Permian Basin Reliability Plan Study – Status Update

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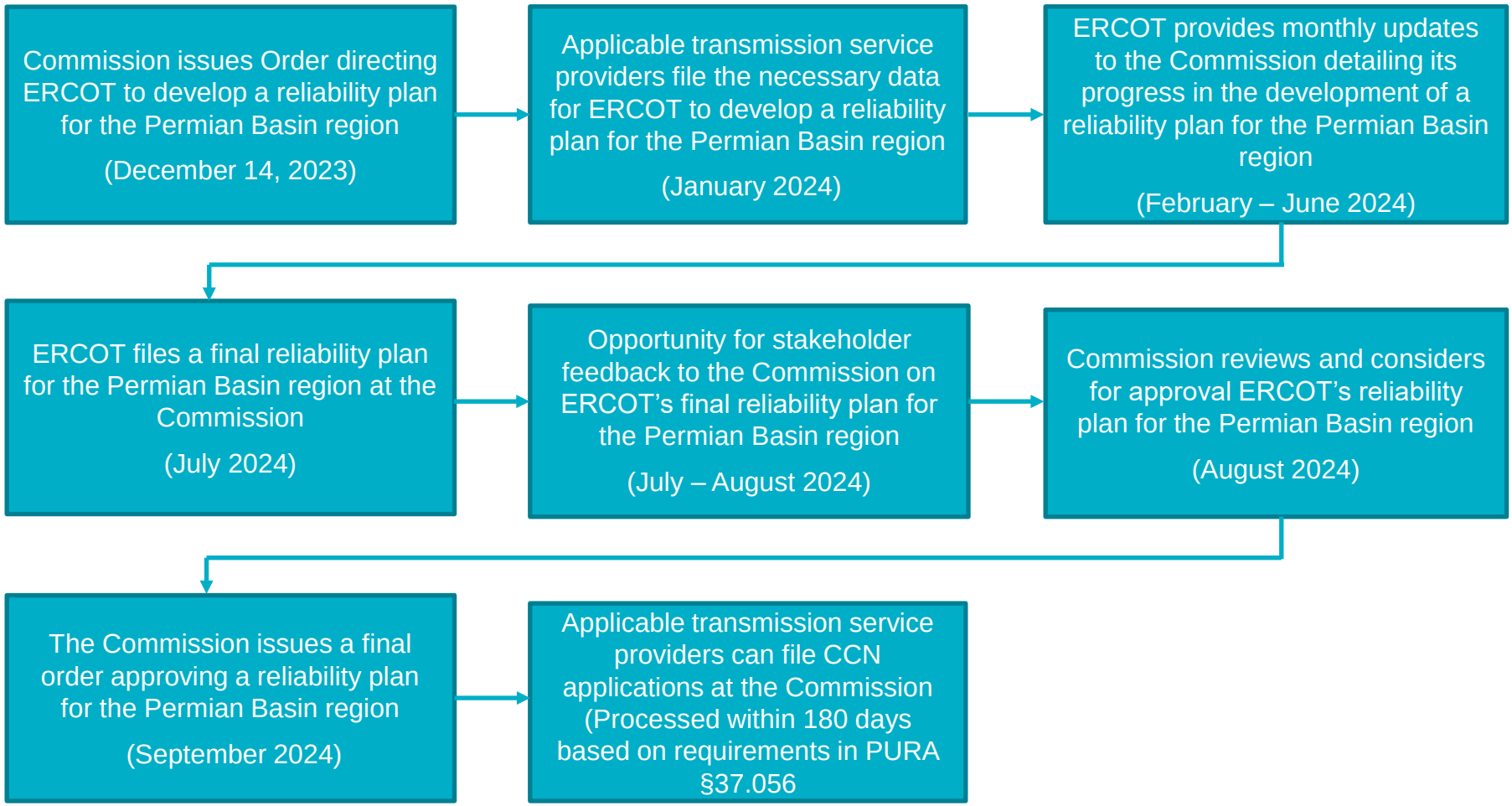
RPG Meeting
March 18, 2024

