

Load Forecast 2025: Potential Model Improvements, Assumptions Review

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Load Analysis Subcommittee

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We are considering the following potential improvements to enhance our 2025 load forecast model:

- Add HD4 and HD5 variables to reflect the relationships of load to cold weather conditions.
- Add new variable WindHD2 to better capture the impact of windy weather on load in winter.
- Combine holiday variables into one.
- Updates on solar/EV forecast.

- HD variables are used to capture different relationships of load to weather under different conditions.
- Currently we have three HD variables which act splines when weather gets very cold. They are, respectively:

Hour Ending	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Base Point	55	55	55	55	55	55	55	55	55	55	55	60	60	60	60	60	60	60	60	60	55	55	55	55

Base-points are set for each hour to calculate HD variables

$$HD1_t = \max(Base_Point_{HE} - Temp_t, 0)$$

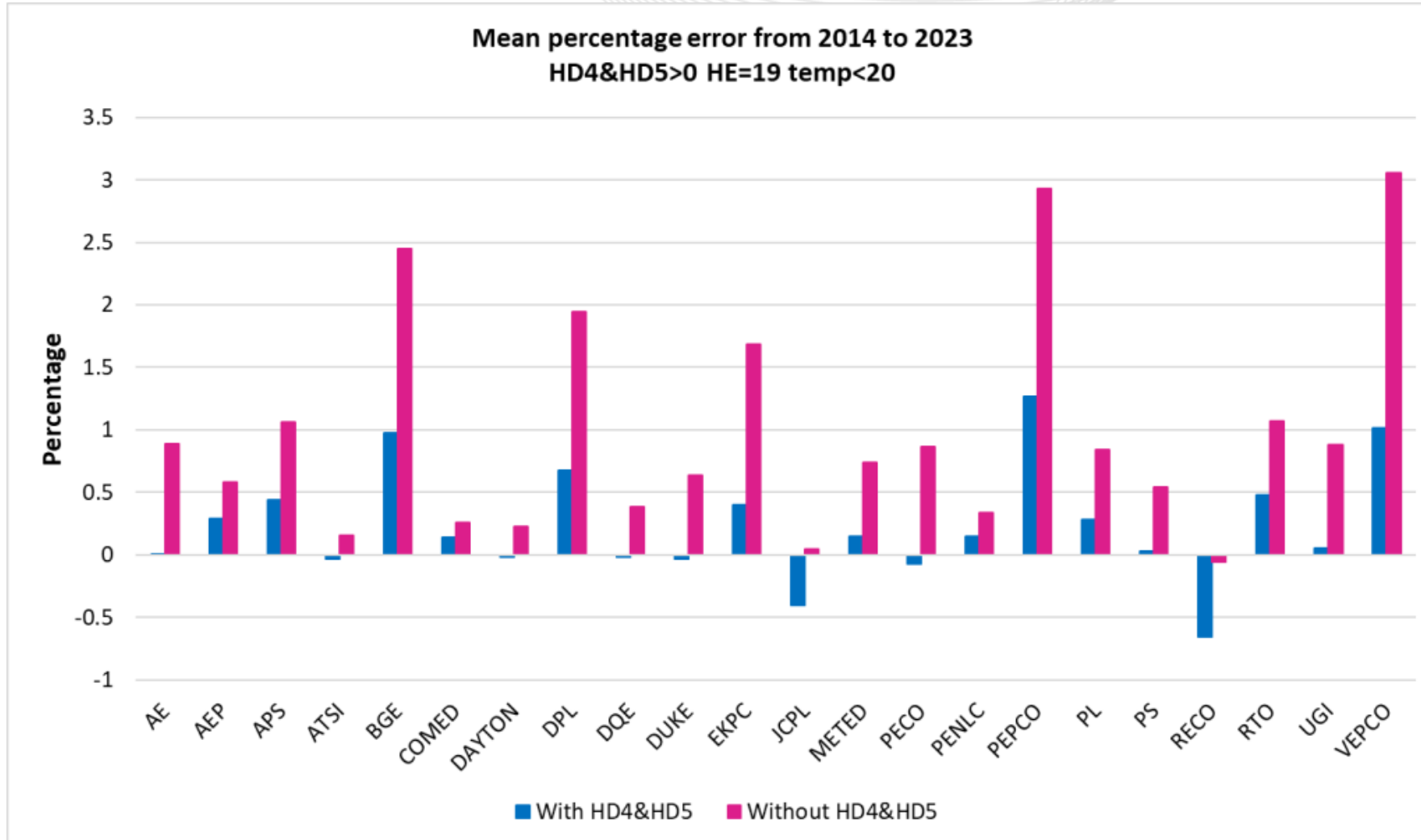
$$HD2_t = \max(Base_Point_{HE} - 10 - Temp_t, 0)$$

