ERCOT Trending Topics

TOPIC: ERCOT's Transmission Planning Process

Transmission Planning Process
Regional Transmission Plan (RTP)
Regional Planning Group (RPG)

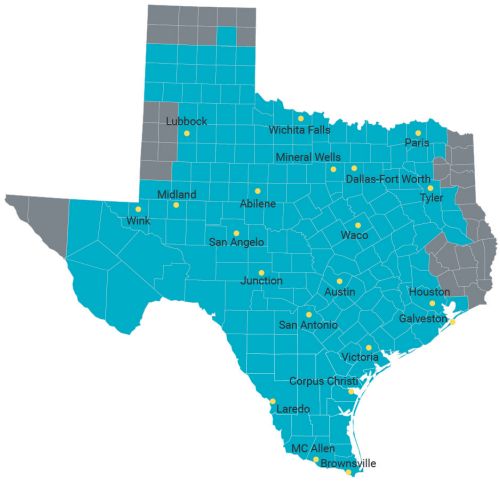
In this ERCOT Trending Topic, we explain ERCOT's transmission planning process, the Regional Transmission Plan (RTP), and Regional Planning Group (RPG), and how they are critical to the reliability of the transmission network in the ERCOT Region.

FACTS:

Background

ERCOT schedules power on an electric grid that connects more than 54,100 miles of transmission lines, providing power to more than 27 million customers, representing about 90% of the state of Texas. The ERCOT Region encompasses the urban load centers of Houston, Dallas, Fort Worth, San Antonio, and Austin, as well as most of West Texas, portions of the Panhandle, and the Rio Grande Valley. Economic and population growth in Texas is driving significant growth in electricity demand, resulting in a need for more generation (power) on the grid to meet that demand.

ERCOT's overall transmission planning looks at near- and long-term needs through the Regional Transmission Plan (RTP) and the Regional Planning Group (RPG). Together, the RTP and RPG form ERCOT's process for a reliable and efficient transmission system (equipment and power lines), which is critical to balance supply and demand in the ERCOT Region to keep the power flowing to Texas homes and businesses.



ERCOT Region

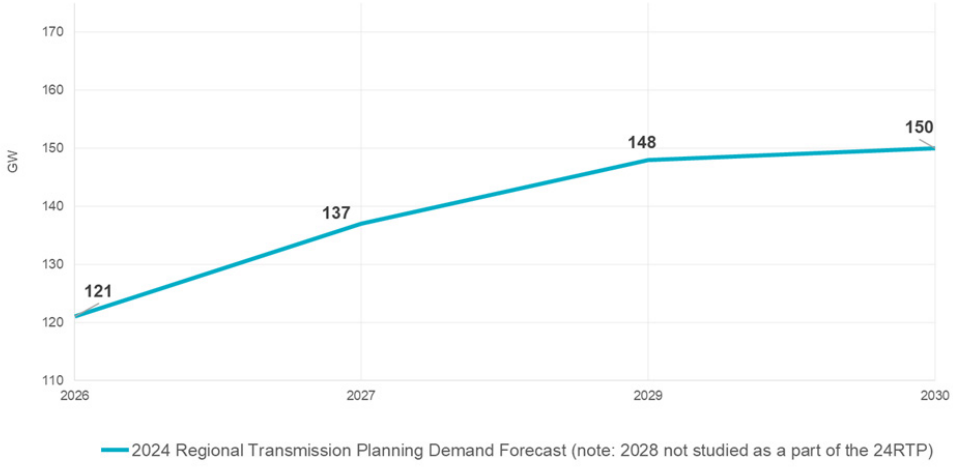
What is ERCOT's Transmission Planning Process?

ERCOT's transmission planning involves two critical components: the RTP and the RPG. Together, these elements form the comprehensive process for both long-term and immediate transmission needs to maintain a reliable and efficient transmission system. ERCOT coordinates with Transmission Service Providers (TSPs) and other stakeholders to evaluate transmission projects based on ERCOT System reliability needs. ERCOT does not own, build, or maintain the transmission lines—this is done by TSPs—rather, ERCOT oversees the transmission planning process from initial system planning to project implementation.