Recap: Introduction

- Significant progress has been made to address the high demand growth in the Permian Basin area
  - Delaware Basin Load Integration Study in 2019
  - Permian Basin Load Interconnection Study in 2021
- In part, H.B. 5066 (May 2023) requires the PUCT to direct ERCOT to develop a Reliability Plan for the Permian Basin region and that the plan must:
  - Address extending transmission service to areas where mineral resources have been found
  - Address increasing available capacity to meet forecasted load for the next decade
  - Provide available infrastructure to reduce interconnection times in areas without access to transmission service
- PUCT Order Project No. 55718 (December 2023)
  - Procedural Process and Timeline
  - Not later than July 2024, ERCOT must file a final reliability plan at the Commission in this project, and after opportunity for stakeholder feedback, and Commission will review and approve a reliability plan for the Permian Basin region
  - The applicable transmission service providers (TSPs) responsible for constructing the transmission infrastructure in the Commission-approved reliability plan can then move forward with filing the necessary applications for certificate of convenience and necessity (CCN) at the Commission

Recap: Procedural Process and Timeline per PUCT Order Project No. 55718



Status Update

- ERCOT presented the draft study scope at January RPG meeting
  - https://www.ercot.com/calendar/01172024-RPG-Meeting
- ERCOT presented the updated study scope at February RPG meeting
  - https://www.ercot.com/calendar/02122024-RPG-Meeting
- ERCOT categorized the additional non-oil & gas load in the Permian Basin region into confirmed load and unconfirmed load based on the feedback from TSPs
- ERCOT updated the initial study base cases for 2030 and 2038 to include the load forecast modeling of confirmed and unconfirmed loads along with generation and transmission assumptions shared with stakeholders at the February 12 RPG meeting
- Due to the high load level, ERCOT has spent considerable time and effort to condition the 2030 and 2038 cases to prepare for the reliability need analysis
- ERCOT performed the reliability need analysis for the S&P Global Permian Basin load plus the additional non-oil & gas load
- The initial reliability need analysis indicates substantial amounts of transmission projects would be needed to serve the high load level, which includes the S&P Global Permian Basin load plus the all the additional non-oil & gas load

Study Scope

- ERCOT will focus on the 138-kV and above transmission upgrades and TSPs are responsible for the 69-kV transmission upgrades
  - Thermal/voltage violations as well as unsolvable contingencies at or due to 69-kV transmission system limitation will rely on TSPs to resolve
- For the planned maintenance outage scenarios, ERCOT will only consider the major 345-kV maintenance outages in the Delaware Basin area since
  - The oil & gas loads are concentrated in the Delaware Basin area
  - The transmission in the Delaware Basin area is relatively sparse
  - Other planned maintenance outage scenarios may be evaluated in following RTP studies or RPG reviews
- Due to the high load level, significant amount of local transmission upgrades, especially in the Delaware Basin area, are needed to served the load. Two steps are taken to address the reliability need:
  - First, identify and evaluate the local transmission upgrades to serve the load
  - Second, evaluate the import paths to the Permian Basin region

Recap: Study Assumptions – Load Forecast

Permian Basin Region Load Comparison (MW)

	2019 Delaware Basin Study	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	23,959	26,700
Permian Basin Oil & Gas Load*	9,771	10,527	12,341	11,964	14,705
Additional Non-Oil & Gas Load**	0	0	4,236	11,995	11,995

Delaware Basin Area Load Comparison (MW)***

	2019 Delaware Basin Study	2021 Permian Basin Study 2030 Case	2023 RTP Study 2029 Case	Permian Basin Reliability Plan 2030 Case	Permian Basin Reliability Plan 2038 Case
Delaware Basin Total Load	5,260	4,960	7,933	11,230	13,483
Delaware Basin Oil & Gas Load*	5,260	4,960	4,884	6,439	8,692
Additional Non-Oil & Gas Load**	0	0	3,049	4,791	4,791

*Including residential/commercial load

**Mainly datacenter/crypto load

***The Delaware Basin load is a subset of the Permian Basin load and is included as part of the Permian Basin Reliability Plan Study

Recap: Load Forecast – Observations and Challenges

- The total load in the Permian Basin region is extremely high, even for 2030. The total load level is comparable to that of ERCOT Coast Weather Zone and North Central Weather Zone