$$HD3_t = \max(Base_Point_{HE} - 15 - Temp_t, 0)$$

- We are considering adding HD4 and HD5 variables which can help us to better reflect the relationships of load to cold weather conditions.

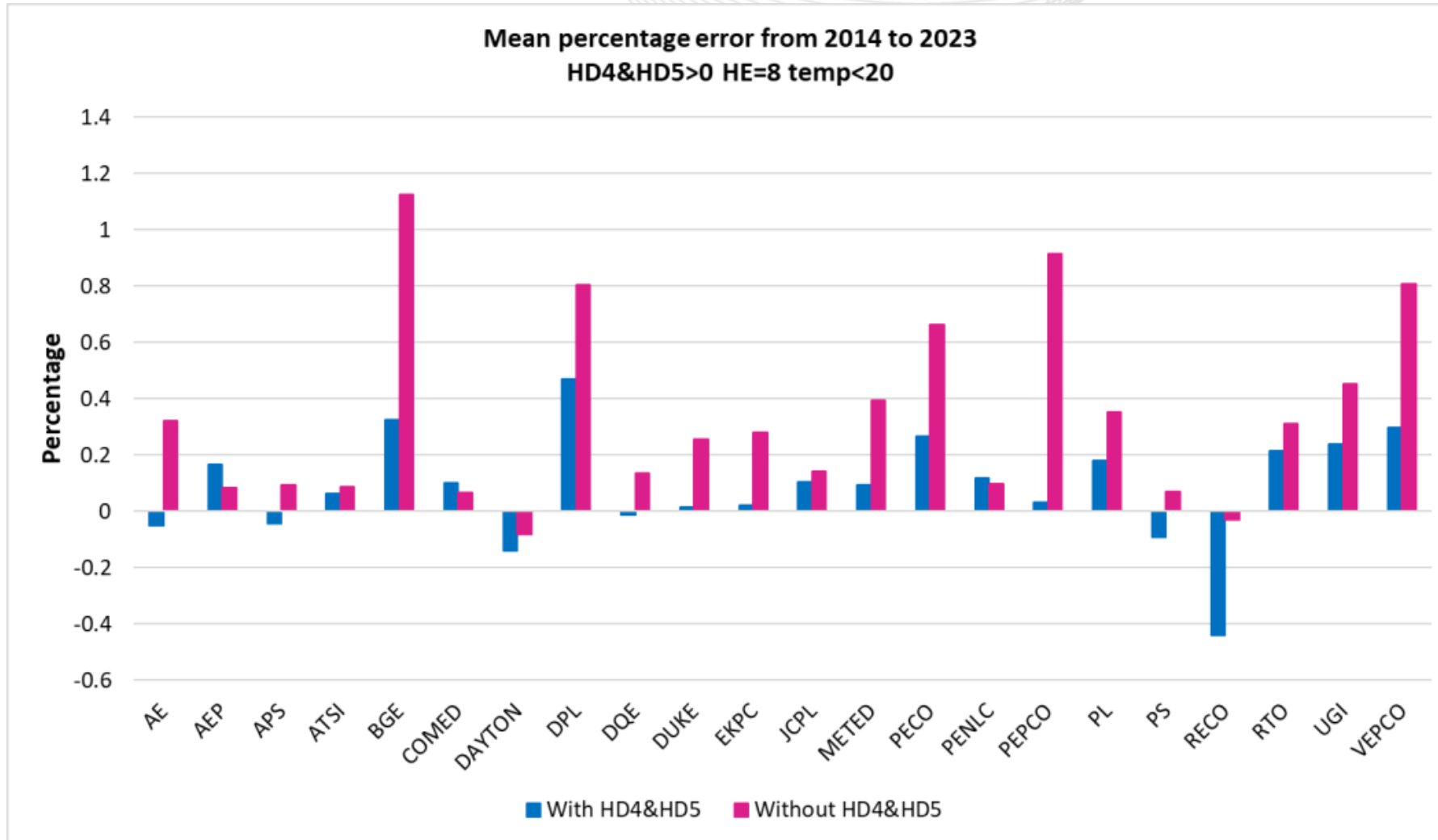
$$HD4_t = \max(Base_Point_{HE} - 20 - Temp_t, 0)$$

