Permian Basin Reliability Plan Study – Status Update

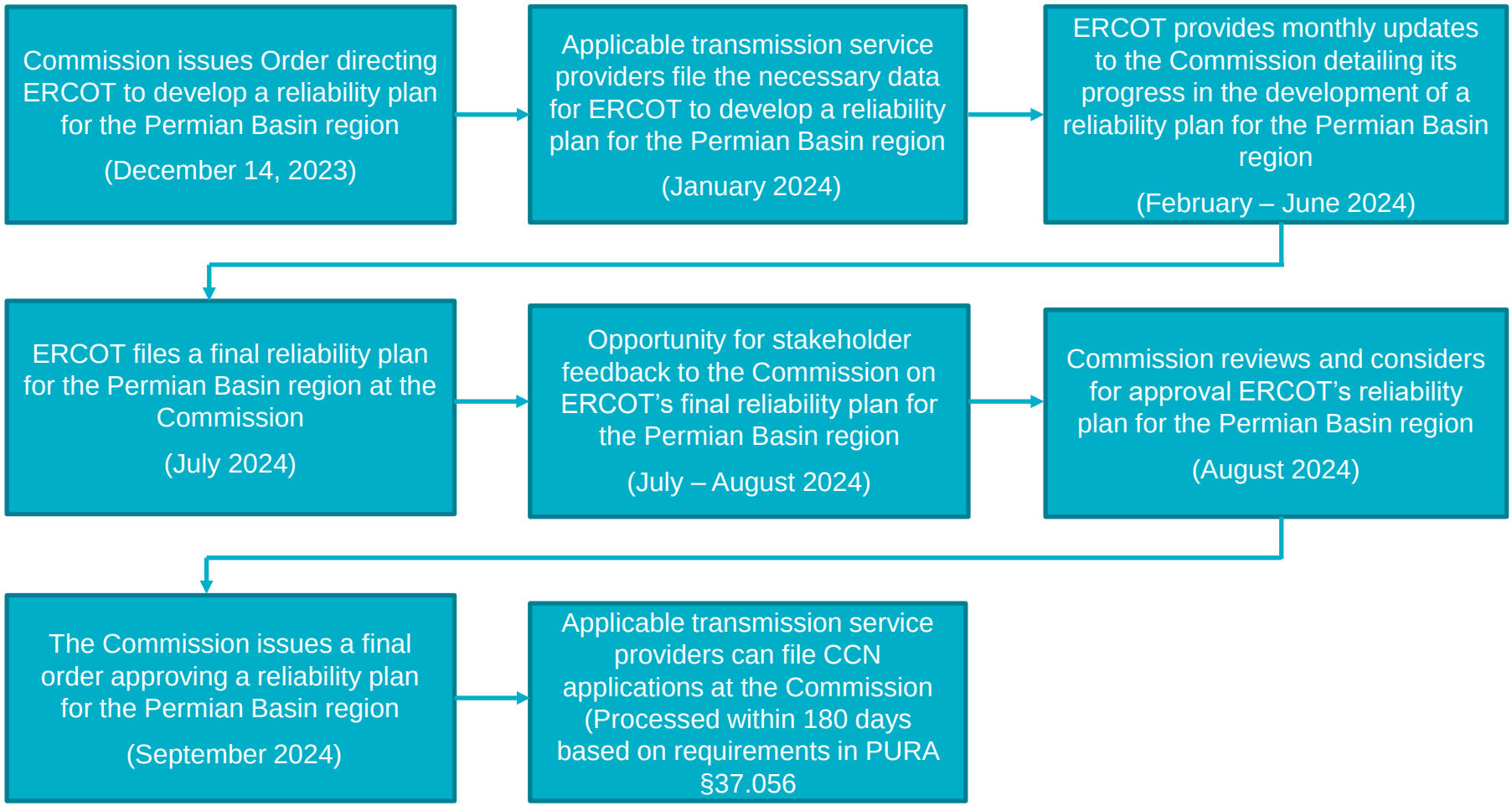
Ying Li

RPG Meeting
May 14, 