



# MTLF Performance

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Load Forecasting & Analysis

WMWG

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# Agenda

- Model Review
- Model Update
- Performance metrics for August and September
- Next Steps

# MTLF Models

- **A3 Notes**

- Uses recent history to update the model coefficients
- Prone to significantly over-forecast summer demands on very hot days
- Prone to significantly over-forecast winter demands on very cold days

# MTLF Models

- **A6 Notes**
  - Uses recent history to update the model coefficients
  - Only uses one weather station per weather zone
  - Prone to significantly over-forecast summer demands on very hot days
  - Prone to significantly over-forecast winter demands on very cold days

# MTLF Models

- **E, E1, E2, E3**
  - Based on neural network and linear regression models with a separate model for each hour
  - Common weather variables are incorporated (temperature, wind speed, cloud cover, solar irradiance, etc.) based on the particular month or season
  - 49 weather stations (expanded set)
  - Other variables include day of week and holidays

# MTLF Models

- **M Notes**
  - The weighted average of the 6 other models
  - Historically has shown to be the best Day Ahead forecast
  - Provides a good benchmark for other models

# Model Update

- **All internally developed forecasts (E, E1, E2, and E3) are configured exactly the same:**
  - Same exact model
  - Same application of error correction
  - Same application of tuning
- **The only difference is the weather forecast that is used in each forecast model**

# Weather Forecast Sources

- **The following weather forecasts are available:**
  - European Model (Euro)
  - Global Forecast System (GFS)
  - Global Forecast System Ensemble (GENS)
  - North American Model (NAM)
  - 3 vendor models



# Model Update

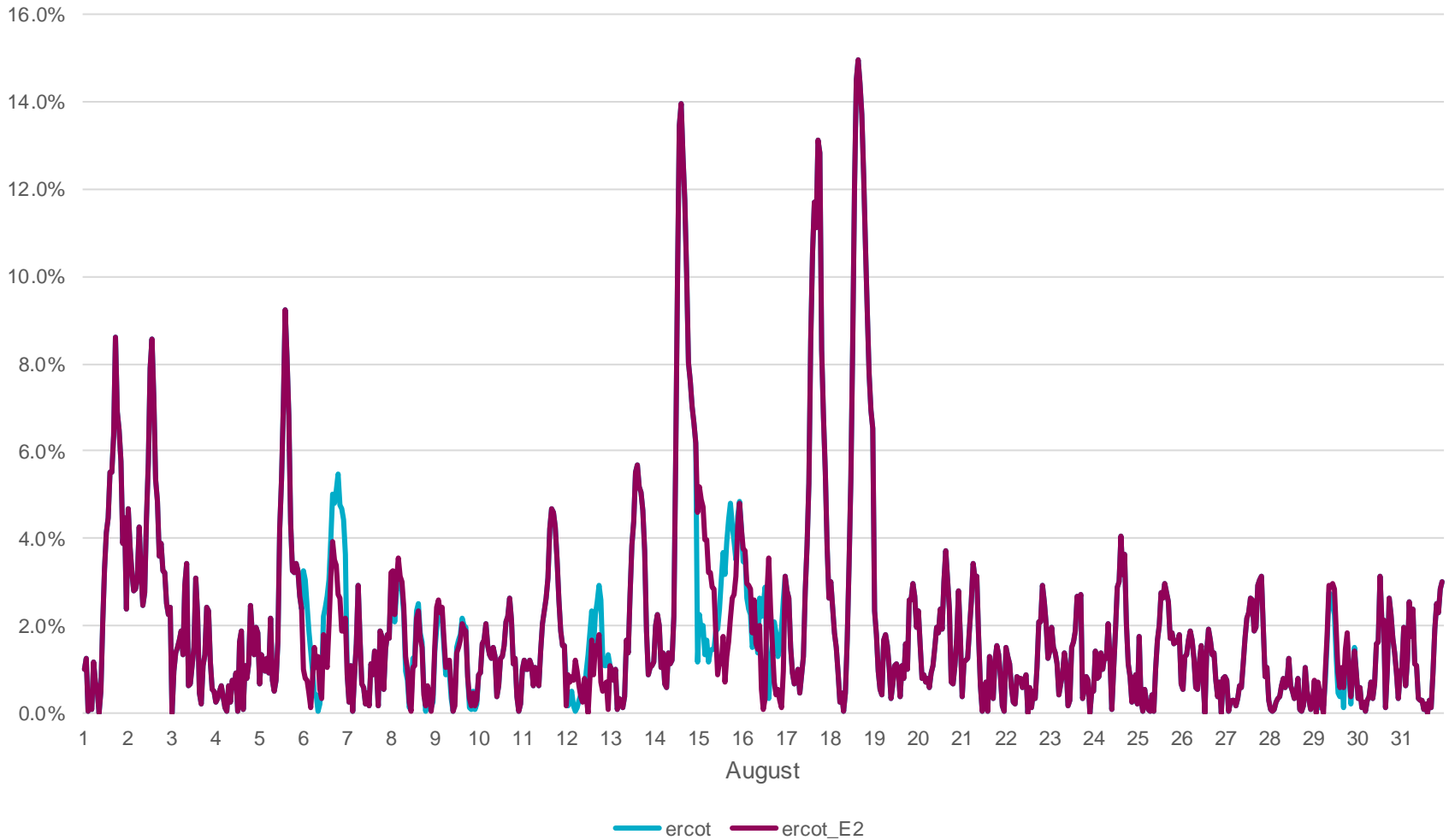
- Typically, E2 uses the most extreme weather forecast for each Weather Zone for the **Day Ahead**
  - Will result in different forecasts being used in different weather zones (i.e., Euro used in North Central while GFS is used in Coast)
- Typically, E3 uses the most extreme weather forecasts for each Weather Zone for **days 4+** in the future
  - Will result in different forecasts being used in different weather zones (i.e., vendor 1 used in South Central while GENS is used in South)
- Typically, E and E1 will use the same weather forecast for all Weather Zones
  - The most extreme weather forecasts based on a single source (i.e., GFS, Euro, etc.) is used for E and E1. An example would be E using the GFS for all Weather Zones with E1 using the Euro for all Weather Zones.