$$HD5_t = \max(Base_Point_{HE} - 25 - Temp_t, 0)$$



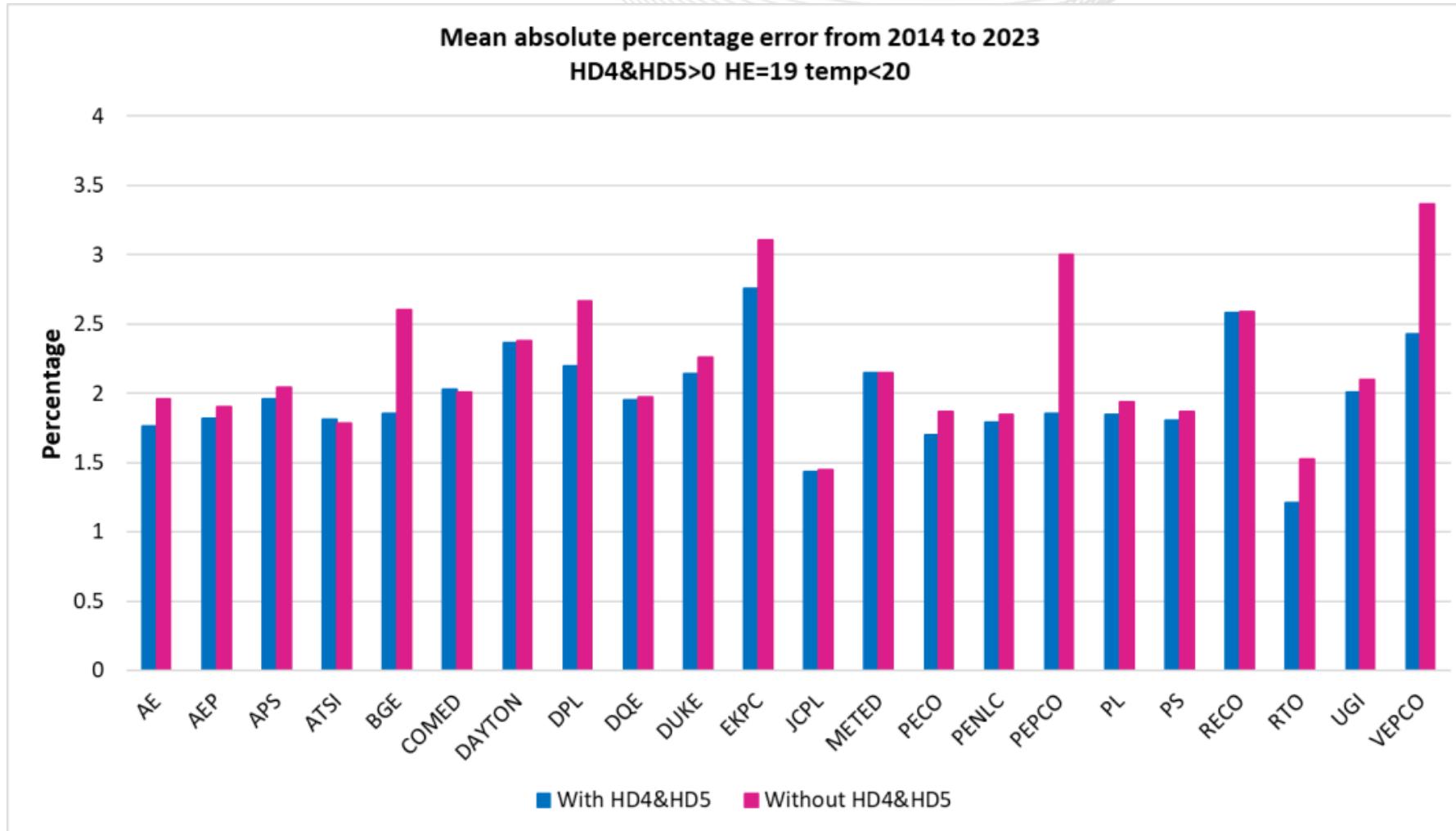
MPE chart for
 Current hour ending = 19
 Temperature < 20F
 HD4&HD5 >0