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

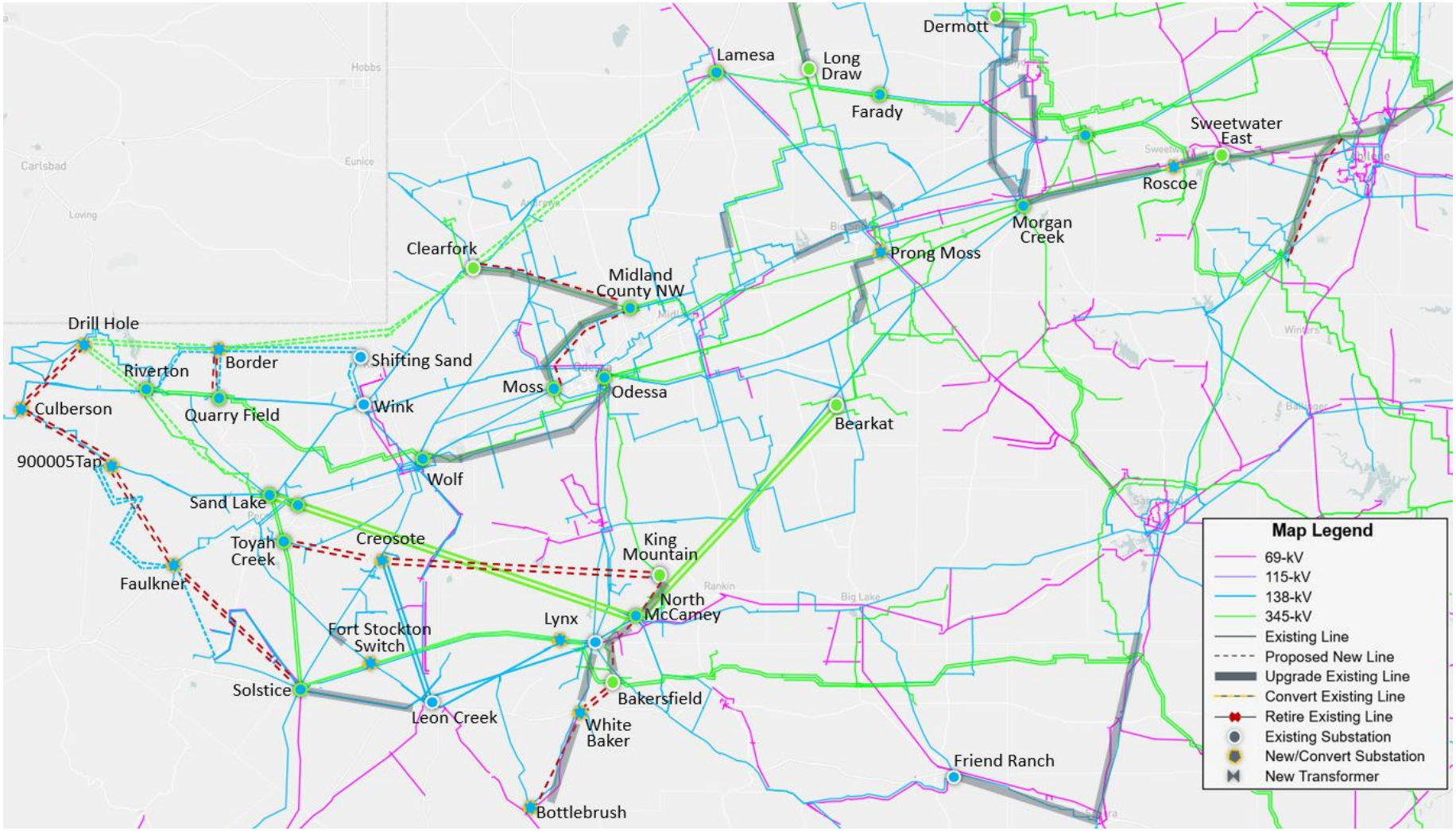
Recap: Procedural Process and Timeline per PUCT Order Project No. 55718



