
ERCOT Trending Topics

TOPIC: RELIABILITY PLAN FOR THE PERMIAN BASIN REGION

Reliability Needs Analysis
Load Forecast
High-Voltage Transmission

In this ERCOT Trending Topic, we explain what the Permian Basin Reliability Plan is, why there is a need for more transmission in the Permian Basin region, and how ERCOT is planning to meet the reliability needs for this region.



FACTS:

What is the reliability plan for the Permian Basin region?

Recent legislation ([House Bill 5066](#)) required the Public Utility Commission of Texas (PUCT) to direct ERCOT to develop a reliability plan identifying the transmission facilities needed to serve existing and future demand in the Permian Basin region. On December 14, 2023, the PUCT issued an order directing ERCOT to develop the Permian Basin Reliability Plan and to file it with the PUCT by July 2024. ERCOT is currently evaluating the transmission facilities that will be needed to serve the Permian Basin region based on 2030 and 2038 load forecasts.

What is the reliability needs analysis?

ERCOT conducts planning assessments to examine the need for proposed transmission projects based on ERCOT planning criteria and North American Electric Reliability Corporation (NERC) reliability standards. ERCOT's analysis will identify the amount of additional transmission capacity needed to import power to meet the forecasted demand in the Permian Basin region and will propose specific transmission projects.

Why is new transmission needed in the Permian Basin?

The Permian Basin region is continuing to experience tremendous load growth with increased oil and gas activity and the addition of large industrial and data facilities. Transmission Service Providers (TSPs) have provided studies and other reference information supporting a forecasted peak demand of oil and gas load of 11,964 MW (1) in 2030, 14,705 MW in 2038, and an additional 11,995 MW of non-oil and gas load in the Permian Basin region. ERCOT will evaluate these load levels in this study. Because the Permian Basin lacks enough local conventional generation that can reliably serve demand

around the clock, more transmission lines will be needed to import power into the region. Transmission is relatively sparse in the Delaware Basin subregion of the Permian, where oil and gas demand is shifting.

This significant growth in the total forecasted load would make the Permian Basin region in West Texas comparable (from an electricity demand perspective) to that of the ERCOT Gulf Coast (Houston, Galveston, Victoria) and North Central (Dallas-Fort Worth, Waco, Mineral Wells) weather zones.

ERCOT previously performed transmission studies in 2019, 2021, and 2023 for the Permian Basin area. The current study is considering forecasts for 2030 and 2038. The table below highlights the loads historically studied as well as the increased load forecasts for the region considered in the Permian Basin Reliability Plan.

Permian Basin Region Load Comparison (MW)

	2019 Delaware Basin Study (2024 Case)	2021 Permian Basin Study (2030 Case)	2023 RTP Study (2029 Case)	Permian Basin Reliability Plan (2030 Case)	Permian Basin Reliability Plan (2038 Case)
Permian Basin Total Load	9,771	10,527	16,577	23,659	26,400
Permian Basin Oil & Gas Load*	9,771	10,527	12,341	11,964	14,705
Additional Non-Oil & Gas Load	0	0	4,236	11,695	11,695

*Including residential/commercial load

What is the cost to implement the Permian Basin Reliability Plan?

With the increase in large loads projected to move to Texas, there is a need for substantial new transmission infrastructure to serve the forecasted load growth. To ensure the reliability needs of this forecasted load growth can be met, TSPs will have to invest in local upgrades to the Permian Basin region as well as construct multiple paths to import power into the region. ERCOT developed a reliability plan and obtained cost estimates from the respective TSPs responsible for building transmission as well as referencing publicly available data sources. To meet the forecasted load growth needs in 2030, an estimated \$9.1 billion dollars of investment will be required. As load continues to grow in the region, additional transmission will be required by 2038 to serve the demand.