What is ERCOT's Regional Transmission Plan (RTP)?

Annually, ERCOT produces an RTP to comply with national and state planning rules, providing a six-year roadmap for grid improvements to address ERCOT System transmission needs. In short, this roadmap identifies where new transmission lines and upgrades are needed across the ERCOT Region. It is like the Texas Department of Transportation building a comprehensive plan for future state highways and roads. The RTP acts in the same manner – building a comprehensive transmission "highway and road" plan for the future of the Texas power grid.

The RTP is the result of a coordinated planning process performed by ERCOT's Grid Planning department with extensive review and input by Transmission Planners (TPs) and Transmission Owners (TOs) registered with North American Electric Reliability Corporation (NERC), and other stakeholders. ERCOT's 2024 RTP, which includes an analysis of needed transmission improvements for 2026-2030, included an unprecedented amount of economic demand growth (forecasted summer peak demand for 2030 exceeds 150 GW) led by a significant increase in large load interconnections (i.e., data centers, oil and gas, hydrogen and hydrogen-related manufacturing, crypto mining, and electrification).



Forecasted 2026-2030 economic demand growth

What is the Regional Planning Group (RPG)?

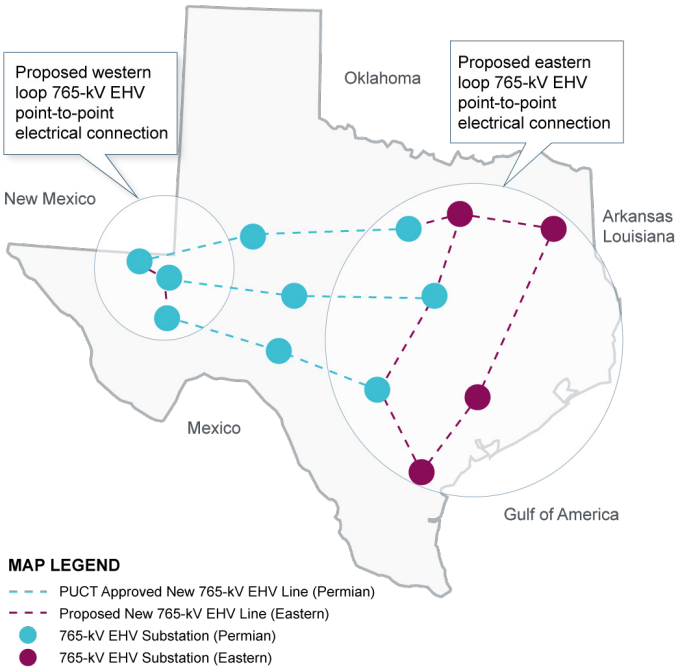
The RPG is a membership-based group led by ERCOT and is responsible for reviewing and providing comments on TSP-proposed transmission projects out of the RTP or other proposed transmission projects. ERCOT works directly with RPG members to assess transmission needs and identify and implement solutions, address potential transmission constraints, and facilitate interconnecting new generation resources to meet the load demand needs. The RPG also addresses short- and long-term transmission planning needs to help shape ERCOT's RTPs by providing input on load forecasts, renewable integration, and project prioritization. Participation in the RPG is required of all TSPs and is open to all Market Participants (MPs), consumers, other stakeholders, and Public Utility Commission of Texas (PUCT) Staff.

What transmission projects were proposed out of the 2024 RTP?

