



Permian Basin Reliability Plan Study – Status Update

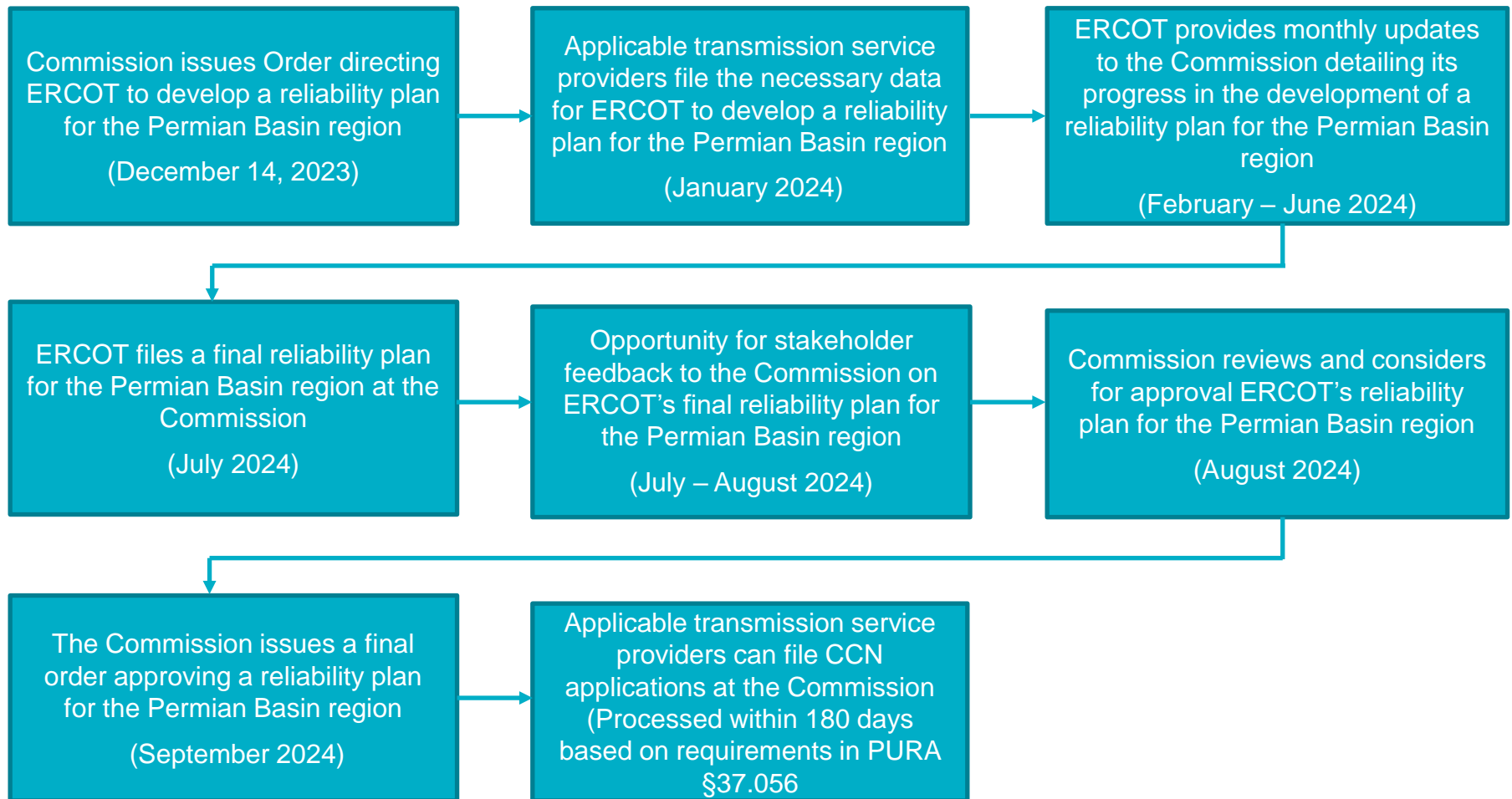
Ying Li

RPG Meeting
June 11, 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, April, and May RPG meetings
 - https://www.ercot.com/calendar/03182024-RPG-Meeting-_-Webex
 - <https://www.ercot.com/calendar/04092024-RPG-Meeting>
 - <https://www.ercot.com/calendar/05142024-RPG-Meeting>
- ERCOT presented the potential local transmission upgrades and initial import paths to serve the S&P Global Permian Basin load plus the all the additional non-oil & gas load for 2038
- ERCOT updated the local transmission upgrades and import paths needed for 2038
- ERCOT identified the local transmission upgrades and import paths to serve the Permian Basin region load growth for 2030
- ERCOT will present the updated local transmission upgrades and import paths to serve all the loads in the Permian Basin region for 2030 and 2038

Status Update (cont.)

- Load update
 - 300 MW of unconfirmed non-oil & gas load in the Delaware Basin area was removed per the updated information from TSPs in early May 2024
- Local transmission upgrades update for 2038
 - Removed Graham – Long Creek 345-kV transmission line upgrade
 - Removed Farmland – Long Draw 345-kV transmission line upgrade
 - Removed Lynx 345/138-kV transformers
 - Removed Lynx – Tombstone – FT Stockton Plant 138-kV second circuit
 - Removed King Mountain – North McCamey 345-kV transmission line upgrade and the second circuit
 - Removed Reiter – Wolf 138-kV transmission line upgrade
 - Removed Rio Pecos – North McCamey 138-kV double-circuit transmission line upgrade
 - Removed Carver – Live Oak – Santiago 138-kV transmission line upgrade
 - Removed Tarbush – Foxtail 138-kV transmission line upgrade
 - Added the upgrade of the existing Creosote – Trans Pecos Tap 138-kV transmission line (0.4 miles)
- Import paths update
 - Import path 1 update due to feasibility issue and regulatory hurdles from the TSP
 - Additional import path update
 - Bring a new 345-kV double-circuit path from Panhandle (replacing the existing 345-kV upgrades and the 2nd circuit from Long Draw – Odessa)

Study Assumptions – Updated 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	23,659	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

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	10,930	13,183
Delaware Basin Oil & Gas Load*	5,260	4,960	4,884	6,439	8,692
Additional Non-Oil & Gas Load**	0	0	3,049	4,491	4,491