With the forecasted load growth across the entire state coupled with the evolution of generation types and locations, ERCOT has expanded its study process to consider extra-high voltage (EHV) transmission lines. ERCOT is considering new EHV transmission lines (765 kV or 500 kV double circuit) as an alternative to only adding new 345 kV in the 2024 Regional Transmission Plan (RTP) and adding a 500-kV double circuit or 765-kV for reliability and to efficiently facilitate large power transfers across the system. ERCOT has studied various transmission options to serve the longer term needs in the Permian Basin Reliability Plan for PUCT consideration.

To meet the forecasted load growth needs in 2038, the following estimated transmission investment will be required depending on the type of transmission selected to meet the needs of Texans:

- 345-kV: \$13.0 billion; 1,676 miles of right of way right-of-way (ROW) for four 345-kV and one 345-kV additional upgrade
- 500-kV double circuit: \$15.3 billion; 1,370 miles of ROW for three 500-kV and one 345-kV additional upgrade
- 765-kV: \$13.8 billion; 1,255 miles of ROW for three 765-kV import paths

The 2038 estimated costs reflect the complete buildout for the Permian Basin Reliability Plan transmission needs and are inclusive of the initial \$9.1 billion investment noted above. The short-term costs will be weighed against longer term benefits to support continued growth in Texas.

What are the benefits of higher voltage transmission?

For long-distance transmission (longer than 100 miles), one 765-kV line on a 200-foot-wide ROW can carry the same amount of energy as five 345-kV lines each needing its own 150-foot-wide ROWs, requiring a combined width of 750 feet.

Some of the benefits of higher voltage transmission include:

- Increased transfer capability to load centers to support continued economic development
- Increased outage coordination capacity for both Generation Resource and Transmission equipment
- Reduced ROW impacts to consumers due to fewer new lines being needed
- Reduced line losses while increasing ability to move power over long distances
- Potential to retire existing series compensation devices reducing stability risks for Generation Resources
- Additional flexibility to mitigate Generation Resource siting uncertainty
- Potential exit strategy for some current major [Generic Transmission Constraints](#) (GTCs) resulting in more generation available to customers

What is ERCOT's role in the planning process?

ERCOT supervises and exercises comprehensive independent authority over the planning of transmission projects for the ERCOT System as outlined in the Public Utility Regulatory Act (PURA) and PUCT Substantive Rules. Under PUCT rules, ERCOT's role is to oversee the transmission planning process and to conduct studies to identify transmission projects that are needed to serve customer demand reliably and economically. The PUCT reviews and approves applications from TSPs for new transmission lines and determines the routing of the lines. TSPs build, own, operate, and maintain the transmission lines and related equipment.

What is the stakeholder process and timeline to file the plan?

ERCOT began working with the TSPs and the ERCOT Regional Planning Group (RPG) in December 2023. The RPG is a consensus-based industry group that provides input on issues related to planning the ERCOT System for reliable and efficient operation, including its evaluation of transmission needs and potential solutions. The RPG is open to all Market Participants, including consumers, Transmission and Distribution Service Providers, and PUCT staff. ERCOT provided monthly status updates to the PUCT and RPG on the Permian Basin Reliability Plan. ERCOT is on track to file its final Permian Basin Reliability Plan with the PUCT by the end of July 2024.

What's next?

ERCOT provided a project review at the Permian Basin Reliability Plan workshop held [June 28, 2024](#). ERCOT expects that it will continue to study potential transmission solutions through June 2024. Considering the high level of load growth to be evaluated, identifying a reliability plan to meet this extremely high load level will be much more complex compared to previous special studies ERCOT has conducted. No later than July 2024, ERCOT must file a final reliability plan with the PUCT. After obtaining additional stakeholder feedback, the PUCT will review and approve a reliability plan for the Permian Basin region. TSPs responsible for constructing the transmission infrastructure in the reliability plan can then file the necessary applications for certificates of convenience and necessity (CCN) for approval with the PUCT.

(1) 1 MW of electricity is enough to serve about 250 residential customers during ERCOT peak hours.