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 presented the status update at March and April RPG meetings
  - https://www.ercot.com/calendar/03182024-RPG-Meeting-_-Webex
  - https://www.ercot.com/calendar/04092024-RPG-Meeting
- ERCOT presented the initial potential local transmission upgrades to serve the S&P Global Permian Basin load plus the all the additional non-oil & gas load for 2038
- ERCOT continues working to identify the local transmission upgrades
- ERCOT identified the initial import paths to serve the Permian Basin region load growth and continues evaluating the import paths
- ERCOT plans to perform a limited dynamic stability analysis utilizing the case where all identified projects are modeled
- ERCOT will present the updated potential local transmission upgrades and initial import paths

Updated Potential Local Transmission Projects for 2038 to Serve All Loads in Permian Basin Region



Updated Initial Local Transmission Projects for 2038 in Delaware Basin Area

- 345-kV
  - Update the Stage 3 upgrade: New 345-kV double-circuit transmission line from Riverton – Drill Hole (instead of new 345-kV single-circuit line from Riverton – Owl Hill)
  - Stage 4 upgrade: Convert the existing Sand Lake – Riverton 138-kV line into 345-kV and add a new 138-kV line from Sand Lake – Riverton
  - Update the Stage 5 upgrade: Faraday – Lamesa – Clearfork – Drill Hole (instead of Riverton)
  - Add a new Border 345/138-kV substations with two 345/138-kV transformers; Loop the Stage 5 upgrade of new Clearfork – Drill Hole 345-kV double-circuit transmission line into the new Border 345-kV station; Add a new Border – Quarry Field 345-kV double-circuit transmission line
  - Add new 345/138-kV substations with two 345/138-kV transformers each at Culberson, 900005Tap (between Culberson and Sand Lake), and Faulkner
  - Add new 345-kV double-circuit transmission lines to form a loop: Riverton – Drill Hole – Culberson – 900005Tap – Faulkner – Solstice
  - Add a new 345/138-kV Creosote substation with three 345/138-kV transformers and add new 345-kV double-circuit transmission lines from King Mountain to Creosote to Toyah Creek
  - Add new 345/138-kV substations with three 345/138-kV transformers each at Fort Stockton Switch and Lynx; Loop the existing Bakersfield – Solstice 345-kV double-circuit transmission lines into Fort Stockton Switch and Lynx
  - Upgrade the existing Bakersfield – Nevil Road – North McCamey – King Mountain 345-kV transmission lines and add 2nd circuits
  - Add new 345/138-kV substations with two 345/138-kV transformers each at White Baker and Century (Bottlebrush) and add new 345-kV double-circuit transmission lines from Bakersfield to White Baker to Bottlebrush

Updated Initial Local Transmission Projects for 2038 in Delaware Basin Area (cont.)

- 138-kV
  - Add Quarry Field to Border 138-kV 2nd circuit and Shifting Sand – Wink 138-kV 2nd circuit, and add new 138-kV double-circuit transmissions line from Border – Shifting Sand to connect and serve the new loads and form a loop
  - Add Border – Riverton 138-kV 2nd circuit
  - Add new 138-kV double-circuit transmission lines from 900005Tap to Faulkner to connect and serve the new loads and form a loop
  - Add new 138-kV transmission lines from Faulkner to Cryo to connect and serve the new loads and form a loop
  - Add new Holiday to Tombstone 138-kV transmission line
  - Upgrade the existing Rio Pecos – North McCamey 138-kV double-circuit transmission line
  - Upgrade the existing Bottlebrush (Century) – White Baker – Girvin 138-kV transmission line
  - Terminal equipment upgrade of the existing Bottlebrush (Century) – Holiday138-kV transmission line
  - Bypass the Solstice phase shifter transformer and upgrade the existing Solstice – FT Stockton Plant 138-kV transmission line
  - Upgrade the existing Foxtail – Tarbush 138-kV transmission line
  - Upgrade the existing Cowpen – Birds of Pray Tap 138-kV line