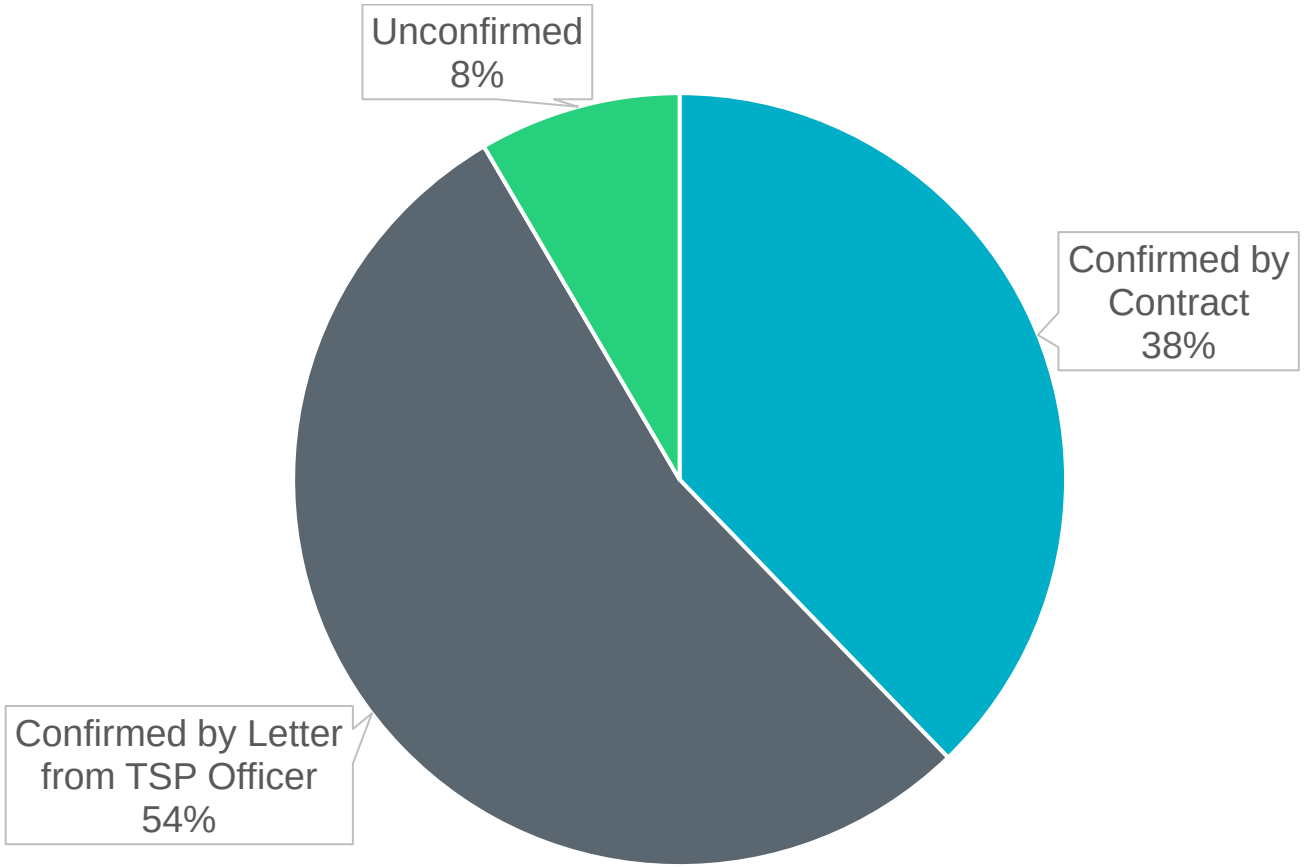
	2023 RTP 2029 Non-Coincident Peak Load (MW)	Load in the Starting Case of This Permian Basin Reliability Plan Study (MW)	Conventional Gen Capacity (MW)
North Central WZ	32,458	28,173	~ 28,400*
Coast WZ	29,848	26,967	`~ 25,900
Permian Basin Region	16,577	26,700	~ 2,800