The unprecedented load growth in the 2024 RTP prompted discussions about introducing a 765-kV backbone infrastructure to the ERCOT Transmission Grid. This 765-kV backbone would function as a superhighway, enabling current to flow more efficiently through long-distance transmission from generation resource-rich regions to load centers. From those discussions, based on the 2024 RTP reliability needs for 2030, ERCOT produced the TX 765-kV STEP plan to address the current and future transmission needs in the ERCOT Region. The following transmission projects were identified as part of the overall 765-kV STEP plan:

1. Three 765-kV Extra-High Voltage (EHV) electric transmission lines into the Permian Basin area as identified by the Permian Basin Reliability Study. In April 2025, the PUCT approved these lines, known as Permian Basin Import Paths.
2. Two 765-kV EHV transmission line projects to connect the western and eastern loop point-to-point electrical connections to the RPG for review.
    - **Western Loop:** Oncor and American Electric Power (AEP) Drill Hole to Sand Lake to Solstice 765-kV Line Project
    - **Eastern Loop:** AEP, CPS Energy, Oncor, and CenterPoint (CNP) Texas 765-kV STEP Eastern Backbone Project

The figure below shows the proposed western and eastern loop point-to-point connections.



The proposed western and eastern loop point-to-point connections

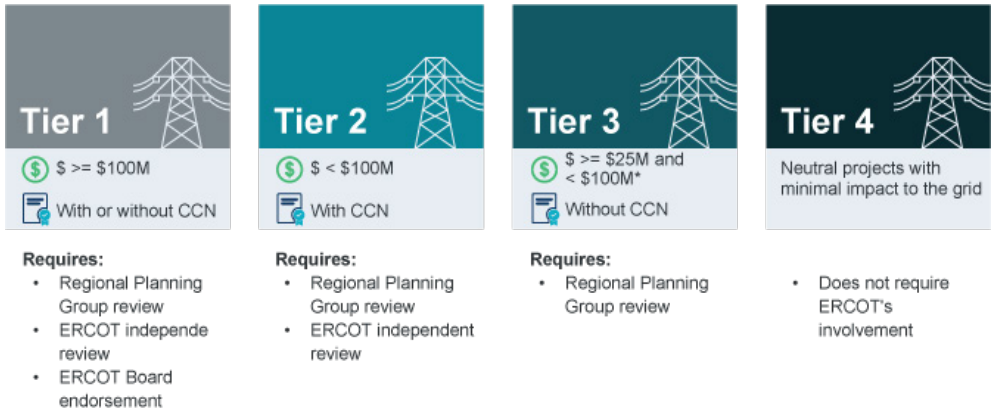
Note: Geographic locations for proposed new transmission lines are meant to demonstrate general electrical point-to-point connections.

Specific routing of any new transmission infrastructure is determined by the PUCT as part of the Certificates of Convenience and Necessity (CCN) process with TSPs. A CCN is a certificate issued by the PUCT that allows the transmission owner to establish a new right-of-way (specific route to build) for the proposed project.

Both the western and eastern loop projects are currently going through the RPG review process. For other transmission projects listed in the 2024 RTP, TSPs can select and propose the projects that they determine serve a reliability need to move from the RTP into the RPG for further review and evaluation. The RPG review will evaluate different options to identify the best one. This process is the same for each annual RTP that ERCOT produces.

How does the Regional Planning Group review and designate proposed transmission projects?