# Model Update

- **On a seasonal basis or when weather patterns change, the internally developed forecasts (E, E1, E2, and E3) will be updated with a model that is appropriate for the conditions**
- **Using a single model for all forecasts allows for:**
  - Better model maintenance/updates
  - Clear enumeration of weather forecast impacts
  - Allows multiple team members to make updates more efficiently
  - Results in consistent back testing and analysis for events

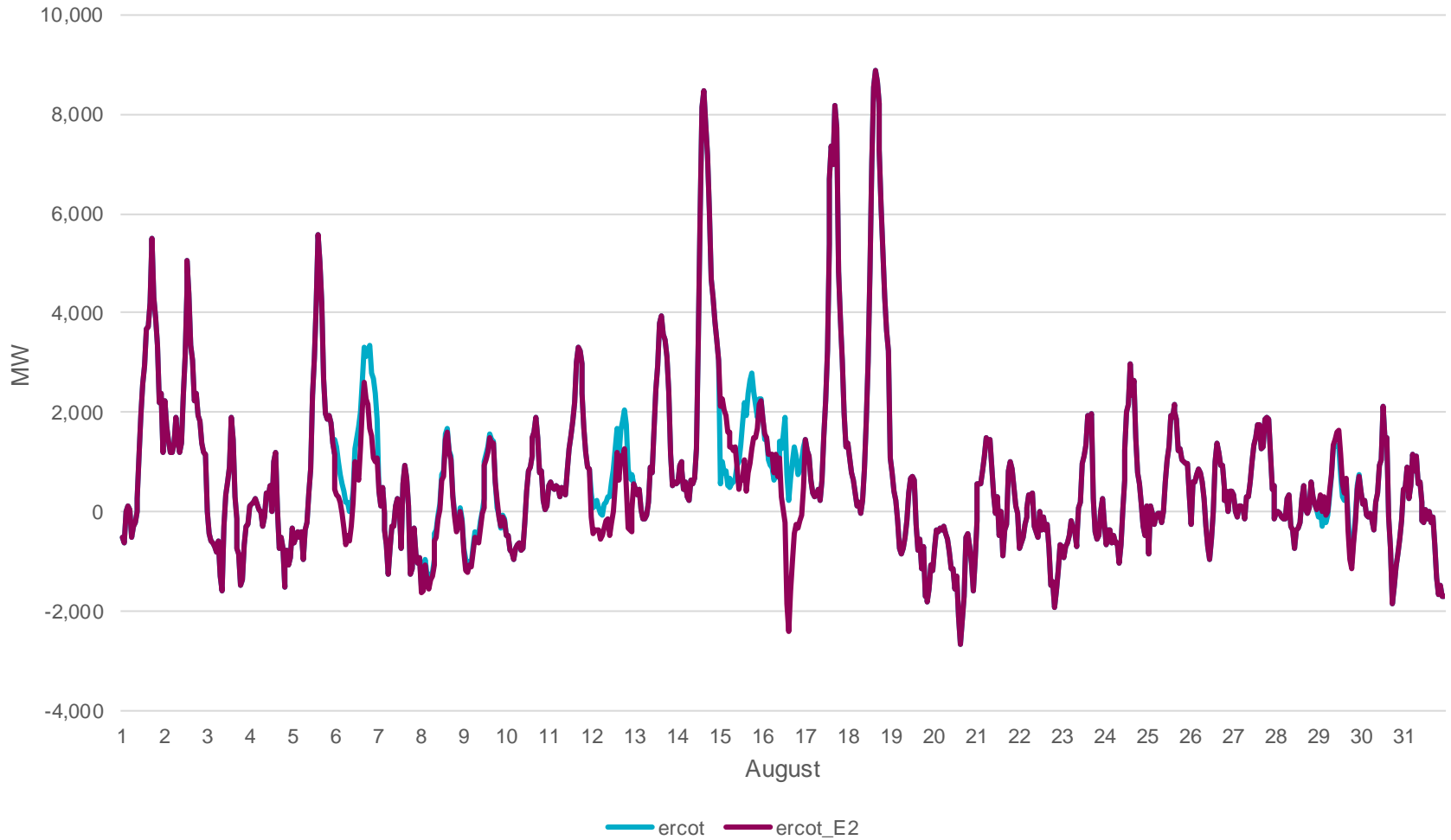
# MTLF Performance - August

Day Ahead Hourly MAPE - All Hours