* This includes the conventional generation in the East Weather Zone

- The total Load in West & Far West Weather Zones in this Permian Basin Reliability Plan Study is 28,669 in 2038 case which is even higher than the load in North Central Weather Zone
- The total amount of additional non-oil & gas load is almost the same as the oil & gas load
- Within the Permian Basin, oil & gas load is shifting to the Delaware Basin area where transmission is relatively sparse. Especially for 2038, the load in the Delaware Basin area (8,692 MW) is significantly higher than what we have previously studied (5,260 MW)
- Permian Basin lacks local conventional generation compared to the North Central and Coast Weather Zones
- Considering the high level of load growth to be evaluated, identifying a reliability plan to meet this extremely high load level will require extraordinary effort to complete on the directed timeline and will be much more complex compared to previous special studies ERCOT has conducted

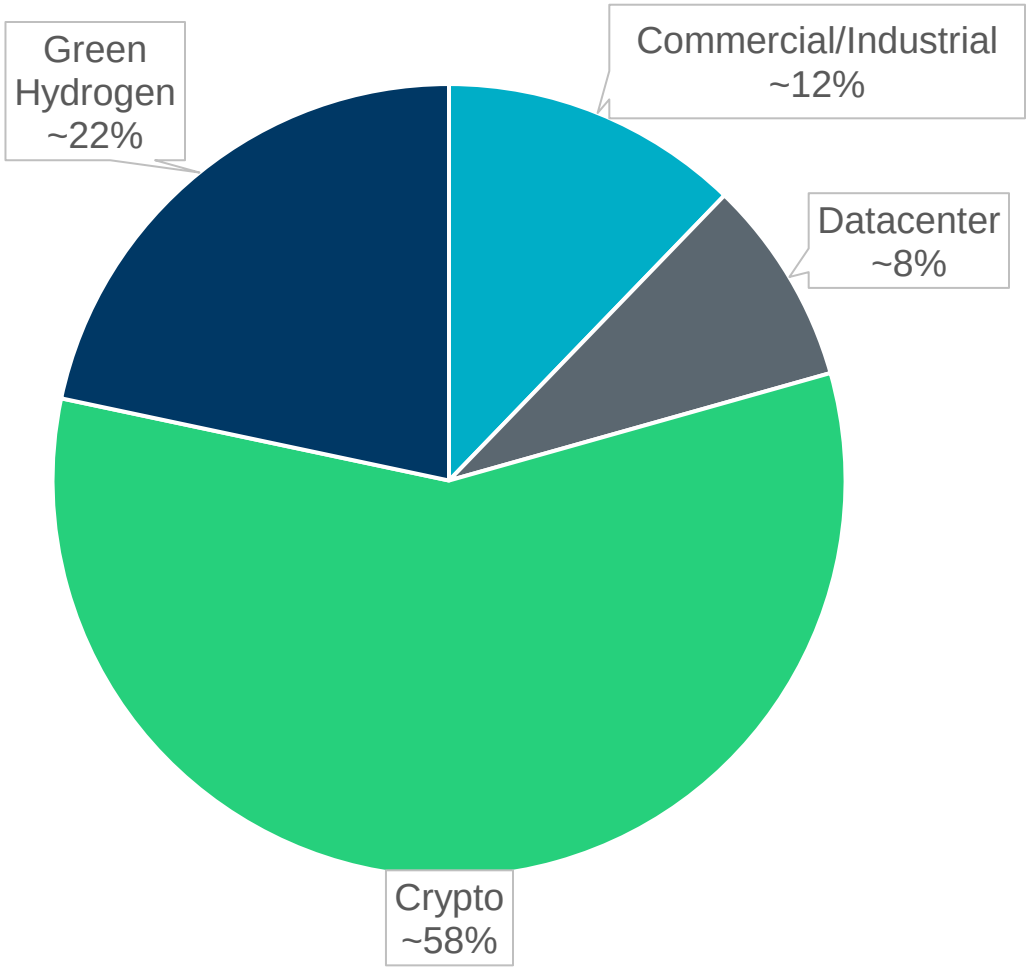
Additional Non-Oil & Gas Load Breakdown

This chart shows the confirmed/unconfirmed percentage breakdown for the total 11,995 MW of additional non-oil & gas load.



Additional Non-Oil & Gas Load Type Breakdown

This chart shows the approximate load type breakdown for the total 11,995 MW of additional non-oil & gas load.