300 MW of unconfirmed non-oil & gas load in the Delaware Basin area was removed per TSP request in May 2024

*Including residential/commercial load

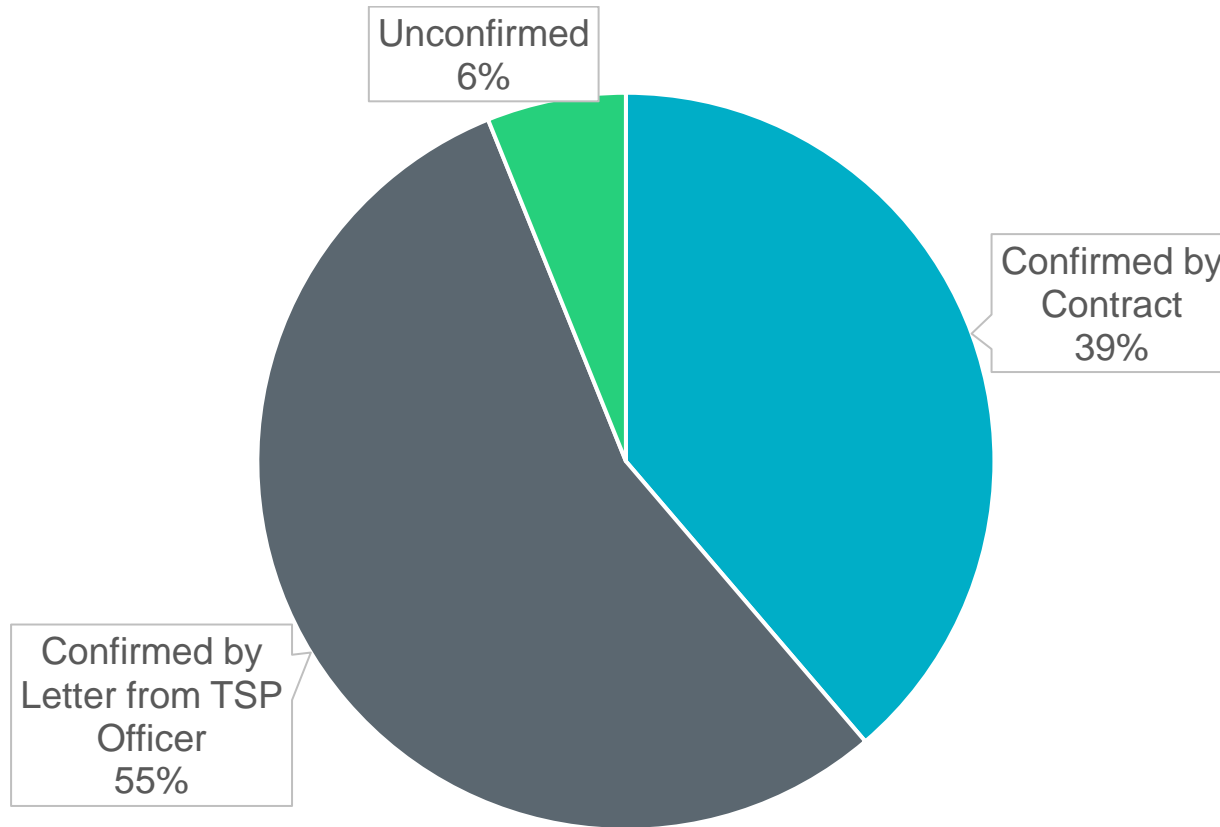
**Mainly datacenter/crypto load

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