MPE > 0 Underestimate
 MPE < 0 Overestimate

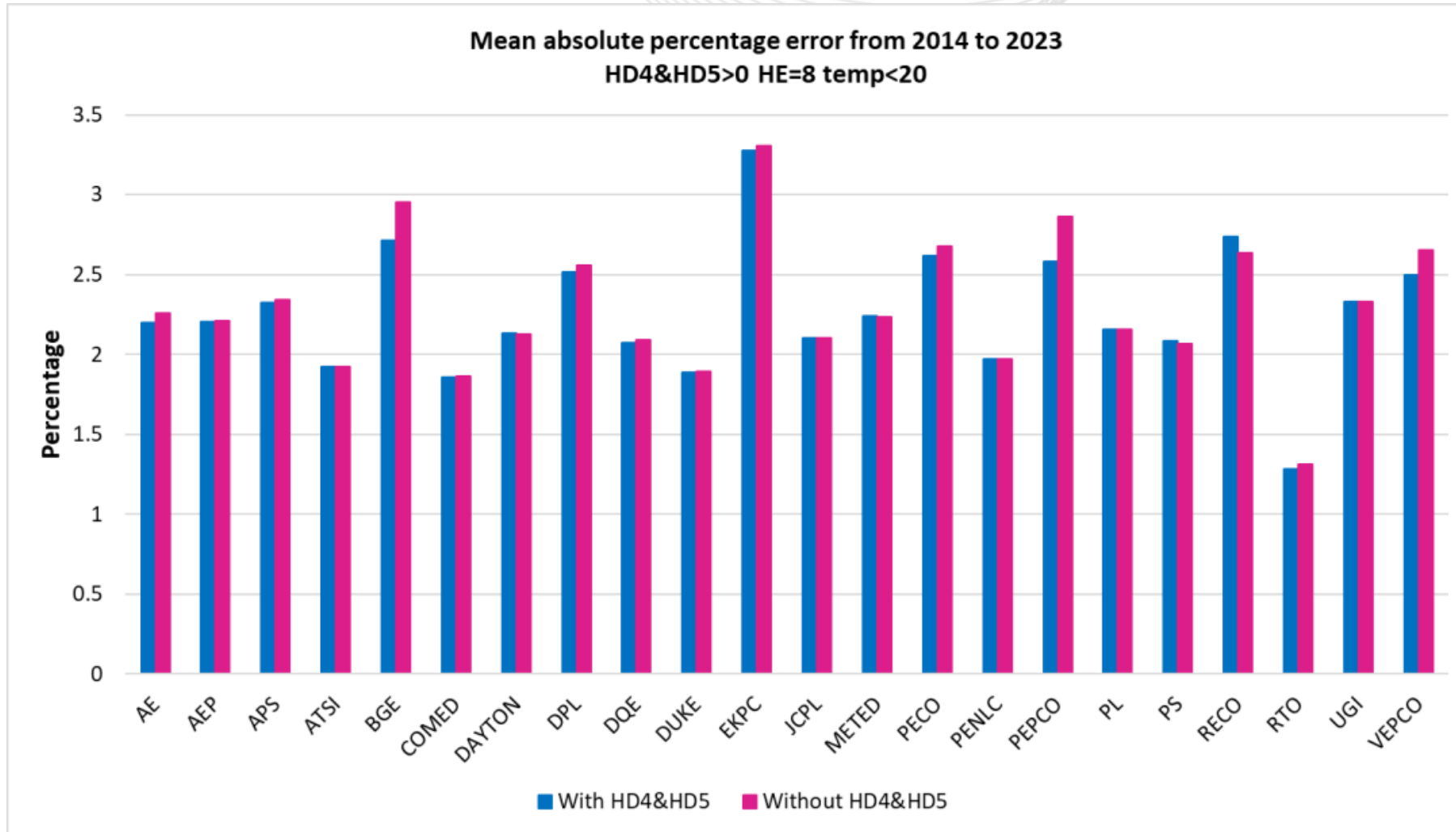


MPE chart for
 Current hour ending = 8
 Temperature < 20F
 HD4&HD5 >0

MPE > 0 Underestimate
