Weather Year Selection Methodology Updates for 2025 Regional Transmission Plan (RTP) Economic Study

Nelson Avila
RPG Meeting
May 20, 2025.

Background

- Weather year selection, as one of the key assumptions in the economic analysis, determines the load and renewable profiles to be used in the study.

- Prior to 2017, a single weather year that reflects an average weather condition (base weather year) had been used in the ERCOT economic analysis.

- In 2017, to better capture the economic benefits of a transmission project, ERCOT developed a [methodology](#) to include additional weather conditions (sensitivity weather years) to address weather uncertainties in the economic analysis.

  - EROCT then made improvement to the methodology over the past several years including the incorporation of wind locations.

- ERCOT reviewed the methodology in 2025 and identified additional areas of improvement to better align the methodology with the fast-evolving grid conditions.

- ERCOT is proposing to adopt an improved methodology for both the selection of the base weather year and sensitivity weather years for 2025 RTP economic analysis.

ercot

Key Improvements from the New Methodology

- Additional and more detailed metrics are incorporated.
  - Peak net load and net load demand are introduced to capture the increased risks during peak net load hours.
  - The impact of the wind and solar units' location based on correlation is now incorporated.

- The methodology to score different metrics for ranking the weather years has been improved.

- Flexibility is introduced to allow the consideration of constraint-specific sensitivity weather years for major constraints that are more relevant to the root causes of the congestion.

Proposed Weather Year Selection Variables

- The following nine variables are proposed:

    - **Peak Load (MW):** The system-wide peak load during the year.
    - **Demand Load (MWh):** Total system-wide demand during the year.
    - **Peak Net Load (MW):** The system-wide peak net load during the year.
    - **Demand Net Load (MWh):** Total system-wide net load demand during the year.
    - **South & Coast Wind Capacity Factor:** Average capacity factor of wind generation in the South and the Coast zones during the year.
    - **North & West Wind Capacity Factor:** Average capacity factor of wind generation in the North and West zones during the year.
    - **Panhandle Wind Capacity Factor:** Average capacity factor of wind generation in the Panhandle region.
    - **West and Panhandle Solar Capacity Factor:** Average capacity factor of solar generation in the West and Panhandle regions.
    - **South, Coast and North Solar Capacity Factor:** Average capacity factor of solar generation in the South, Coast and North zones during the year.

Proposed Weather Year Scores

- The following five scores are proposed for weather year ranking:

  - **Score Load:** Weighted average of the *Peak Load (MW), Demand Load (MWh), Peak Net Load (MW)* and *Demand Net Load (MW).* The same weight (25%) is assigned to each variable.

  - **Score Wind:** Weighted average of *South & Coast Wind Capacity Factor*, *North & West Wind Capacity Factor and Panhandle Wind Capacity Factor*. Weights are assigned according to the capacity of each region.

  - **Score Solar:** Weighted average of *West and Panhandle Solar Capacity Factor*, *South* and the *Coast and North Solar Capacity Factor*. Weights are assigned according to the capacity of each region.

  - **Score Renewables:** Weighted average of *Score Wind* and *Score Solar* described above. The same weight (50%) is assigned to each type of renewable generation.

  - **Final Score:** Weighted average of *Score Load* and *Score Renewables*. The same weight (50%) is assigned to each metric.

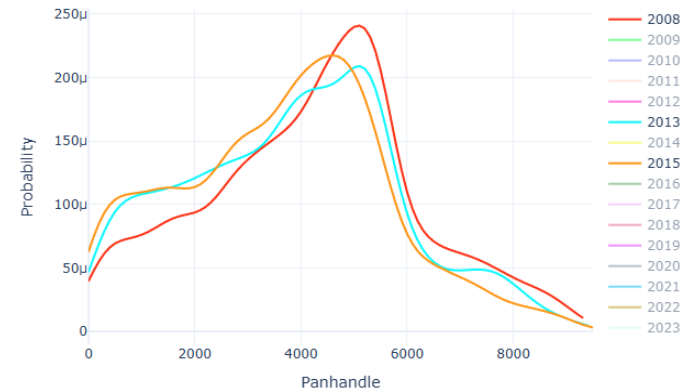![ercot logo]

