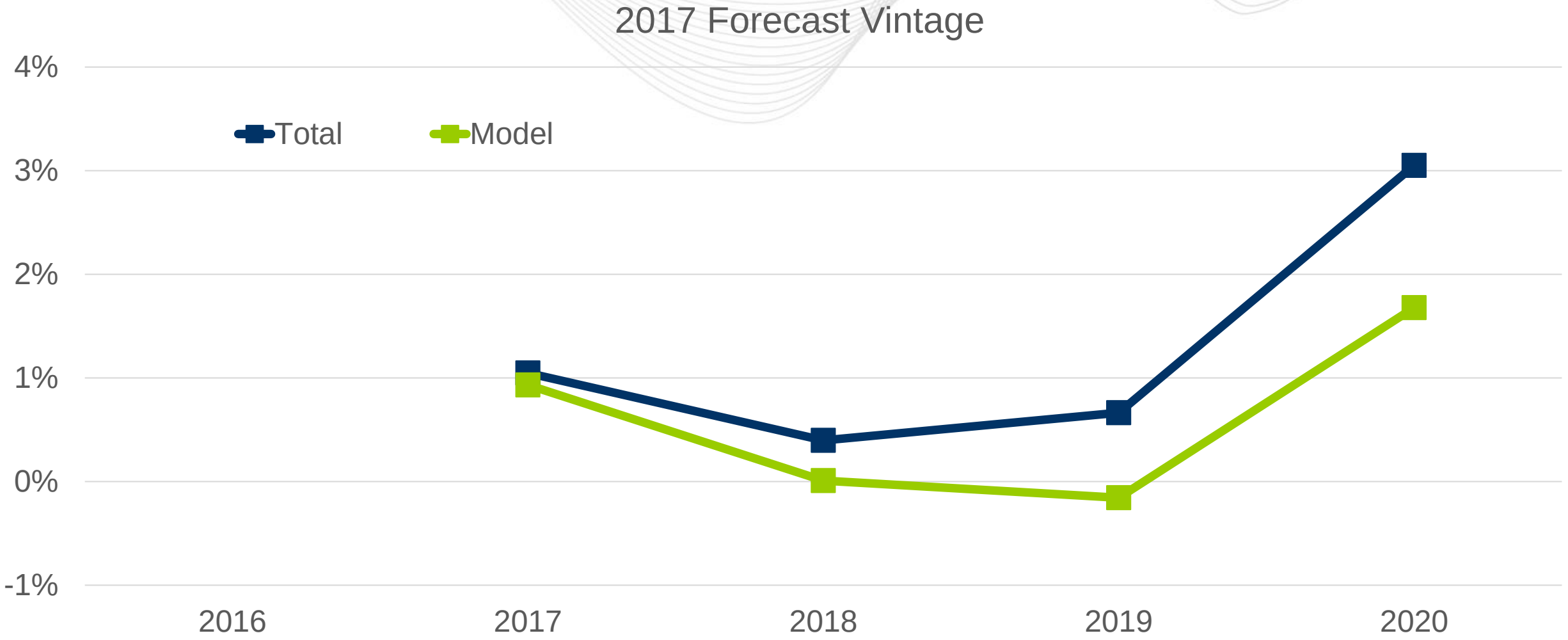


- Forecasts improve starting with 2017 Forecast Vintage. After this point, errors are in the +/- 1% range (with the exception of 2020).
- All forecast vintages show a noticeable deterioration in accuracy in 2020, reflecting the pandemic.