 MPE < 0 Overestimate



MAPE chart
Current hour ending = 19
Temperature < 20F
HD4&HD5 >0



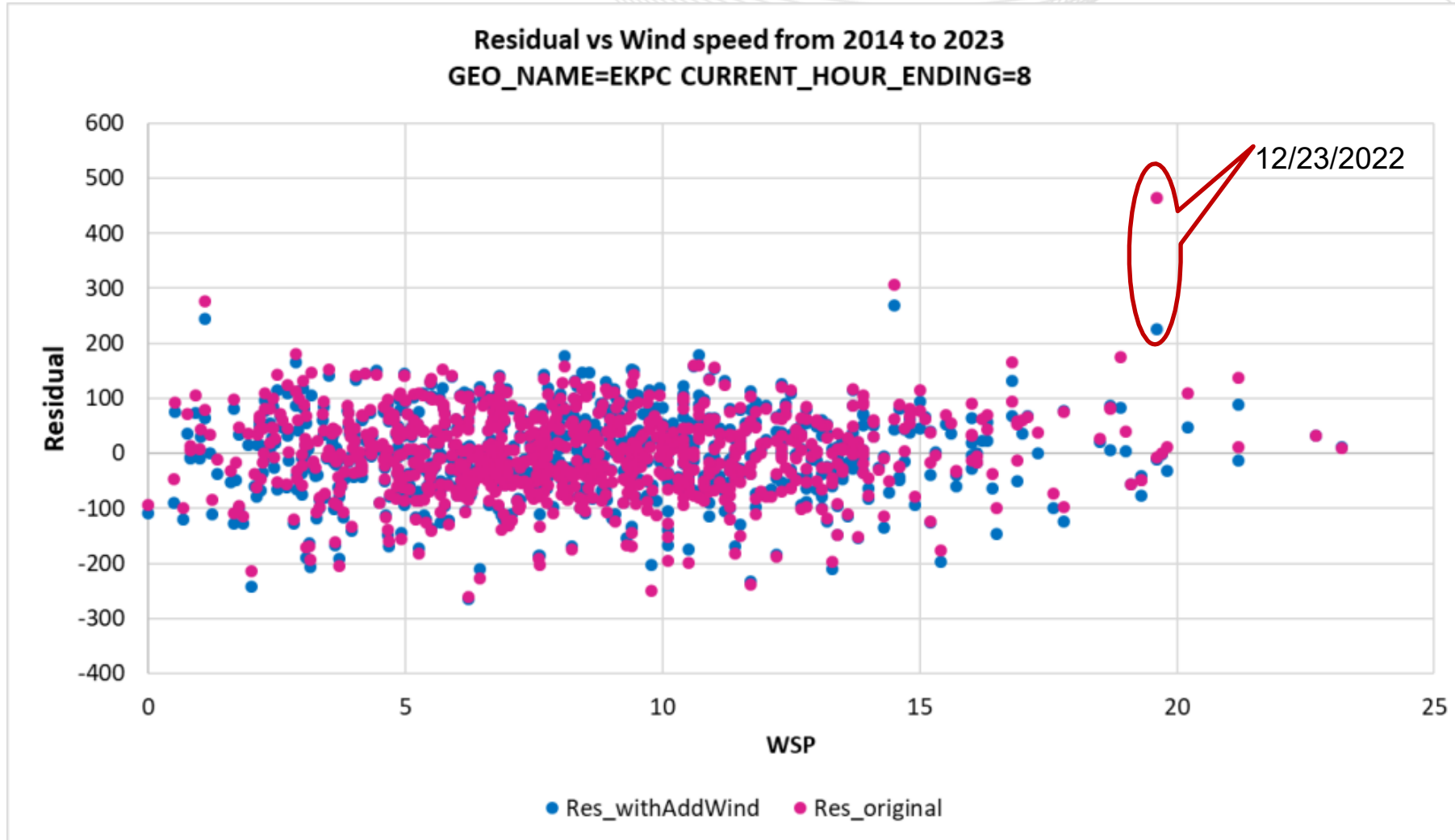
MAPE chart
 Current hour ending = 8
 Temperature < 20F
 HD4&HD5 >0