Weather Year Ranking Heatmap
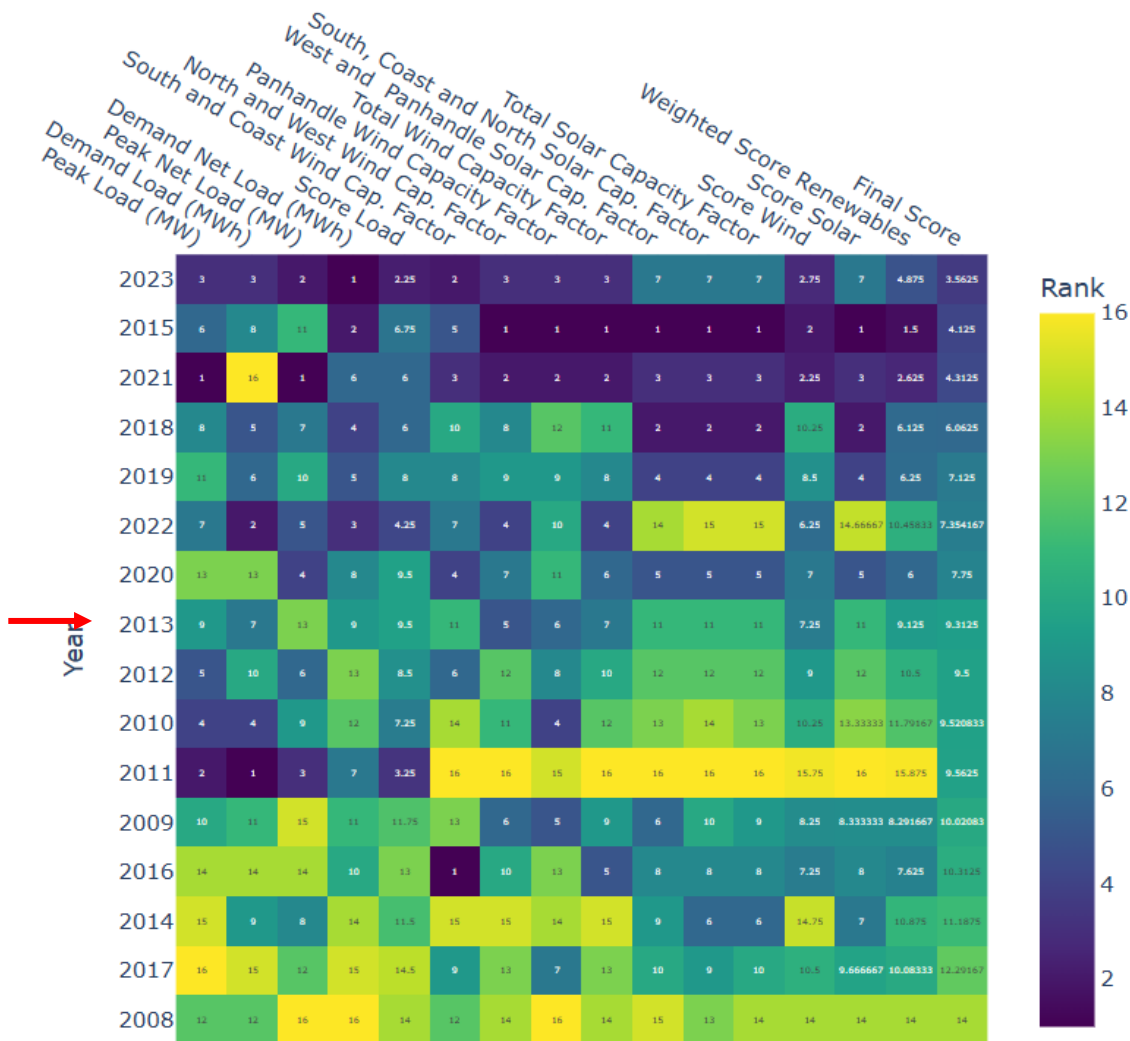
- Load related variables are ranked in descending order while renewable generation related variables are ranked in ascending order.

- 2013 will be selected as the base weather year (located in the middle of the heatmap) for the 2025 RTP economic analysis.

Note: The Total Wind Capacity Factor and Total Solar Capacity Factor are given for information purposes only as they are not used to compute the Final Score

Sensitivity Weather Years for the Panhandle and West Texas Export Constraints.

- Set the weight for *Score Load* to 40% and the weight for *Score Renewables* to 60%.

- Set the weight for *South & Coast Wind Capacity Factor* to 0% and modify the weights *of North & West Wind Capacity Factor* and *Panhandle Wind Capacity Factor* according to their capacity (83.2% and 16.8% respectively).

- Set the weight for *South, Coast and North Solar Capacity Factor* to 0% and the weight of **West and Panhandle Solar Capacity Factor** to 100%.

![ercot logo]

Sensitivity Weather Years for the Panhandle and West Texas Export Constraints (Cont.)

- 2015 and 2008 are sensitivity weather years for evaluation of projects impacting the congestions through the Panhandle and West Texas Export interfaces in the 2025 RTP economic study.

Note: The Total Wind Capacity Factor and Total Solar Capacity Factor are given for information purposes only as they are not used to compute the Final Score

Summary

	Existing Method	Proposed Method
Weather Year Selection Variables	Peak net load and solar location are not considered. All variables are ranked in descending order.	Incorporated peak net load and solar locations. Load related variables ranked in descending order and renewable generation related variables ranked in ascending order.
Weather Year Scores	A single score computed as the average of all ranked variables.	Separate scores for load and renewable variables. The final score is computed using the weighted average of the score for load and the score for renewables.
Weather Year Selection for Particular Congested Path	Not considered.	Obtained by modifying input parameters such as the weights, months, hours of interest etc.

Public

Thank you!

Question?

Comments?

Suggestions?
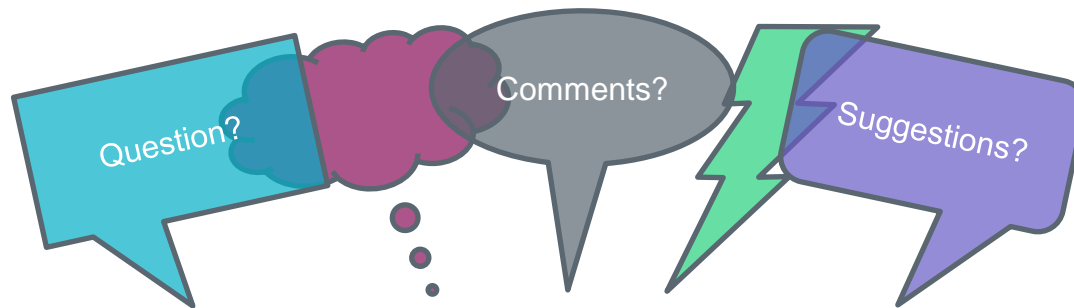
Stakeholder comments also welcomed through:

Nelson Avila: nelson.avilahernandez@ercot.com

Pengwei Du: pengwei.du@ercot.com