



Oncor – Delaware Basin Stages 3 and 4 Project ERCOT Independent Review Status Update

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RPG Meeting
September 25, 2024

Recap Introduction

- Oncor submitted the Delaware Basin Stages 3 and 4 Project for Regional Planning Group (RPG) review in March 2024
 - This Tier 1 project is estimated to cost \$202.2 million
 - Filing of Certificate of Convenience and Necessity (CCN) will be required
 - Estimated in-service date (ISD) is Summer 2027
 - Project is needed to addresses reliability issues in the Delaware Basin area in the Culberson, Loving, Reeves, and Ward Counties in the Far West (FW) Weather Zone due to the significant load addition in the FW Weather Zone
- Project need and solution was identified in the 2019 ERCOT Delaware Basin Load Interconnection Study
- Oncor presented project overview and ERCOT presented study scope for this ERCOT Independent Review (EIR) at the May RPG meeting
 - <https://www.ercot.com/calendar/05142024-RPG-Meeting>
- This project is currently under ERCOT Independent Review (EIR)

Background

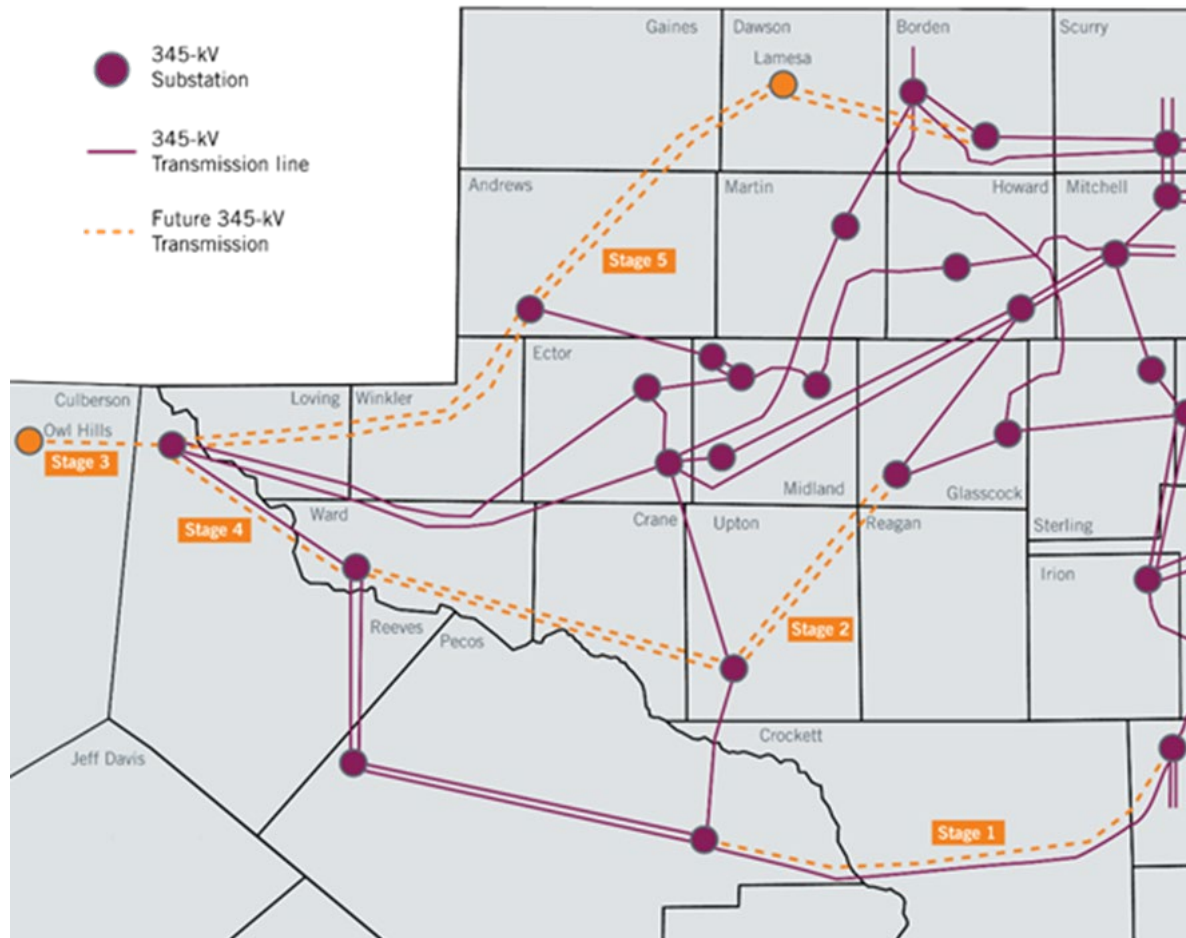
- The Far West Weather Zone, which includes the Study area for this project, has experienced significant growth in oil and natural gas industry demand
- Due to the significant load growth and because of lack of long-term load commitment from the oil and gas customers, ensuring that necessary transmission improvements are in place in time is a significant challenge for both ERCOT and TSPs
- As part of the efforts to address this challenges, ERCOT previously completed two studies, which incorporated extensive review and input by Transmission Service Providers (TSPs) and stakeholders:
 - 2019 Delaware Basin Load Integration Study
 - 2024 Permian Basin Reliability Plan Study