Study Assumptions – Generation Update

- New generation that met Planning Guide Section 6.9(1) condition with Commercial Operation Date (COD) before June 2030 and 2038 at the time of the study, but not already modeled in the starting case, will be added to the study base case based on the February 2024 Generator Interconnection Status (GIS) report posted on March 1, 2024
  - GIS Link: https://www.ercot.com/gridinfo/resource
- Renewable generation dispatch will be consistent with the 2024 RTP methodology
  - Solar generation in the study area will remain online (dispatched at 76% of their installed capacity)
  - Wind generation inside the study region will use the CDR dispatch (same as the wind generation outside the study region) (22% for wind generation in WFW)
  - All battery units including the distribution connected batteries will be dispatched up to 20.3% of their installed capacity

Recap: Study Assumption - Transmission

- Based on the October 2023 Transmission Project and Information Tracking (TPIT) posted on ERCOT website, RPG approved Tier 1, Tier 2, and Tier 3 projects as well as Tier 4 projects with in-service dates on or before summer 2030 and 2038 within the study area will be added to the study base case if not already modeled in the starting case
  - TPIT Link: https://www.ercot.com/gridinfo/planning
- Additional projects identified in the previous special studies will be added
  - Oncor West Texas 345-kV Infrastructure Rebuild Project (currently under EIR review)
  - Stage 3, Stage 4, and Stage 5 upgrades in the Delaware Basin Load Integration Study (Stage 1 and Stage 2 upgrades were already approved and modelled in the study)
  - New 138-kV lines to connect the future new loads into the system as proposed by the Permian Basin Load Interconnection Study

Reliability Need Analysis

- ERCOT conducted the reliability need analysis for the S&P Global Permian Basin load plus all the additional non-oil & gas load for 2030 and 2038
  - The intention is to conduct the reliability need analysis and evaluate transmission options first for 2038 since the reliability need and transmission projects for 2030 would be a subset of that for 2038
  - Due to the high load level, both 2030 and 2038 study base cases are not solvable
  - The reliability need analysis was taken step by step starting with the Delaware Basin area as the S&P Global Permian Basin load is concentrated in this area
    - The additional non-oil & gas load in the Midland Basin area is not included here
    - Add the S&P Global load in the Delaware Basin area gradually
    - Propose potential local transmission projects to serve the load
    - Include placeholder import paths
    - Add the additional non-oil & gas load in the Delaware Basin area gradually
  - The reliability need analysis in the Midland Basin area
    - Add the additional non-oil & gas load in the Midland Basin area gradually
    - Propose potential local transmission projects to serve the load

Initial Results of Reliability Need Analysis – 2038 case in Delaware Basin area

- ERCOT conducted steady-state reliability analysis for the 2038 case in Delaware Basin area
- The study results showed that both local transmission upgrades and additional import paths to Delaware Basin area will be needed
- Potential local transmission projects in the Delaware Basin area to server 2038 load
  - Add new 345-kV substations with 345/138-kV transformers
  - Add new 345-kV additional double-circuit transmission lines
  - Form a new 345-kV double-circuit loop
  - Add new 138-kV transmission lines
  - Rebuild the existing 345-kV transmission lines
  - Rebuild the existing138-kV transmission lines
  - Add reactive support devices

Initial Results of Reliability Need Analysis – 2038 case in Midland Basin area

- ERCOT conducted steady-state reliability analysis for the 2038 case in Midland Basin area
  - Include the potential local transmission projects in the Delaware Basin area
  - Include the placeholder import paths to the Delaware Basin area
  - Add additional non-oil & gas load in the Midland Basin area
- The study results showed that both local transmission upgrades and additional import paths to Midland Basin area will be needed

Deliverables and Timeline

- The study is expected to be completed in June 2024 and the final report is ready in July 2024
- Status updates at future RPG meetings
- Tentative Timelines

Deliverables	Tentative Timeline
Load Update by TSPs	January 2024
Review the Data Provided by TSPs	January 2024
Develop Study Base Case and Conduct Reliability Analysis	February 2024
Study Potential Transmission Solutions and Propose Final Reliability Plan	March – June 2024
Final Report	July 2024

Thank you!

Stakeholder comments also welcomed through:

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