Wind is also an important variable during cold winters. Therefore, in addition to the existing WindHD variable, which is:

$$\mathbf{WindHD}_t = \mathbf{WSP}_t * \mathbf{min(HD1}_t / \mathbf{60, 1)}$$
 Where WSP is a 3-period centered moving average of wind speed.

We are considering adding a new variable WindHD2 to capture the impact of windy weather on load.

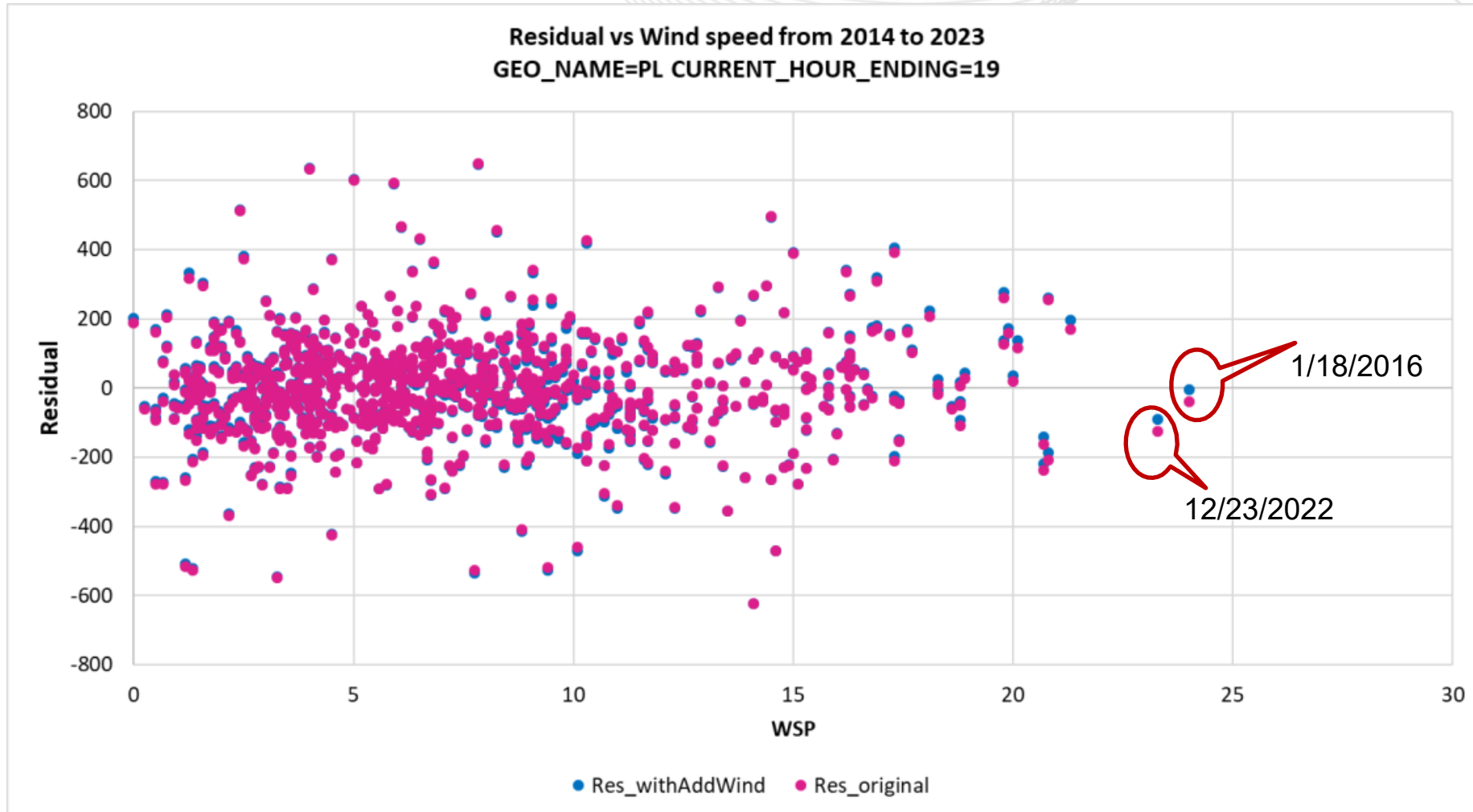
$$\mathbf{WindHD2}_t = \mathbf{(WSP}_t - \mathbf{10)} * \mathbf{min(HD1}_t / \mathbf{60, 1)}$$
 Where WSP is a 3-period centered moving average of wind speed.