Background (Cont.)

- [Delaware Basin Load Integration Study](#) completed in December 2019
 - Identified the reliability needs in the region
 - Provided a roadmap of long lead time transmission improvements for the continued oil and gas load growth in the Delaware Basin area
 - Stage 1 upgrade was endorsed in June 2021 and is expected to be complete in 2023
 - Stage 2 upgrade was endorsed in August 2022 and is expected to be complete in 2026
 - Updated Stage 5 upgrade is currently under RPG review and has an expected ISD of December 2029

Stage	Estimated Delaware Basin Load Level (MW)	Upgrade Element	Trigger
1	3,052	Add a second circuit on the existing Big Hill - Bakersfield 345-kV line	Import Needs
2	4,022	A new Bearkat - North McCamey - Sand Lake double-circuit 345-kV line	Import Needs
3	4,582	A new Riverton - Owl Hills single-circuit 345-kV line	Culberson Loop Needs
4	5,032	Riverton - Sand Lake 138-kV to 345-kV conversion and a new Riverton - Sand Lake 138-kV line	Culberson Loop Needs
5	5,422	A new Faraday - Lamesa - Clearfork - Riverton double-circuit 345-kV line	Import Needs

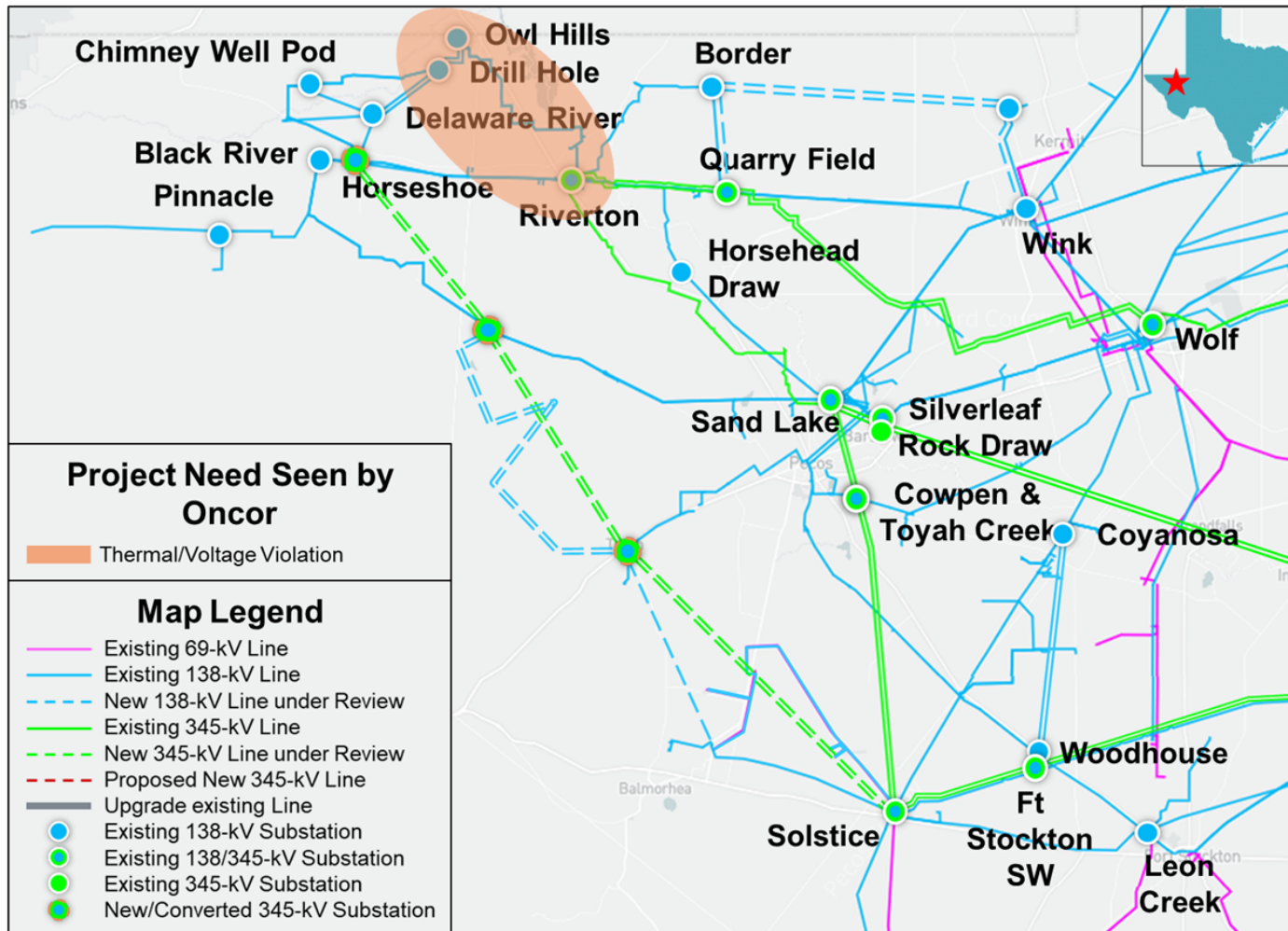
Map – Preferred 2019 Delaware Basin Load Integration Study Upgrades



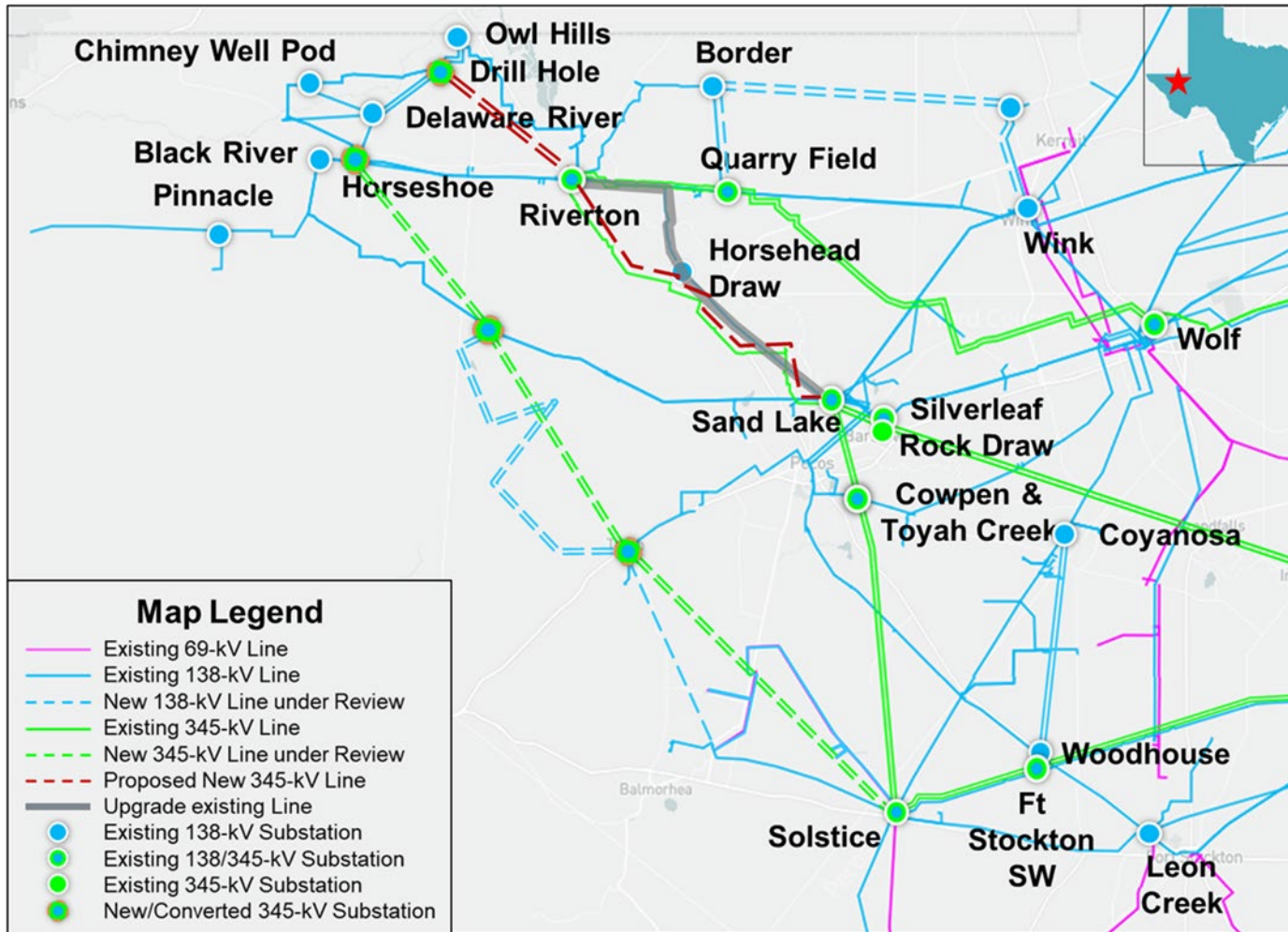
Background (cont.)