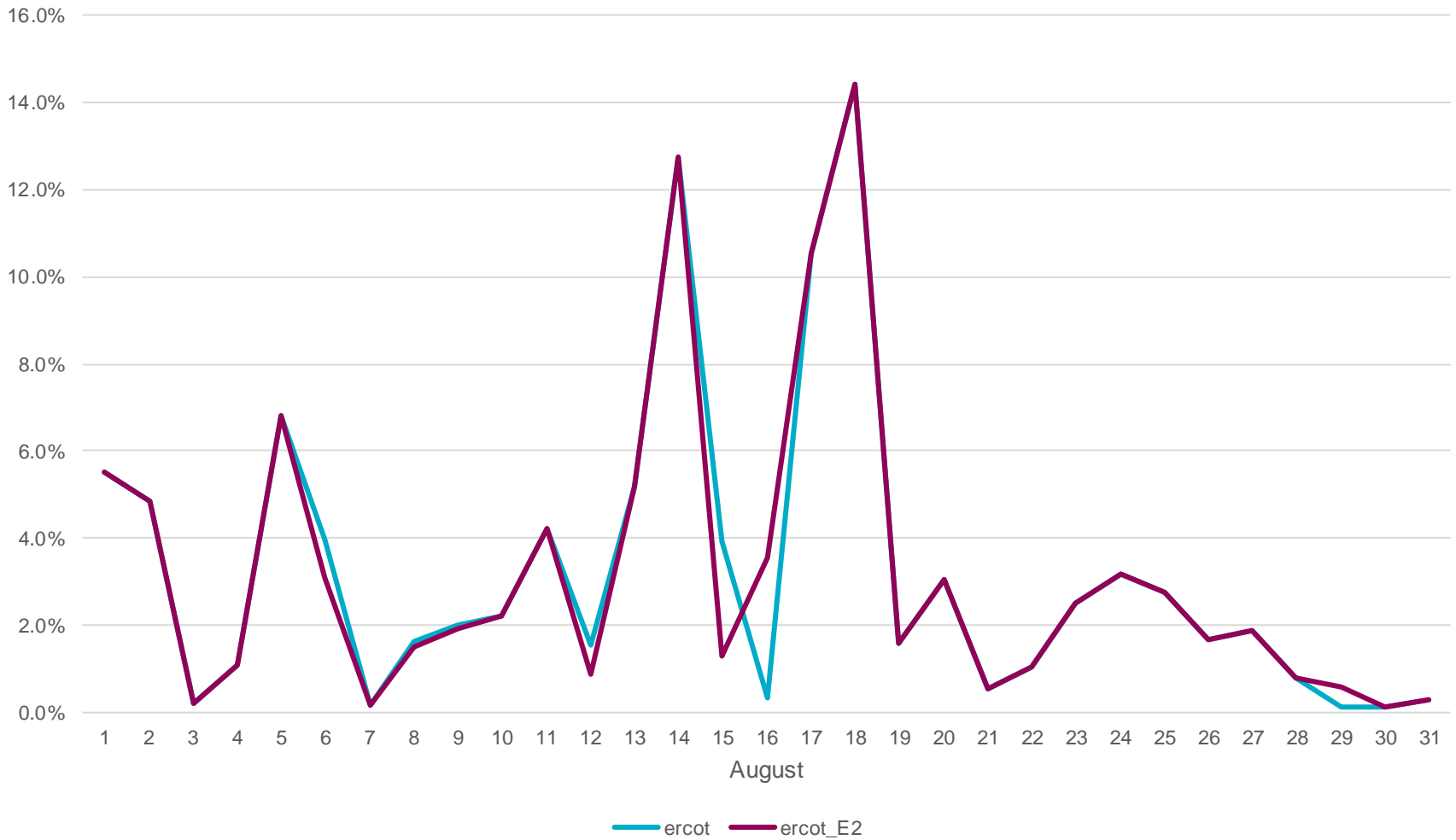
# MTLF Performance - August

## Forecast Error - Day Ahead All Hours



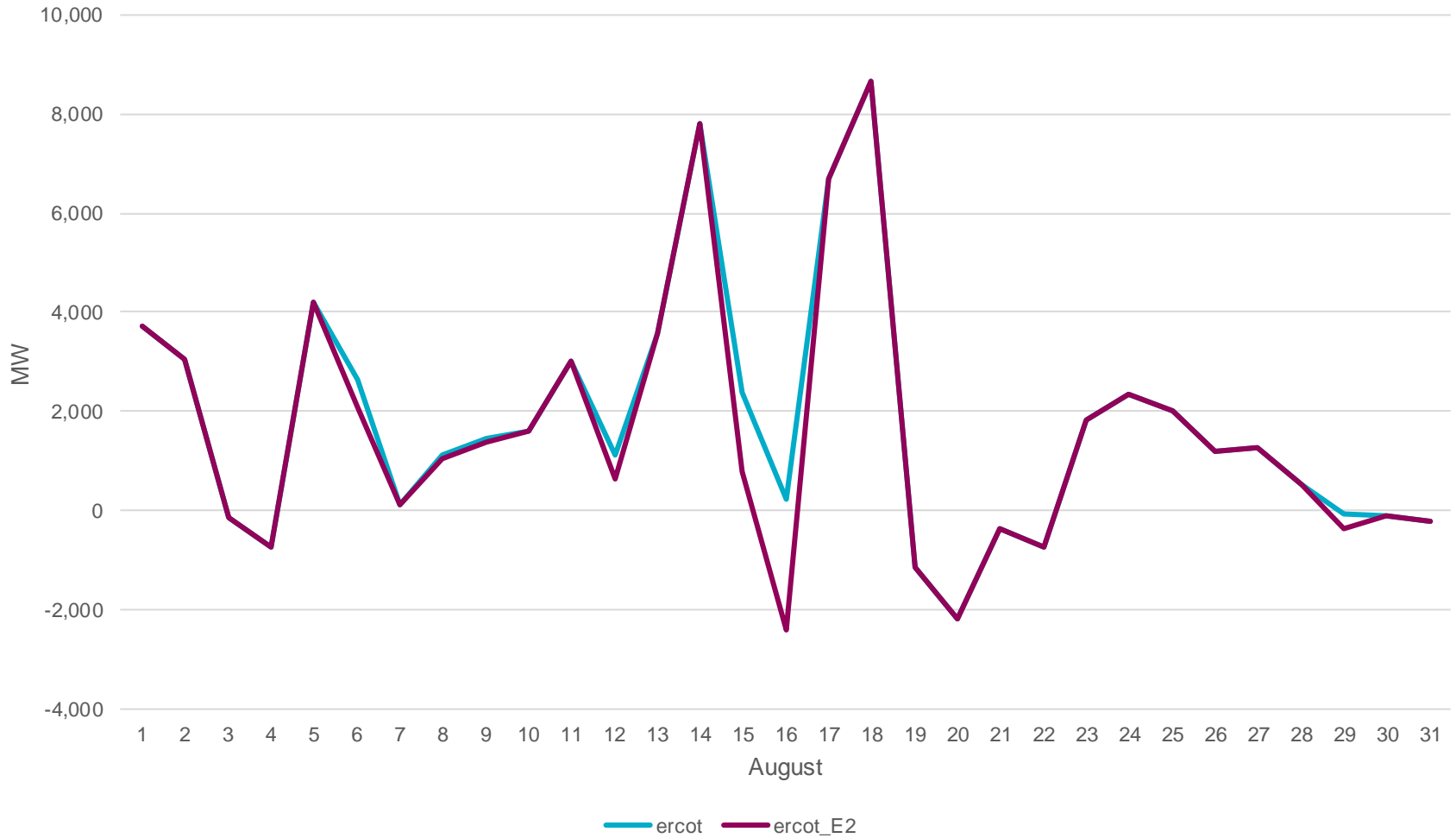
# MTLF Performance - August

Day Ahead Peak Forecast - MAPE



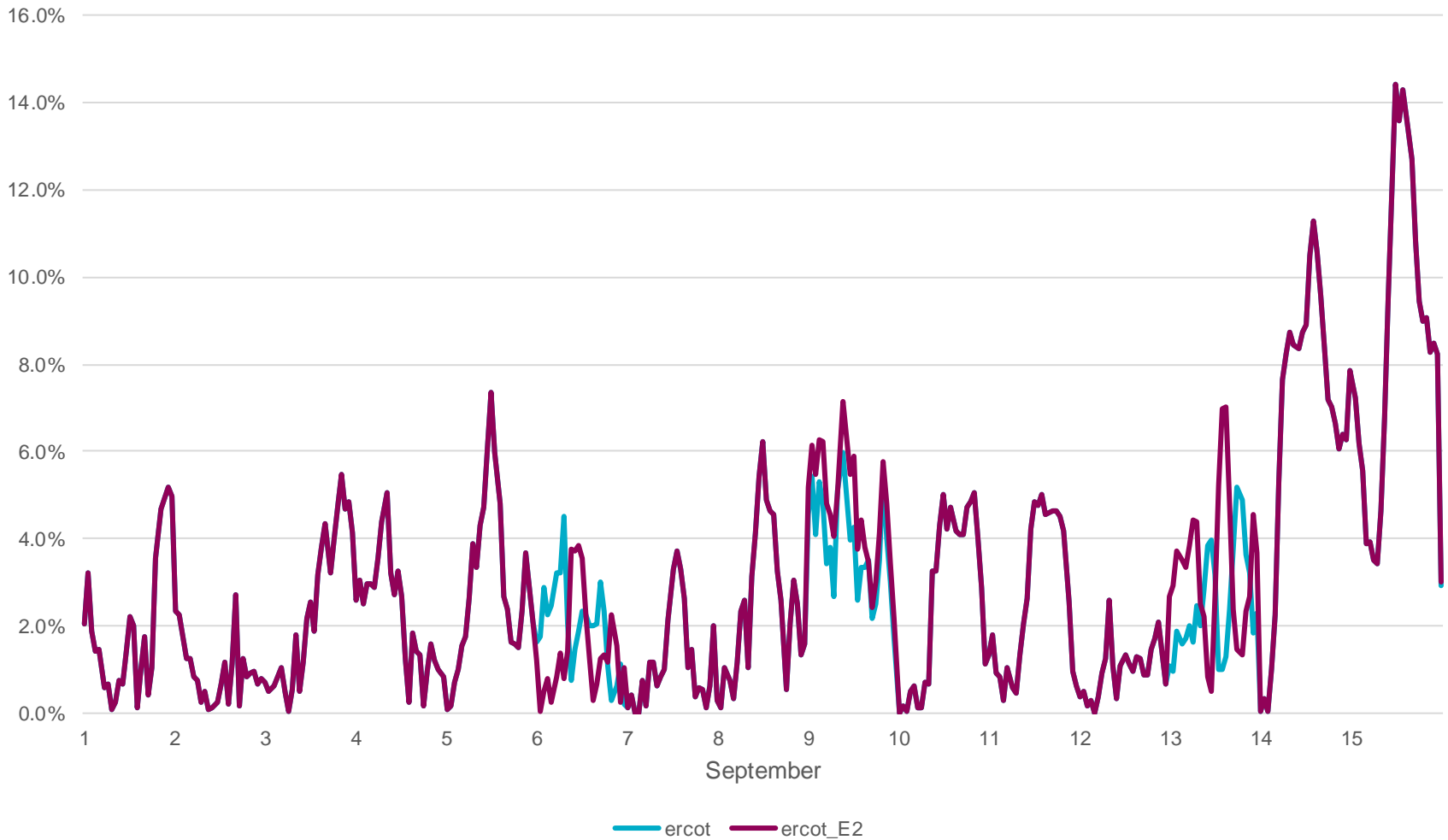
# MTLF Performance - August

## Forecast Error - Day Ahead Peak