Additional Non-Oil & Gas Load Breakdown – Updated

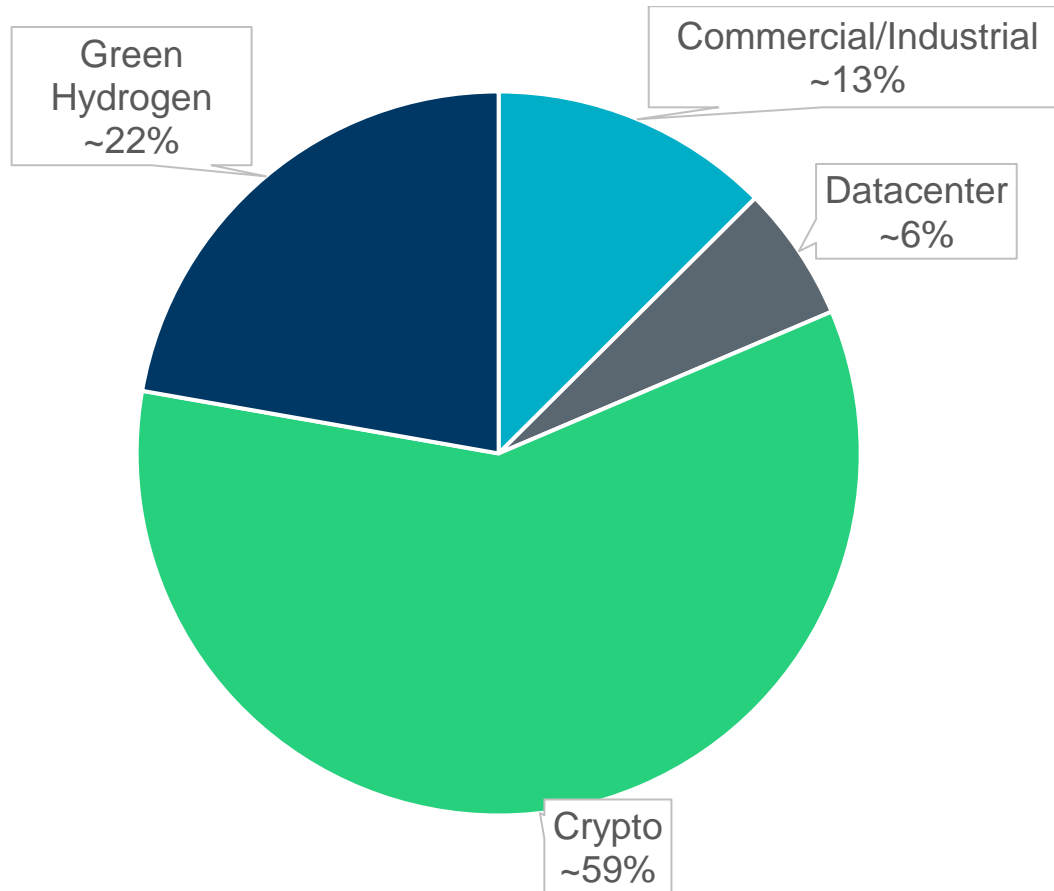
This chart shows the updated confirmed/unconfirmed percentage breakdown for the total 11,695 MW of additional non-oil & gas load.