- [Permian Basin Reliability Plan Study](#) completed in July 2024
 - Identified the reliability needs in the region
 - Identified local upgrades along with import paths needed to serve the Permian Basin region loads
 - Updated Stages 3 and 5 upgrades as well as the Stage 4 upgrade from 2019 Delaware Basin Load Integration Study was included in the base case

Map – Project Need as Seen by Oncor



Map – Proposed Project by Oncor



- Owl Hills, a load-serving distribution substation, has physical limitations and will not allow the expansion needed. Therefore, Oncor recommends the new 345-kV switch to be constructed at the existing Drill Hole station, which is approximately one-quarter mile further from Riverton than Owl Hills Station

Proposed Project by Oncor

- Expand the existing Drill Hole capacitor station into a 345/138-kV Switch by installing a 345/138-kV Switch and two 600 MVA 345/138-kV autotransformers. The Drill Hole 345/138-kV Switch will initially be constructed with an 8-breaker, 345-kV breaker-and-a-half bus arrangement, and a 10-breaker, 138-kV breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345-kV and 3200 A for 138-kV
- Construct a loop of the existing Riverton – Owl Hills – Horseshoe Springs 138-kV double-circuit transmission line into the new Drill Hole 138-kV Switch, with normal and emergency rating of at least 614 MVA, approximately 0.1-mile
- Connect the existing Drill Hole 138-kV capacitors to the expanded Drill Hole 138-kV Switch
- Construct a new Drill Hole – Riverton 345-kV double-circuit transmission line, normal and emergency rating of at least 2988 MVA, which will require new right of way (ROW), approximately 18.0-mile
- Install five 5000 A, 345-kV circuit breakers at the existing Riverton 345-kV Switch
- Install one 5000 A, 345-kV circuit breaker at the existing Sand Lake 345-kV Switch
- Convert the existing Riverton – Sand Lake 138-kV transmission line to 345-kV operational by terminating both endpoints into the existing 345-kV Riverton and the existing 345-kV Sand Lake stations, with normal and emergency rating of at least 2988 MVA, 40.8-mile
- Construct a new Riverton – Sand Lake 138-kV transmission line on 138-kV double-circuit structures, with one circuit in place, with normal and emergency rating of at least 614 MVA, which will require new ROW, approximately 40.8-mile
- Construct a loop of the new Riverton – Sand Lake 138-kV transmission line into the existing Horsehead Draw 138-kV substation, with normal and emergency rating of at least 614 MVA, approximately 0.1-mile