Updated Initial Local Transmission Projects for 2038 in Midland Basin Area

- 345-kV
  - Add a new 345/138-kV Prong Moss substation with two new 345/138-kV transformers; Loop the existing Bulldog – Elbow 138-kV transmission line into Prong Moss; Loop the existing Hillcrest – McDonald 138-Kv line into Prong Moss; Convert the existing Big Spring – Signal Mountain 69-kV line to 138-kV; and Connect Signal Mountain to Prong Moss
  - Add a new 345/138-kV Roscoe substation near the Sweetwater Tap with two new 345/138-kV transformers; Loop the existing Sweetwater East – Champion and Bitter Creek – Cattleman 345-kV double-circuit line into Roscoe; Convert the existing Plowboy – Escoka 69-kV line to 138-kV; Loop the converted Plowboy – Eskota 138-kV line into Roscoe near the Sweetwater; Move the Eskota 138/69-kV transformer #1 to Plowboy
  - Upgrade the existing 345-kV double-circuit transmission lines from Cattleman to Sweetwater East to Long Creek to Graham
  - Upgrade the existing Bluff Creek – Abilene Mulberry Creek 345-kV transmission line and add 2nd circuit
  - Upgrade the existing Moss – Midland County NW – Clearfork 345-kV transmission lines and add 2nd circuits
  - Upgrade the existing Farmland – Long Draw 345-kV transmission line and add 2nd circuit

Updated Initial Local Transmission Projects for 2038 in Midland Basin Area (cont.)

- 138-kV
  - Add a new Ranger (Morgan Creek) – Frontier 138-kV transmission line
  - Upgrade the existing Ranger – Sun – Demott and Ranger – China Groove – Snyder 138-kV transmission lines
  - Upgrade the existing Eiland – Elbow 138-kV transmission line
  - Upgrade the existing Luther – Bulldog 138-kV transmission line
  - Upgrade the existing Natural Dam – Beals Creek 138-kV transmission line
  - Upgrade the existing Big Springs – Steer 138-kV transmission line
  - Upgrade the existing 138-kV transmission lines along and path of Friend Ranch to Like Oak to Santiago
  - Connect the new load bus 900052 to Big Lake to form a 138-kV loop
  - Add a new Friend Ranch – Stockman 138-kV transmission line
  - Upgrade the existing Grady – Coronado Midstream Tap – Sales Ranch 138-kV transmission line
  - Upgrade the existing Odessa – Reiter – Wolf 138-kV transmission line

Initial Import Paths – Major Consideration Factors

- Import paths could serve as dual-purpose
  - Import generation to Permian Basin region to serve the forecasted Permian Basin load
  - Export rich renewable generation in West Texas to the load centers
- Generation
  - Import from generation rich area
- CIP-014
  - Avoid voltage instability under the major 345-kV substation outage
- ERCOT Long-Term West Texas Export Study
  - Considered the West Texas export paths if applicable
- Cost

Initial Import Paths to Permian Basin Region for 2038

Total new ROW approximately 1,452 miles

New Substation 1 is cutting into the existing Big Hill – Twin Butte 345-kV line, about 16 miles away from the Big Hill substation

20% adder was included for the new lines

Initial Import Paths to Permian Basin for 2038

- Import Path 1
  - Upgrade the existing Comanche Peak – Comanche Switch 345-kV line and adding a 2nd circuit
  - New Comanche Switch – Central Bluff – Longshore – Rockhound 345-kV double-circuit line
  - New Moss – Border 345-kV double-circuit line
- Import Path 2
  - New Sam Switch – Comanche Switch – Twin Butte – King Mountain 345-kV double-circuit line
- Import Path 3
  - New Bell East – Buckhorn – New Substation 1 – Nevil Road – Lynx 345-kV double-circuit line
  - New Substation 1 is cutting into the existing Big Hill – Twin Butte 345-kV line, about 16 miles away from the Big Hill substation
- Import Path 4
  - New Fowlerton – Hamilton – Bottlebrush – Solstice 345-kV double-circuit line
  - No 345/138-kV transformers at Hamilton in this study
  - Add new dynamic reactive devices at Hamilton
- Additional Upgrades
  - Upgrade the existing Long Draw – Odessa 345-kV line and adding a 2nd circuit
  - Bypass the series capacitors at Edison and add new dynamic reactive devices

Next Step

- ERCOT will continue evaluating the local transmission upgrades and the initial import paths to the Permian Basin region to address the reliability need for 2038
- ERCOT will evaluate the transmission upgrades, both local and import paths, for 2030. These upgrades will be a subset of the transmission upgrades for 2038

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:

Ying.Li@ercot.com

Robert.Golen@ercot.com