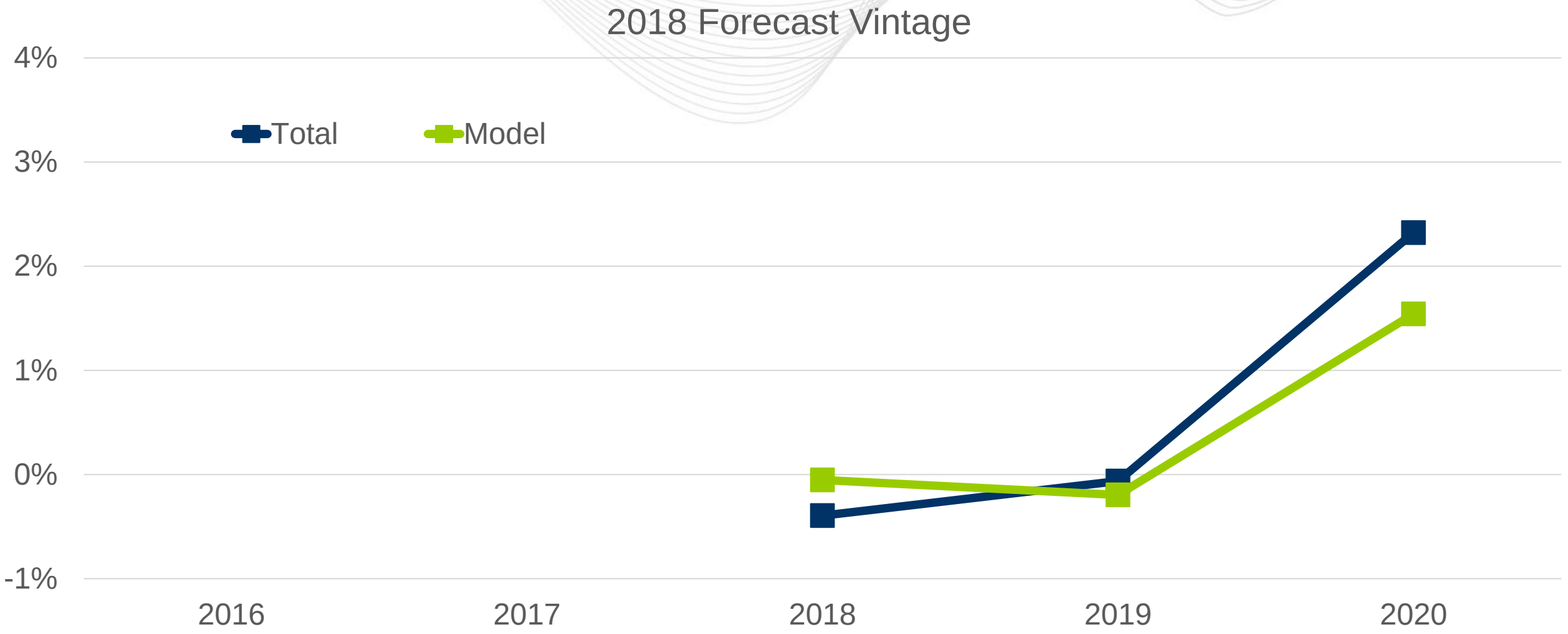
Total vs Model – Error (MPE) on Summer 10 CPs



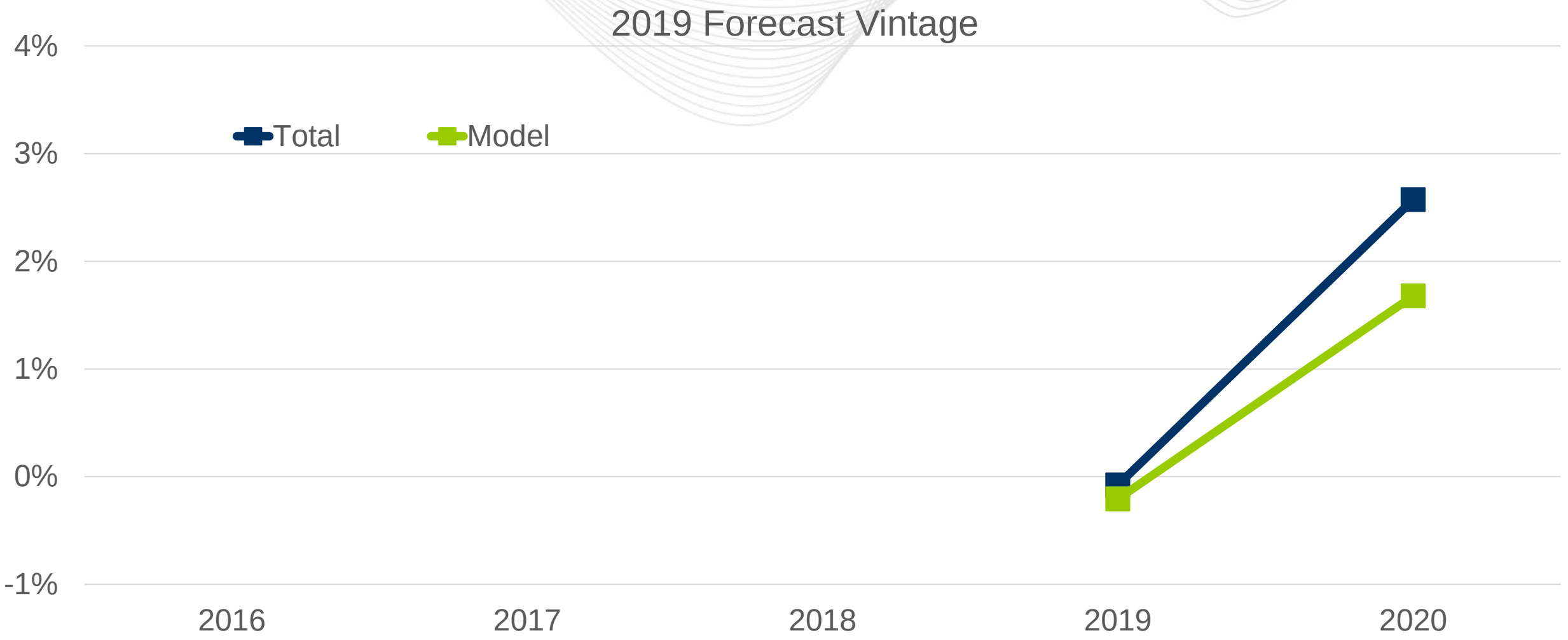
Total vs Model – Error (MPE) on Summer 10 CPs