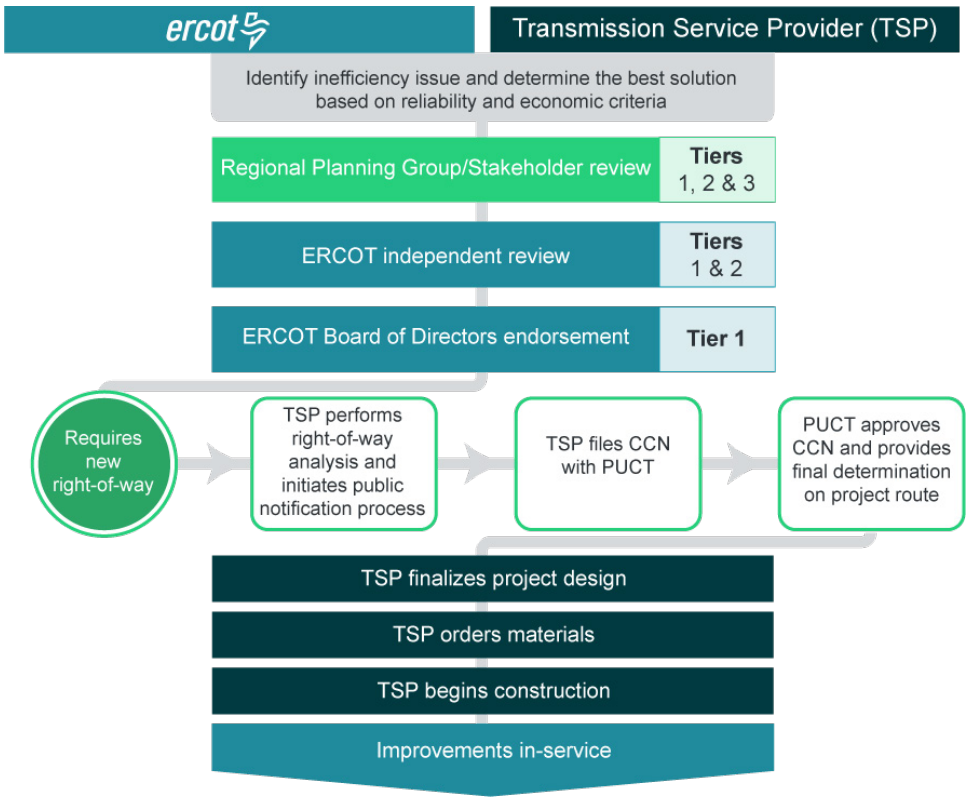
From the RTP, TSPs outline their proposed transmission project plans for RPG review and approval. MPs are required to address any reliability issues identified in the RTP to maintain the system reliability defined under both the ERCOT and NERC planning criteria. Transmission projects are evaluated based on reliability need and economic benefit. Once the RPG receives and reviews the proposed transmission project plans, projects are then designated one of the four tier levels shown below based on the scope and cost of the project.



RPG transmission project tiers

** Note: Tier 3. A CCN is not required if the estimated capital cost is less than $25M and the project includes any of the following elements:*

- More than one mile of 345-kV circuit reconductoring which essentially is upgrading existing transmission line conductors using the same infrastructure.
- Adding new 345-/138-kV autotransformer capacity. An autotransformer is a device that changes the voltage of electricity—either making it higher or lower.
- Building a new 345-kV substation



The exception to this is if the project is classified as a neutral project, it may not qualify under this exemption—even if the above conditions are met. A neutral project typically refers to a transmission upgrade or addition that does not impact ERCOT's broader transmission system's transfer capability or power flow patterns.

What is ERCOT's overall transmission planning timeline?

In April 2024, ERCOT announced a New Era of Planning that focuses on ensuring all areas of system planning – from generation and load interconnections to transmission development – can adapt to better serve the needs of the rapidly growing Texas economy from transmission planning to siting and construction. ERCOT's transmission project timeline as shown below typically ranges between three to six years. The timeline for implementation depends on the scope of the project and whether or not a CCN application is required. For those projects that do need a CCN, once approved by the PUCT, the TSPs will begin construction of the project.

ERCOT Transmission Planning Process

What's next?

ERCOT's Grid Planning department is currently working on the 2025 RTP using the 2031 ERCOT Transmission Planning Adjusted Load Forecast, which is approximately 159 GW of demand on the grid. The typical RPG process for the RTP requires ERCOT to present RTP start cases, finalize weather-zone level load numbers and generation assumptions, start-case transmission project assumptions, and MP project discussions. After further analysis, ERCOT will then coordinate discussions with TSPs around identified project development. The RTP process typically takes an entire year from beginning to end, and the 2025 RTP is expected to be completed in December 2025. To learn more about ERCOT's long-term grid planning, visit ERCOT Planning.