300 MW of unconfirmed non-oil & gas load in the Delaware Basin area was removed per TSP request in May 2024

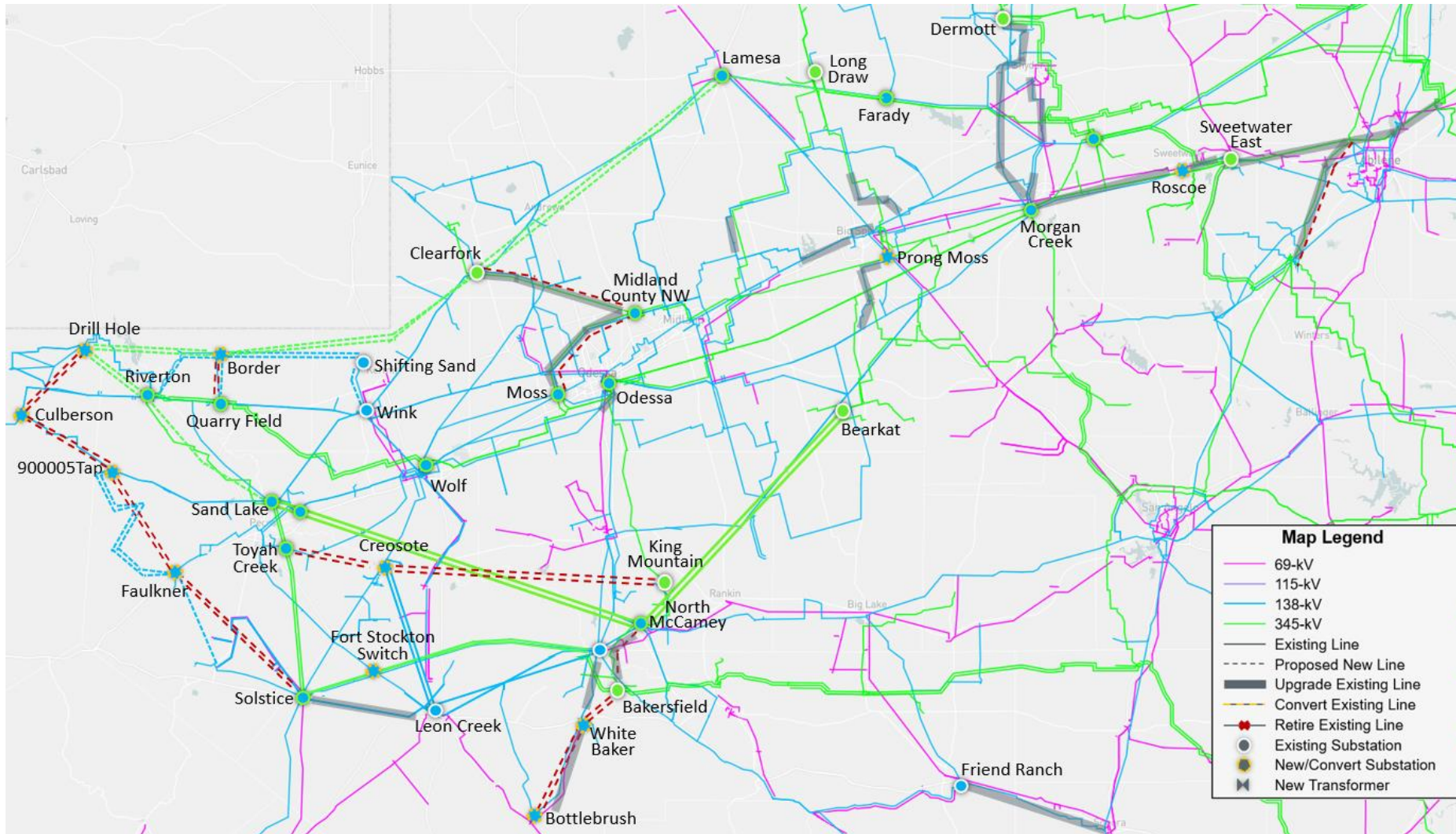
Additional Non-Oil & Gas Load Type Breakdown – Updated