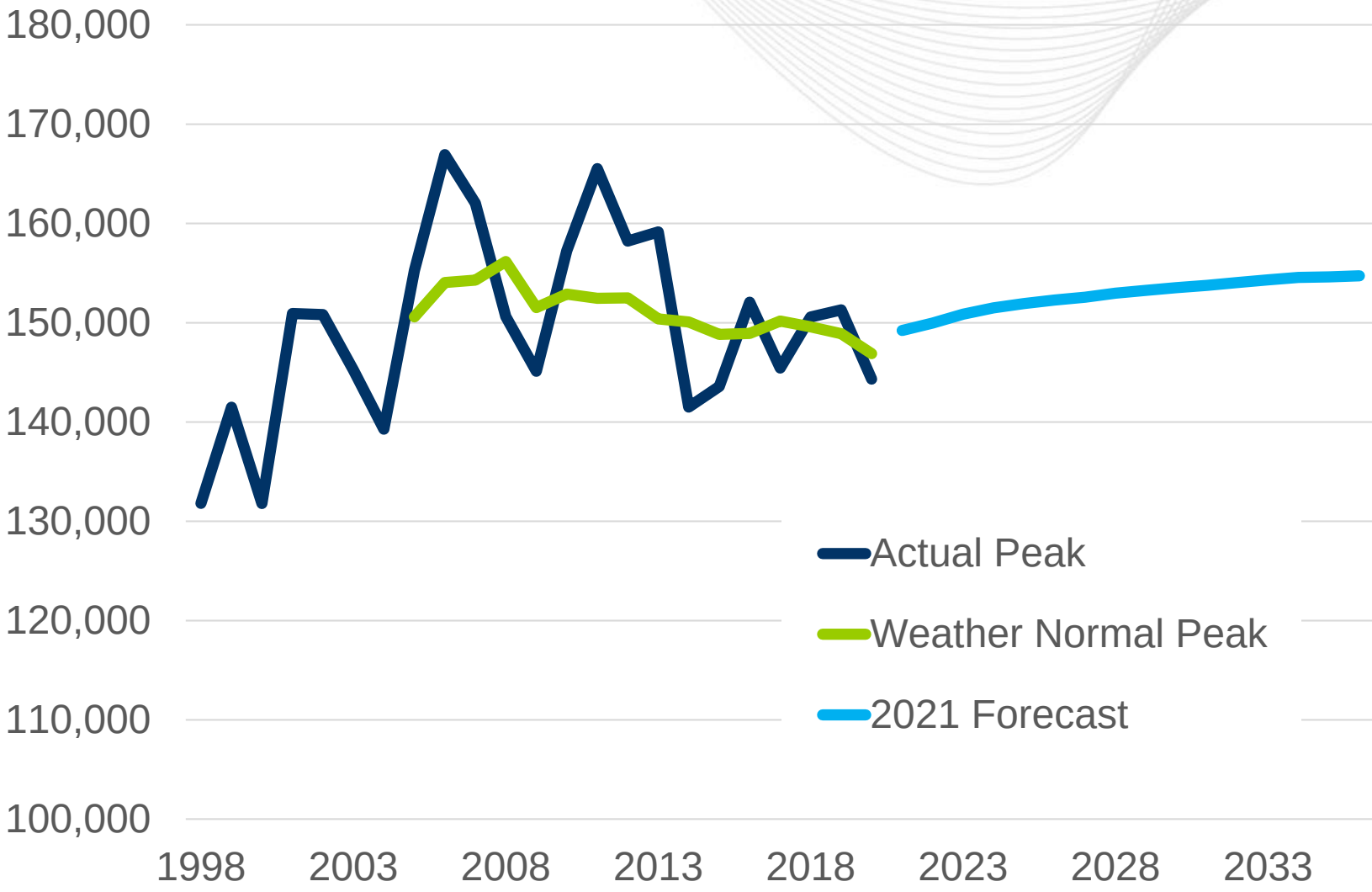
Total vs Model – Error (MPE) on Summer 10 CPs



Total vs Model – Error (MPE) on Summer 10 CPs



2021 Load Forecast



- Forecast
  - 2023 – 150,855 MW
  - 2024 – 151,503 MW
  - 15 yr growth rate - +0.2%
- Forecast seems reasonable as forecast values in the next five years have been exceeded within the last five years.
  - 2019 – 151,302 MW
  - 2016 – 152,069 MW

Next Steps

- PJM is continuing to investigate model changes this year to further improve forecast model accuracy.

- We continue to seek stakeholder feedback on our assumptions, methodologies, and results to produce the most accurate forecast possible.

- Load Analysis Subcommittee Meetings
  - Sept. 3, 2021 9 AM – 12 PM
  - Oct. 4, 2021 9 AM – 10 AM
  - Nov. 24, 2021 9 AM – 12 PM