Recap Study Assumptions

- Final 2023 Regional Transmission Planning (RTP) 2028 summer peak case for West and Far West (WFW) Weather Zones was used as the start case
- Transmission Updates
 - New transmission projects, listed in the Appendix A1, based on the February 2024 Transmission Project and Information Tracking (TPIT) report along with recently approved RPG projects were added to the base case
 - Topology upgrades provided by Oncor
 - A placeholder project for the Delaware Basin Stage 5 upgrade was removed from the base case
- Generation update
 - New 6.9(1) generation, listed in Appendix B1, were added based on the March 2024 Generator Interconnection Status (GIS) report
 - All generation were dispatched consistent with the 2024 RTP methodology
 - Reserve was maintained consistent with 2024 RTP methodology

Recap Study Assumptions (Continued)

- Loads update
 - Oil & Gas loads in the FW Weather Zone were updated based the S&P Global Load Forecast
 - Large Loads with Singed Interconnection Agreement (IA) were added in the FW Weather Zone

Load Type	Load (~MW)
Total S&P Global Forecasted Loads	5,312
Total Large Loads in Delaware Basin	3,361
Total Delaware Basin Loads	8,587

Status Update

- Reliability Need Analysis
 - Sensitivity Analysis
 - N-1
 - G-1+N-1
 - G-1: Permian Basin all five units, and Odessa Combined Cycle (CC) train 1
 - X-1: Riverton, Sand Lake, and Quarry Field 345/138-kV transformers
 - Planned Maintenance Outage Evaluation
- Project Evaluation
- Additional Analyses and Assessment
 - Generation Addition Sensitivity Analysis
 - Load Scaling Sensitivity Analysis
 - Subsynchronous Resonance (SSR) Assessment

Preliminary Results of Reliability Assessment – Need Analysis

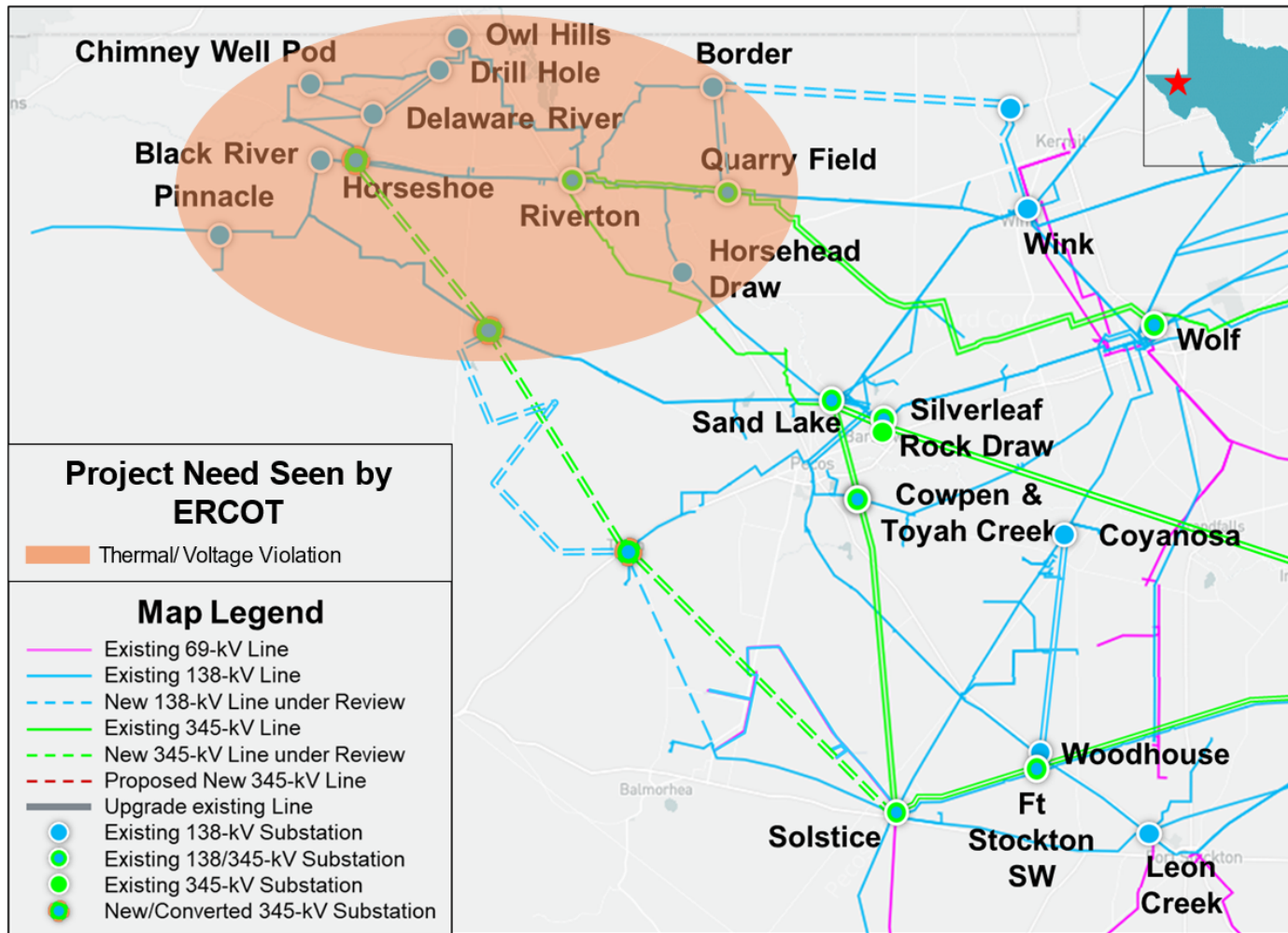
- Base Case Update
 - ERCOT conducted sensitivity analysis with and without local upgrades from 2024 Permian Basin Reliability Plan Study for the Delaware Basin area. Based on the results, local upgrades (L1, L3, and L5), listed in the Appendix A2, were added as placeholder projects to the study base case
- ERCOT conducted steady-state load flow analysis for the study base case according to the NERC TPL-001-5.1 and ERCOT Planning Criteria to identify the project need

Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
N-0 (P0)	None	None	None
N-1 (P1, P2-1, P7)	16	None	3
G-1+N-1 (P3)*	2	None	1
X-1+N-1 (P6-2)**	2	None	None
Total	20	None	4

* G-1: Odessa Ector CC Train, and Permian Basin all five units

** X-1: Riverton, Sand Lake, and Quarry Field 345/138-kV transformers

Map – Project Need Seen by ERCOT



Preliminary Results of Reliability Assessment – Preferred Upgrades

- ERCOT conducted steady-state load flow analysis for the study base case according to the NERC TPL-001-5.1 and ERCOT Planning Criteria to evaluate the preferred upgrades

Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
N-0 (P0)	None	None	None
N-1 (P1, P2-1, P7)	None	None	None
G-1+N-1 (P3)*	None	None	None
X-1+N-1 (P6-2)**	None	None	None

* G-1: Permian Basin all five units, and Odessa Combined Cycle (CC) Train 1

** X-1: Riverton, Sand Lake, and Quarry Field 345/138-kV transformers

Preliminary Results of Planned Maintenance Outage Analysis

- ERCOT conducted planned maintenance outage analysis
 - Load level in the Far West weather zone was scaled down to 96% of the summer peak load in the study base case based on ERCOT load forecast, historical load, and ratio of residential/commercial load from TSP, in order to mimic the non-summer peak load condition
 - N-2 contingencies were tested as a proxy for N-1-1, and then tested the applicable violating contingencies with system adjustments
 - The transmission elements in the area of Pecos County Improvement Project were monitored in the maintenance outage evaluation
- Planned maintenance outage analysis results

Case	Voltage Violations	Thermal Overloads	Unsolved Power Flow
Base Case	52	3	34
Project	None	None	None