For example
Residual chart for EKPC
Current hour ending = 8

Blue dots:
Residual after adding WindHD2

Pink dots:
Residual without WindHD2



For example
Residual chart for PL
Current hour ending = 19

Blue dots:
Residual after adding WindHD2

Pink dots:
Residual without WindHD2

- In our model, holiday variables are coded such that they have values for more than one day, and for some holidays, these values can differ year to year depending on the day of the week the holiday is observed
- e.g. **XMasEve**

	Value by Day of Week						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
December 24	1.00	1.00	1.00	1.00	1.00	0.50	0.50
All other days	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- We are considering combining existing holiday coefficients into one to capture more granularity of performance on holidays

- By combining the holiday, model, and baseline coefficients for each holiday, we can compare all holidays on a normalized scale
- Now the model has much more data to train on (all holidays scaled to each other instead of individual occurrences of that holiday)

EIA's National Energy Modeling System (NEMS), which we use to produce our *Annual Energy Outlook* (AEO), requires substantial updates to better model hydrogen, carbon capture, and other emerging technologies. To facilitate these model enhancements, we will not publish an AEO in 2024. You can find more information in [our Statement on the *Annual Energy Outlook* and EIA's plan to enhance long-term modeling capabilities.](#)

Update: Visit the [AEO2025 Resource page](#) for additional information.

From: <https://www.eia.gov/outlooks/aeo/>

- PJM will not have updated AEO data on saturation and efficiency and will use the AEO 2023 data for the 2025 Load Forecast.

- The assumptions for the vendor supplied electric vehicle and solar/battery forecasts were posted and sent to stakeholders for review.
- PJM shared stakeholder feedback with S&P and subsequently shared S&P responses with those stakeholders who supplied comments.
- PJM also received state specific and city specific electrification policies/goals/plans. PJM will review submissions for firmness and has a measureable way to incorporate it into the end-use data.

- PJM received Large Load Adjustment requests impacting 11 zones for consideration in the 2025 Load Forecast. This compares to 4 zones that had accepted Large Load Adjustment requests in the 2024 Load Forecast.
- PJM has already met with and will continue to reach out to requestors for more information and any questions regarding the submitted data.
- EDC/LSE presentations will be posted for and reviewed at the October 25th LAS meeting.

Request for Data:

Large Load Adjustment Requests
Electrification Policies (sent to
LAS/PC July 1)

Data due September 9:

Large Load Adjustment Requests
Electrification Policies

Requesting EDC/LSE
Presentations at LAS
on October 25

Request for Assumptions Review (2 week comment period):

Electric Vehicle Forecast (sent to LAS/PC August 6)
Solar/Battery Forecast (sent to LAS/PC August 9)

PJM Reviews Preliminary
2025 Load Forecast at
LAS on November 25 and
PC December 3



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Assumptions Review**



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