This chart shows the updated approximate load type breakdown for the total 11,695 MW of additional non-oil & gas load.



300 MW of unconfirmed non-oil & gas load in the Delaware Basin area was removed per TSP request in May 2024

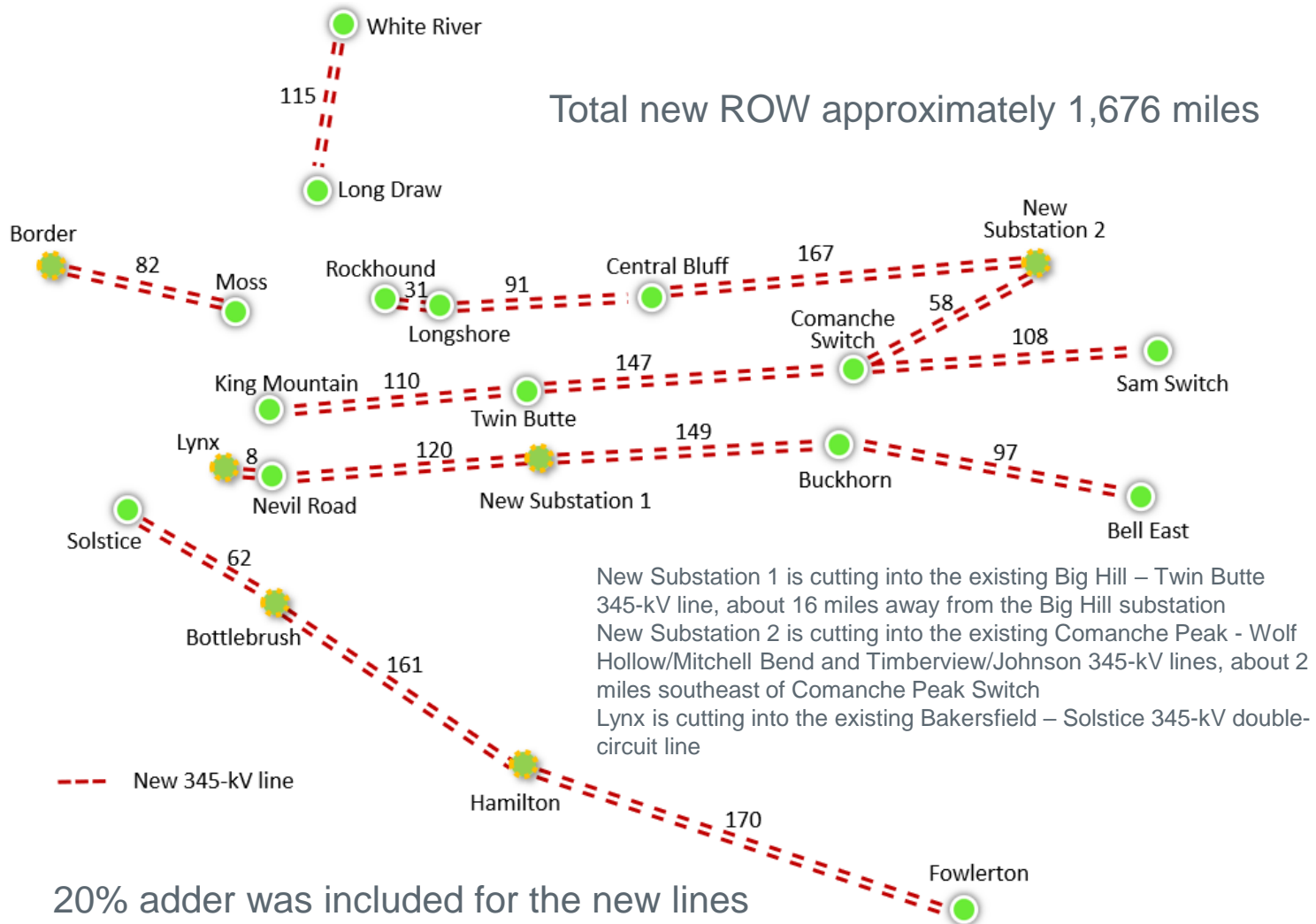
Updated Local Transmission Projects for 2038 to Serve All Loads in Permian Basin Region



