Weather Normalization of Peak Load

Load Analysis Subcommittee

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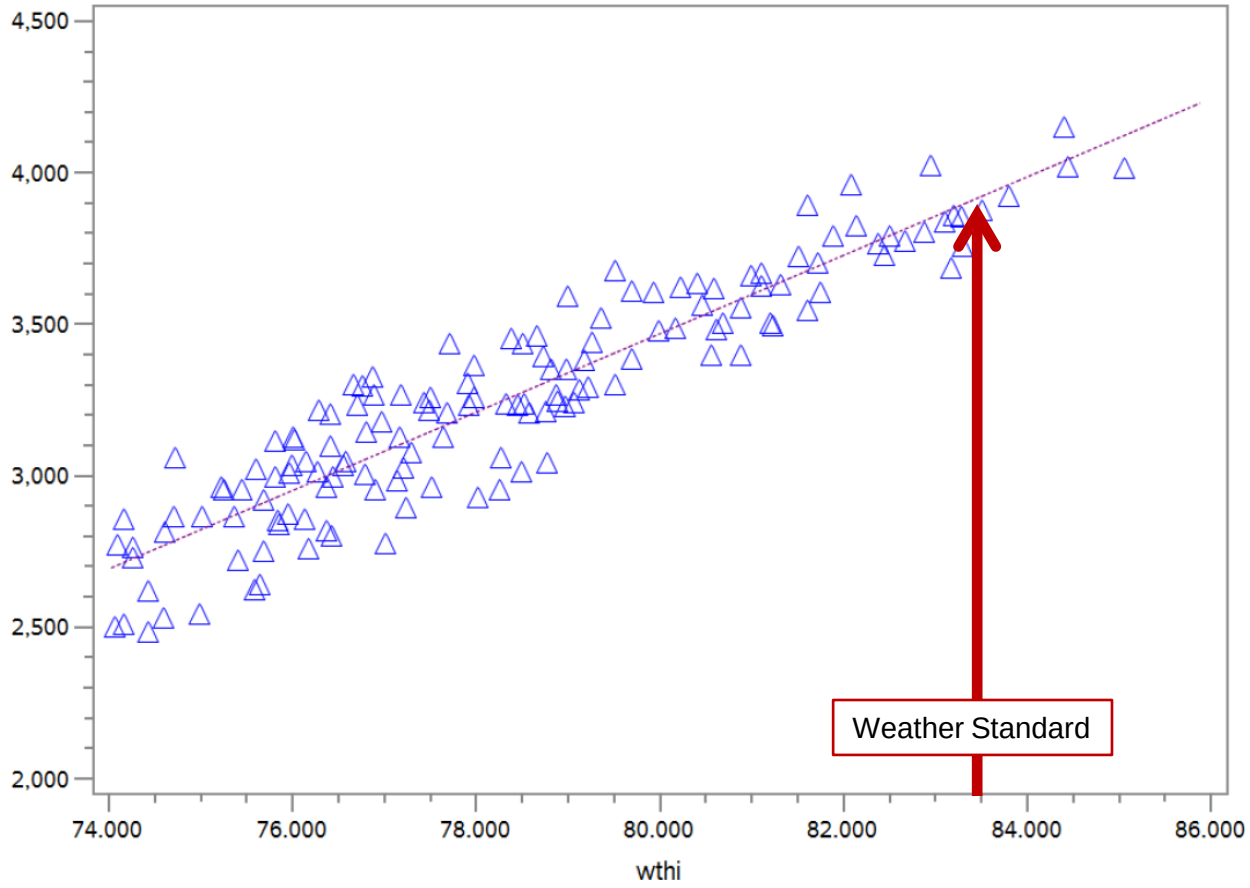
Weather Normalization of Peak Load

- In 2015 PJM introduced a new methodology to weather normalize coincident and non-coincident peak loads. The intent was to adopt a method that best indicates:
  1. The long-term trend of each zone's seasonal coincident and non-coincident peak loads
  2. A reasonable portrayal of the anticipated growth in each zone's first year forecast.

Non-Coincident Peak Normalization

- Method: Regress seasonal daily peak load on non-holiday weekdays against weather and evaluate the equation at a weather standard.



Non-Coincident Peak Normalization

- Load – Unrestricted load (metered load plus addbacks for load management, voltage reduction, loss of load)
- Weather - two-day weighted (4-today,1-yesterday) temperature humidity index (summer); wind-adjusted temperature (winter)
- Include data from the last three years (e.g., 2016 normalized peaks will use data from 2014-2016) with constant adjustment for earlier years
- Exclude weekend days and holidays
- Include only days that are in the peak-producing months: summer (June, July, August); winter (December, January, February)
- Include only days that are in the peak-producing weather range (summer > 74 WTHI, winter < 45 WWP)

Non-Coincident Peak Normalization

- An initial regression is run. Any outliers (observations with residuals outside +/- two standard deviations) are removed and a final regression is then run.
- Weather standard definition: the average of the seasonal extremes from all non-holiday weekdays from 1994 through the current year. This value will be used across all years, resulting in previous years being restated.
- The official non-coincident weather-normalized peaks are the final regression results evaluated at the weather standard.

Coincident Peak Normalization

- Method: Use the results of the non-coincident weather normalization and adjust them for long-term average diversity
- For each zone for each season:

  Diversity = ((Non-coincident – Coincident)/Non-coincident)

- Diversity is averaged across the years 1999 through the current year.
- The official coincident weather-normalized peaks are the official non-coincident weather-normalized peaks multiplied by average diversity

- For summer, there can be an issue if a zone experiences a September peak.

Uses of Weather Normalized Peak Loads

- Weather normalized **non-coincident** peak loads are not used in any PJM planning or market processes. They are produced solely for stakeholders to use in evaluating the PJM load forecast.
- Weather normalized **coincident** peak loads are not used in any PJM planning processes. They are used in RPM to set the total load EDCs allocate to customers as Peak Load Contributions (5CP). Capacity obligations are ultimately set by the coincident peak load forecast.

Zonal Scaling Factor Calculation

First Example

RTO Obligation	1000 MW
RTO Pk Fcst	900 MW
FPR	1.09
Zone Pk Fcst	450 MW
Zone CP WN	430 MW

Zonal Scaling Factor 1.06678 = (RTO Obligation/(RTO Pk Fcst*FPR)*(Zone Pk Fcst/Zone CP WN)

Zone Obligation
500 MW
= 430 MW*1.09*1.06678
WN*FPR*Zonal Scaling Factor

Second Example

RTO Obligation	1000 MW
RTO Pk Fcst	900 MW
FPR	1.09
Zone Pk Fcst	450 MW
Zone CP WN	520 MW

Zonal Scaling Factor 0.882145 = (RTO Obligation/(RTO Pk Fcst*FPR)*(Zone Pk Fcst/Zone CP WN)

Zone Obligation
500 MW
= 520 MW*1.09*0.882145
WN*FPR*Zonal Scaling Factor

Questions/Comments?