Sensitivity Analyses

- Generation Addition Sensitivity Analysis
 - Per Planning Guide Section 3.1.3(4)(a), ERCOT performed a generation addition sensitivity by adding new the generation listed in Appendix B2 to the preferred option case. The additional resources were modeled following the 2024 RTP methodology.
 - ERCOT determined relevant generators do not impact the preferred option
- Load Scaling Sensitivity Analysis
 - Per Planning Guide Section 3.1.3(4)(b), ERCOT performed a load scaling sensitivity and concluded that the load scaling did not have a material impact on project need

SSR Assessment

- SSR Assessment was conducted for the preferred option per Nodal Protocol Section 3.22.1.3
- ERCOT found no adverse SSR impacts to the existing and planned generation resources at the time of this study

Next Steps and Tentative Timeline

- ERCOT is currently conducting
 - Congestion Analysis to ensure that the identified transmission upgrades do not result in new congestion within the study area
- Final cost estimate will be requested from Transmission Service Providers (TSPs)
- Deliverables
 - Status updates at future RPG meetings
 - Final recommendation in Q4 2024

Thank you!



Stakeholder comments also welcomed through:

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Appendix A1 – New Transmission Projects Added

TPIT No	Project Name	Tier	Project ISD	County
66074	Double ckt Soaptree-Holiday-AlamoSt	4	1/31/2024	Pecos
66532	Grey Well Draw – Pronghorn 138-kV Line Rebuild	4	12/23/2024	Midland
71182	Reiter 345/138 kV Switch	3	12/15/2026	Ector
71187	Reiter - Tesoro 345 kV Double-Circuit Line	2	12/15/2026	Midland
71199	Yucca to Moss 138 kV Line Project	4	5/1/2024	Ward
72863	Delaware River 138 kV Switch	4	5/15/2024	Culberson
73381	TNMP_JACKRABBIT_CUTIN_AC_4-5-2023	4	8/2/2023	Pecos
73452	TNMP_WINK_FISHHOOK_RECONDUCTOR_AC_4-5-2023	4	1/31/2024	Pecos
73476	TNMP_KERMIT_RECONDUCTOR	4	12/31/2024	Pecos
76151	Gas Pad Tap: Replace CTVT	4	4/30/2024	Reeves
76174	Origin 138 kV Interconnection	4	6/30/2025	Reeves
76212	Model Coachwhip Sub	4	5/31/2024	Ward
76232	Reconductor Mivida-Coachwhip-Fishhook 2045 ACCC	4	5/31/2026	Ward
76291	Upgraded Cedarvale–BoneSpringsTap–Fishhook	4	5/31/2026	Ward
76293	Upgraded Cedvale-MiDiva138KV	4	5/31/2026	Ward
76348	Reconductor Foxtail-PIGCreek-1926ACSS-138KV	4	5/31/2026	Pecos
76690	Add Atchison POD	4	12/24/2024	Loving
76696	Construct a new Border – Shifting Sands 138 kV Line	2	12/15/2026	Loving

Appendix A1 – New Transmission Projects Added (cont.)

TPIT No	Project Name	Tier	Project ISD	County
76719	Establish Bull Moose 138 kV Switch	4	12/15/2024	Loving
77146	Reconductor WNK-AAT-MDT-FSH	4	1/31/2024	Winkler
77320	Add CapBANK in COYANOSA	4	6/1/2026	Ward
78044	ROCK DRAW 345 kV Switch	3	12/30/2026	Ward
78046	TOYAH CREEK 345 kV Switch	3	12/30/2026	Ward
23RPG013	Silverleaf and Cowpen 345/138-kV Stations Project	1	5/31/2025	Ward, Reeves
23RPG023	Pecos County Transmission Improvement Project	1	6/1/2027	Pecos
23RPG027	Bakersfield Dynamic Reactive Substation Upgrade	1	8/31/2026	Pecos
24RPG002	Rockhound 345/138-kV Switch and Grey Well Draw to Buffalo 2nd 138-kV Circuit Project	3	12/24/2024	Martin

Appendix A2 – Local Upgrades from 2024 Permian Basin Reliability Plan Study Added