Recap: 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

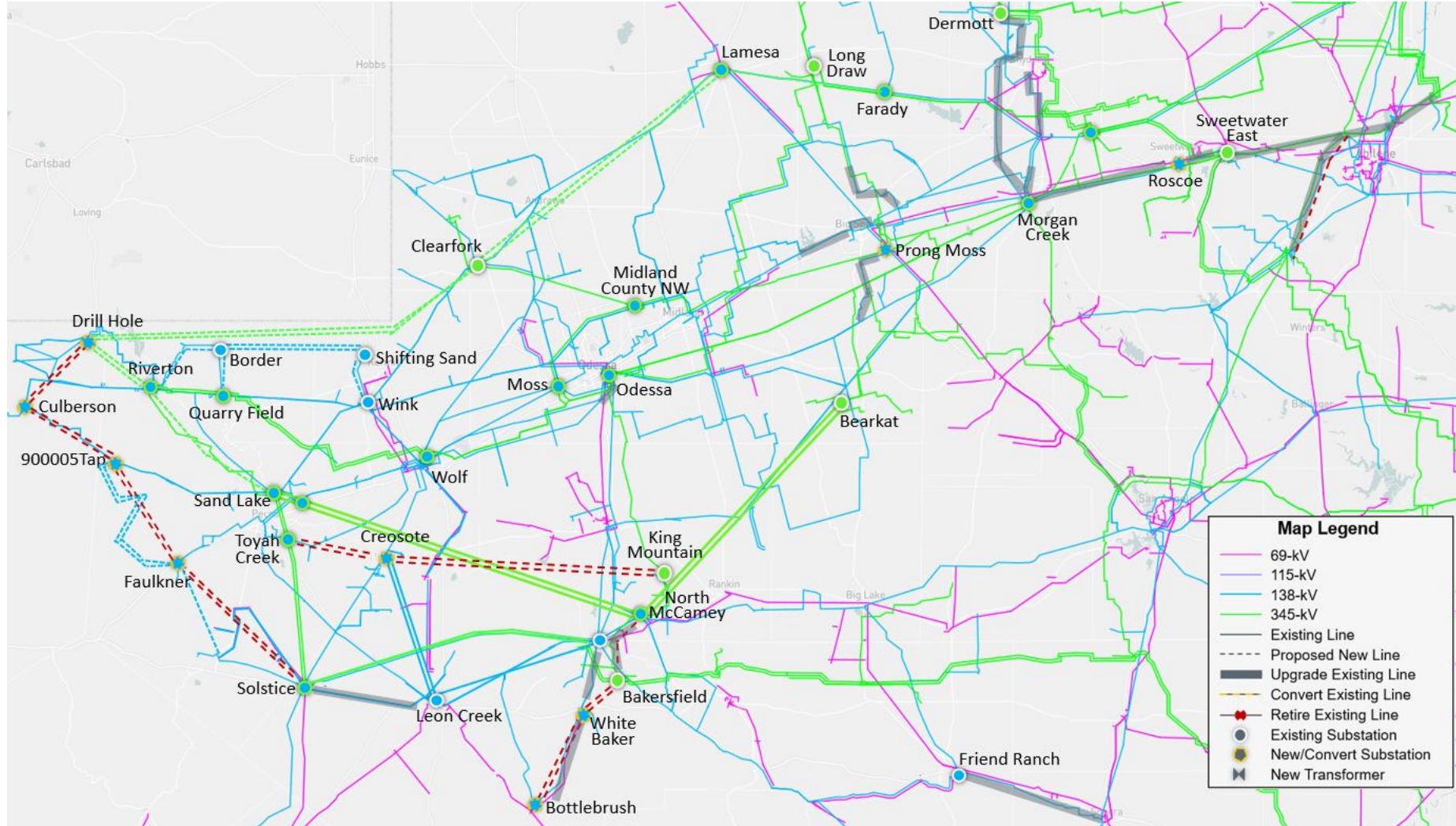
Updated Import Paths to Permian Basin Region for 2038