Demand



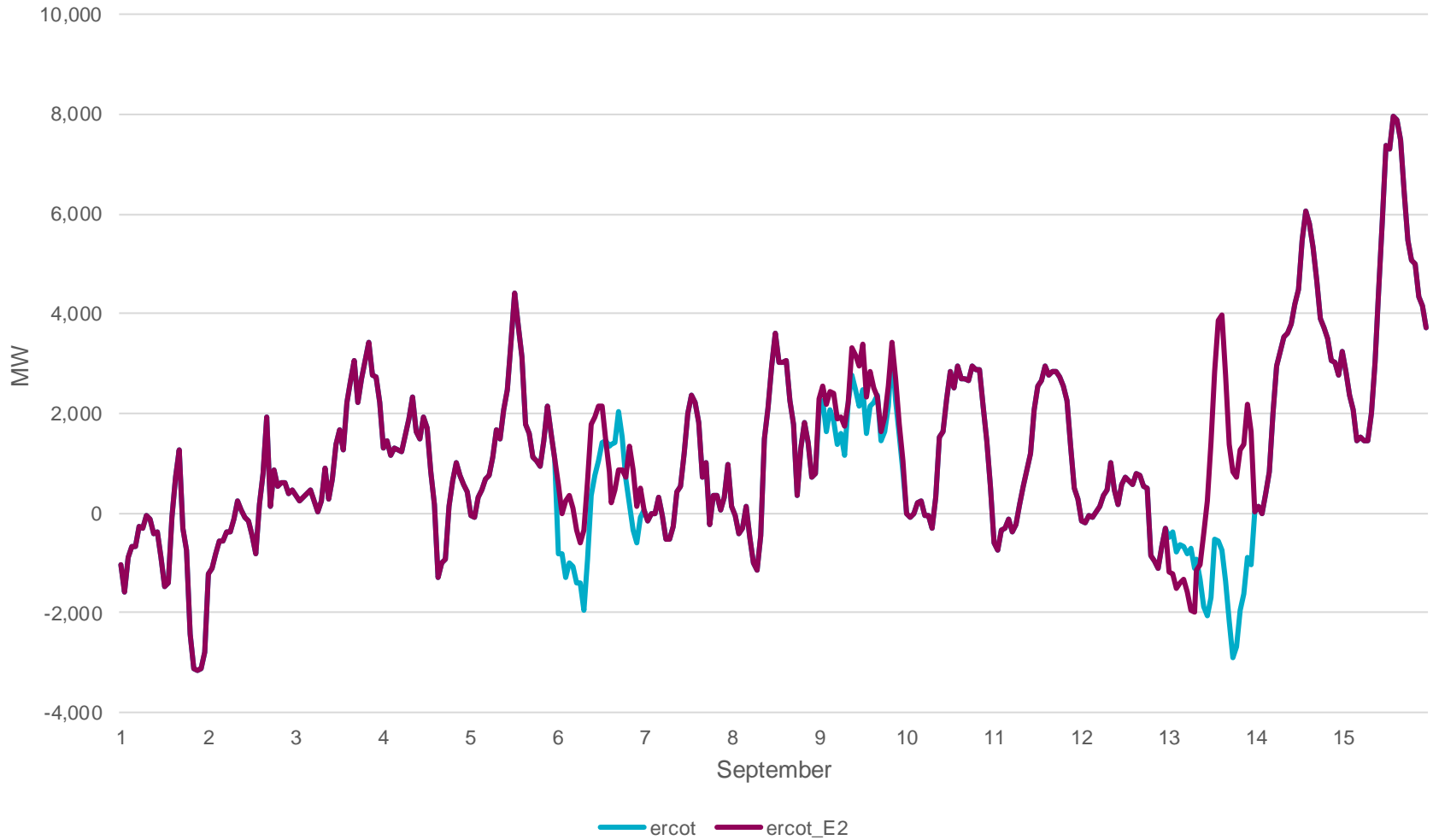
# MTLF Performance - September

Day Ahead Hourly MAPE - All Hours



# MTLF Performance - September

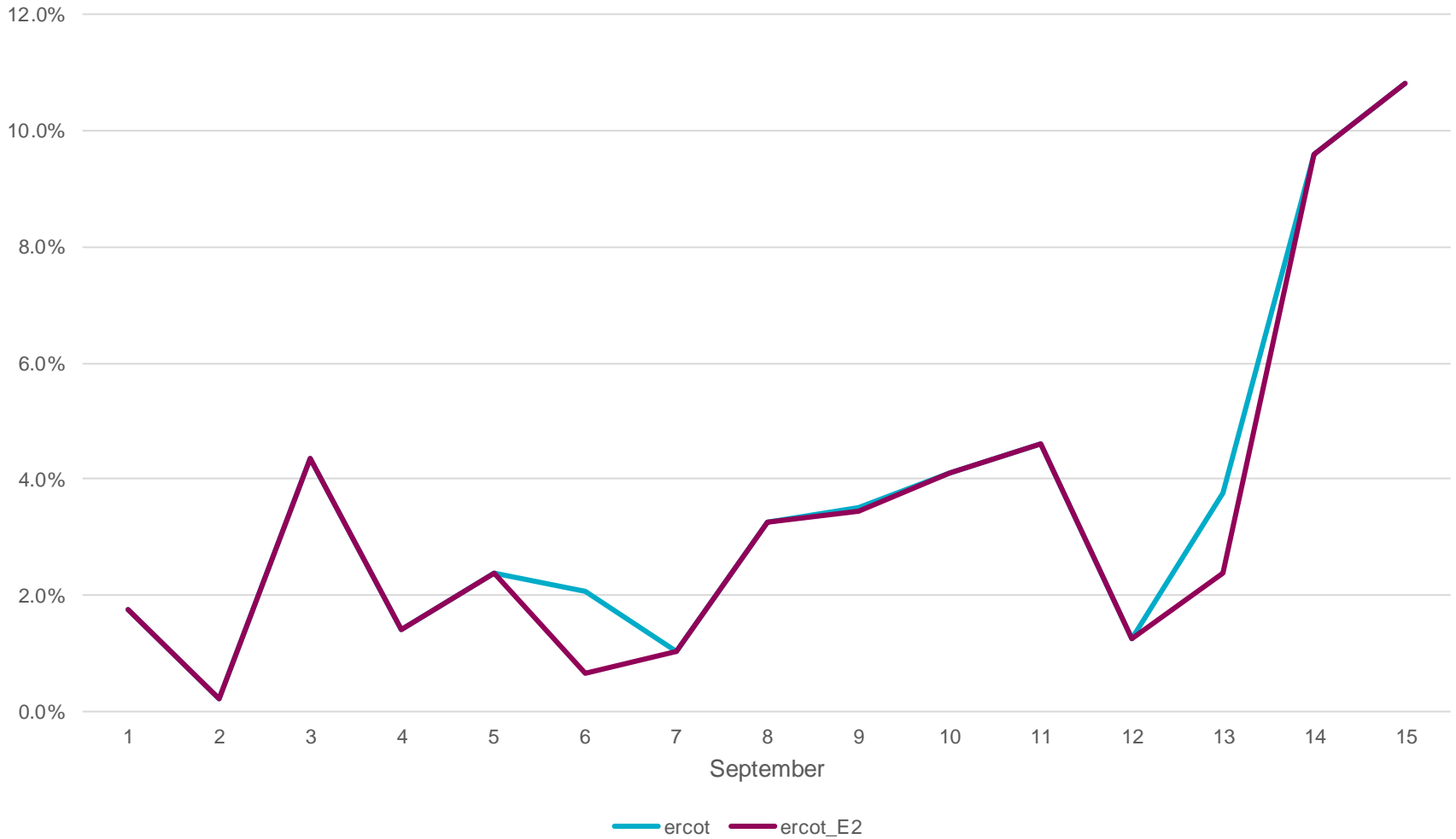
Forecast Error - Day Ahead All Hours





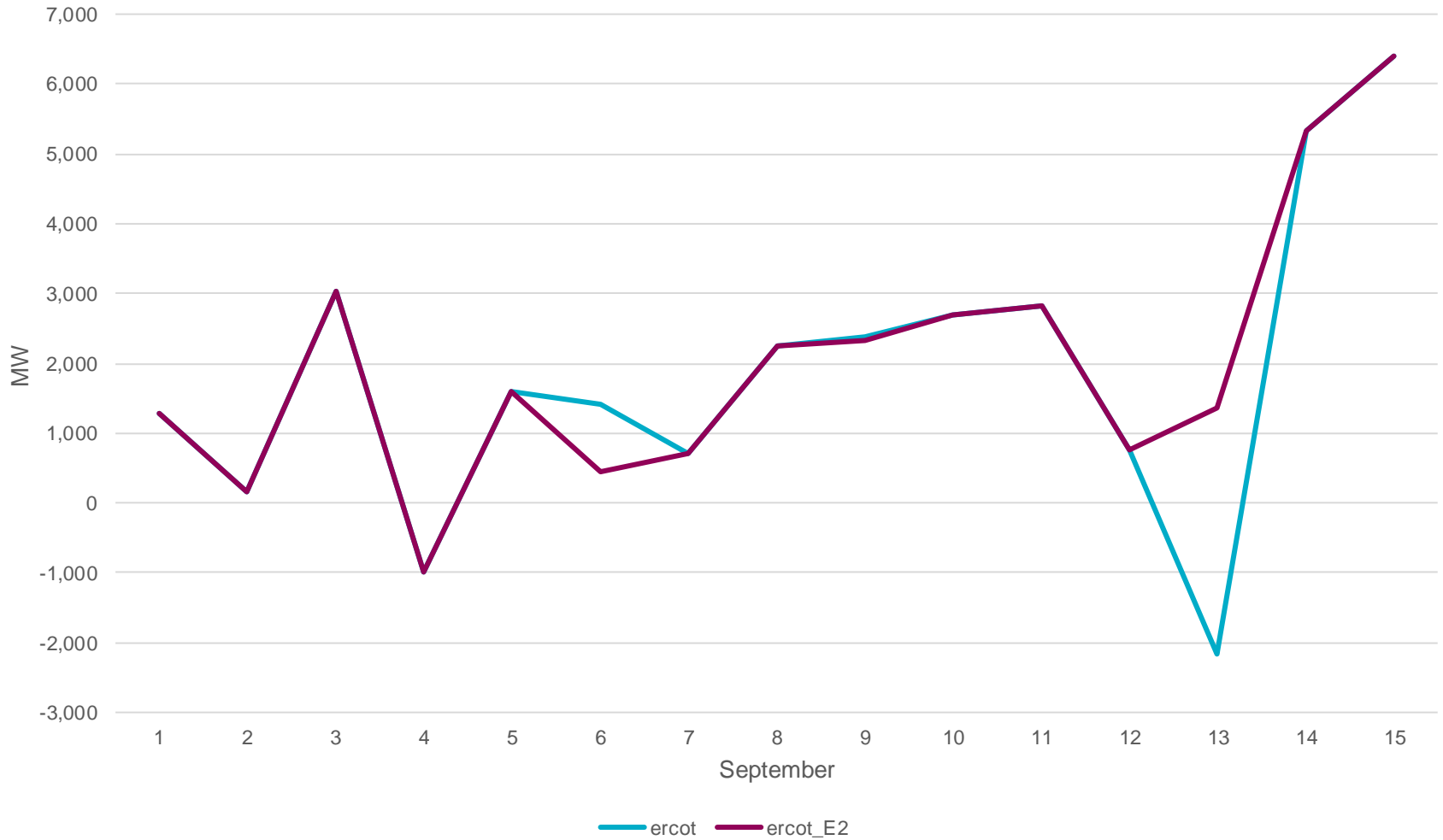
# MTLF Performance - September

Day Ahead Peak Forecast - MAPE



# MTLF Performance - September

Forecast Error - Day Ahead Peak Demand



# MTLF Performance Summary

- **August:**
  - Day Ahead MAPE for all hours – 2.0%  
487 hours were over-forecast (65%)
  - Day Ahead MAPE for Peak Demand – 3.3%  
22 days were over-forecast (71%)
  
- **September 1 - 15:**
  - Day Ahead MAPE for all hours – 2.9%  
249 hours were over-forecast (69%)
  - Day Ahead MAPE for Peak Demand – 3.6%  
13 days were over-forecast (87%)

# MTLF Performance Next Steps

- **What type of reporting would be beneficial?**
  - Regular updates through Market meetings
  - Create a report that is posted on a regular basis
- **What statistics should be included?**
  - Day Ahead MAPE for all hours, peak
  - Forecast error for all hours, peak
  - Performance farther out in the future such as current day + 2, current day + 3, etc

# Questions?