Project No	Upgrade Element
L1	Add Quarry Field – Border 138-kV second circuit
L1	Add Wink – Shifting Sands 138-kV second circuit
L1	Connect new load bus 900004 to Border and new load bus 900066 to Shifting Sands to form a 138-kV double-circuit loop
L1	Add Riverton – Border 138-kV second circuit
L3	Connect new load buses to 11610 and Faulkner and form a 138-kV double-circuit loop: 11610 – 900005 – 900111 – 900023 – 900012 – 900021 – 900038 – 38124
L5	Establish a new Culberson 345/138-kV substation at the existing Culberson Switch and install two new 345/138-kV transformers
L5	Establish a new ONC900005_TAP 345/138-kV substation and install two new 345/138-kV transformers
L5	Establish a new Faulkner 345/138-kV substation at Faulkner station and install two new 345/138-kV transformers
L5	Add a new Drill Hole – Culberson 345-kV double-circuit line
L5	Add a new Culberson – 900005Tap 345-kV double-circuit line
L5	Add a new 900005Tap – Faulkner 345-kV double-circuit line
L5	Add a new Solstice – Faulkner 345-kV double-circuit line

Appendix B1 – New Generation Added

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
19INR0203	Angelo Solar	SOL	8/1/2024	195.4	Tom Green
21INR0424	Tierra Bonita Solar	SOL	9/26/2024	306.9	Pecos
22INR0502	Shamrock Wind SLF	WIN	4/19/2024	223.9	Crockett
23INR0219	Dogfish BESS	OTH	4/16/2025	77.4	Pecos
23INR0387	Pioneer DJ Wind	WIN	9/15/2024	140.3	Midland
23INR0418	Angelo Storage	OTH	8/10/2024	103.0	Tom Green
23INR0470	BoCo BESS	OTH	7/17/2024	155.5	Borden
24INR0273	Al Pastor BESS	OTH	8/30/2024	103.1	Dawson

Appendix B2 – List of Units for Generation Addition Sensitivity Analysis

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
16INR0104	Big Sampson Wind	WIN	10/4/2025	265.4	Crockett
18INR0073	Sweetwater 1 repower	WIN	9/30/2024	3.0	Nolan
20INR0242	Anson Solar Center, Phase II	SOL	12/1/2025	200.9	Jones
21INR0021	Green Holly Solar	SOL	5/30/2026	413.6	Dawson
21INR0022	Red Holly Solar	SOL	5/30/2026	260.0	Dawson
21INR0029	Green Holly Storage	OTH	5/30/2026	50.0	Dawson
21INR0031	Indigo Solar	SOL	8/17/2026	150.0	Fisher
21INR0033	Red Holly Storage	OTH	5/30/2026	50.0	Dawson
21INR0268	Greyhound Solar	SOL	3/31/2026	587.8	Ector
21INR0334	Nightfall Solar SLF	SOL	6/30/2026	181.2	Uvalde
22INR0274	Crowded Star Solar II	SOL	1/26/2026	190.2	Jones
22INR0457	Anson BAT	OTH	12/31/2025	156.9	Jones
23INR0086	Hanson Solar	SOL	4/17/2027	400.6	Coleman
23INR0287	Avila BESS	OTH	5/1/2025	164.3	Pecos
23INR0300	Greater Bryant G Solar	SOL	12/15/2025	17.7	Midland
23INR0340	Larkspur Energy Storage	OTH	5/5/2026	307.5	Upton

Appendix B2 – List of Units for Generation Addition Sensitivity Analysis (cont.)

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
23INR0364	Tierra Seca BESS	OTH	10/01/2025	102.7	Val Verde
23INR0372	Cross Trails Storage	OTH	4/25/2025	58.3	Scurry
23INR0401	Headcamp BESS	OTH	6/16/2025	152.9	Pecos
23INR0501	Soda Lake BESS 1	OTH	6/17/2025	203.9	Crane
24INR0057	Hanson Storage	OTH	4/17/2027	101.4	Coleman
24INR0275	Picadillo BESS	OTH	7/6/2026	100.8	Martin
24INR0421	Swift Air Solar	SOL	3/31/2025	146.5	Ector
24INR0514	Rogers Draw BESS	OTH	5/10/2026	148.6	Gillespie
24INR0627	Champion Wind Repower	WIN	5/9/2025	0.3	Nolan
25INR0208	Iron Belt Energy Storage	OTH	7/31/2026	401.9	Borden
26INR0034	Bracero Pecan Storage	OTH	6/1/2026	232.0	Reeves