Updated Import Paths to Permian Basin for 2038 (cont.)

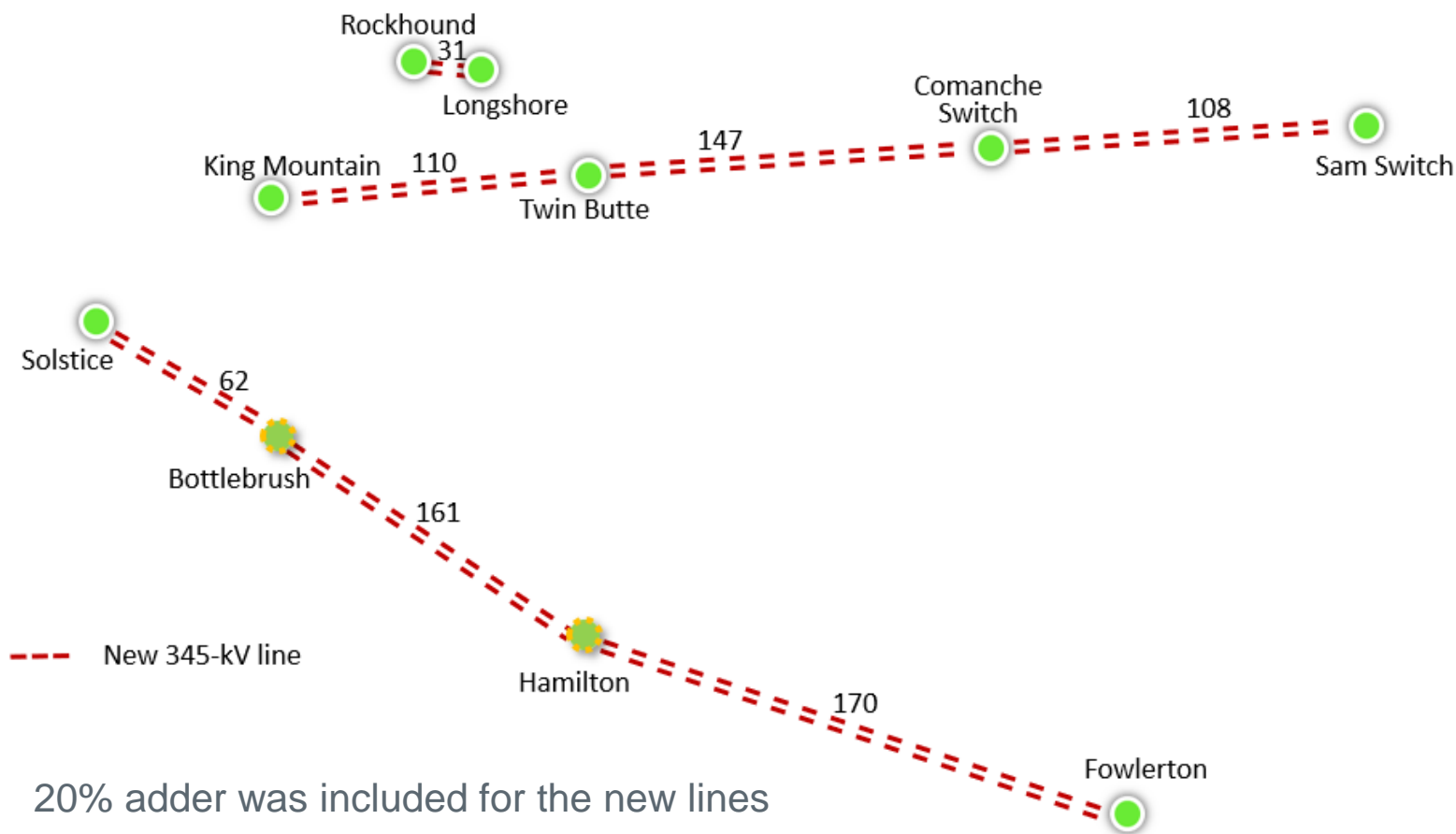
- **Import Path 1**
 - Construct a new 345-kV New Substation 2, about 2 miles southeast of the existing Comanche Peak Switch, cutting into the existing Comanche Peak – Wolf Hollow/Mitchell Bend 345-kV double-circuit line and Comanche Peak – Timberview/Johnson 345-kV double-circuit line
 - New New Substation 2 – Comanche Switch 345-kV double-circuit line
 - New New Substation 2 – 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
 - Lynx is cutting into the existing Bakersfield – Solstice 345-kV double-circuit line
- **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**
 - New White River – Long Draw 345-kV double-circuit line
 - Bypass the series capacitors at Edison and add new dynamic reactive devices

Local Transmission Projects for 2030 to Serve All Loads in Permian Basin Region



Import Paths to Permian Basin Region for 2030

Total new ROW approximately 789 miles



20% adder was included for the new lines

Import Paths to Permian Basin for 2030 (cont.)

- Import Path 2
 - New Sam Switch – Comanche Switch – Twin Butte – King Mountain 345-kV double-circuit line
- Import Path 4
 - New Fowlerlon – 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 Upgrade
 - Bypass the series capacitors at Edison and add new dynamic reactive devices

Next Steps

- ERCOT continues evaluating the local transmission upgrades and the import paths to the Permian Basin region to address the reliability need
- ERCOT is working on reviewing the 69-kV transmission upgrades provided by the TSPs
- ERCOT is working on performing a limited dynamic stability analysis utilizing the case where all identified projects are modeled
- ERCOT is working on the report
- ERCOT will host a Permian Basin Reliability Plan Study workshop on June 28, 2024, for all stakeholders
 - <https://www.ercot.com/calendar/06282024-Permian-Basin-Reliability-Plan>

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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Appendix – Local Transmission Projects for 2030 and 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 substation 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 (2038)
 - 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 a new Fort Stockton Switch 345/138-kV substation with three 345/138-kV transformers; Loop the existing Bakersfield – Solstice 345-kV double-circuit transmission lines into Fort Stockton Switch (2038)
 - Upgrade the existing Bakersfield – Nevil Road – North McCamey 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

Appendix – Local Transmission Projects for 2030 and 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 Bottlebrush (Century) – White Baker – Girvin 138-kV transmission line
- Bypass the Solstice phase shifter transformer and upgrade the existing Solstice – FT Stockton Plant 138-kV transmission line
- Upgrade the existing Cowpen – Birds of Pray Tap 138-kV line (2038)
- Upgrade the existing Creosote - Trans Pecos Tap 138-kV line

Appendix – Local Transmission Projects for 2030 and 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
 - Upgrade the existing Bluff Creek – Abilene Mulberry Creek 345-kV transmission line and add 2nd circuit
 - Upgrade the existing Moss – Midland County NW and Telephone Road – Gardendale – Clearfork 345-kV transmission lines and add second circuits (2038)

Appendix – Local Transmission Projects for 2030 and 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 Friend Ranch – Carver 138-kV transmission line
 - 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 (2038)
 - Upgrade the existing Odessa – Reiter 138-kV double-circuit transmission line