Oncor and LCRA TSC Muscovy and Voss Lake 345/138-kV Project – ERCOT Independent Review Scope

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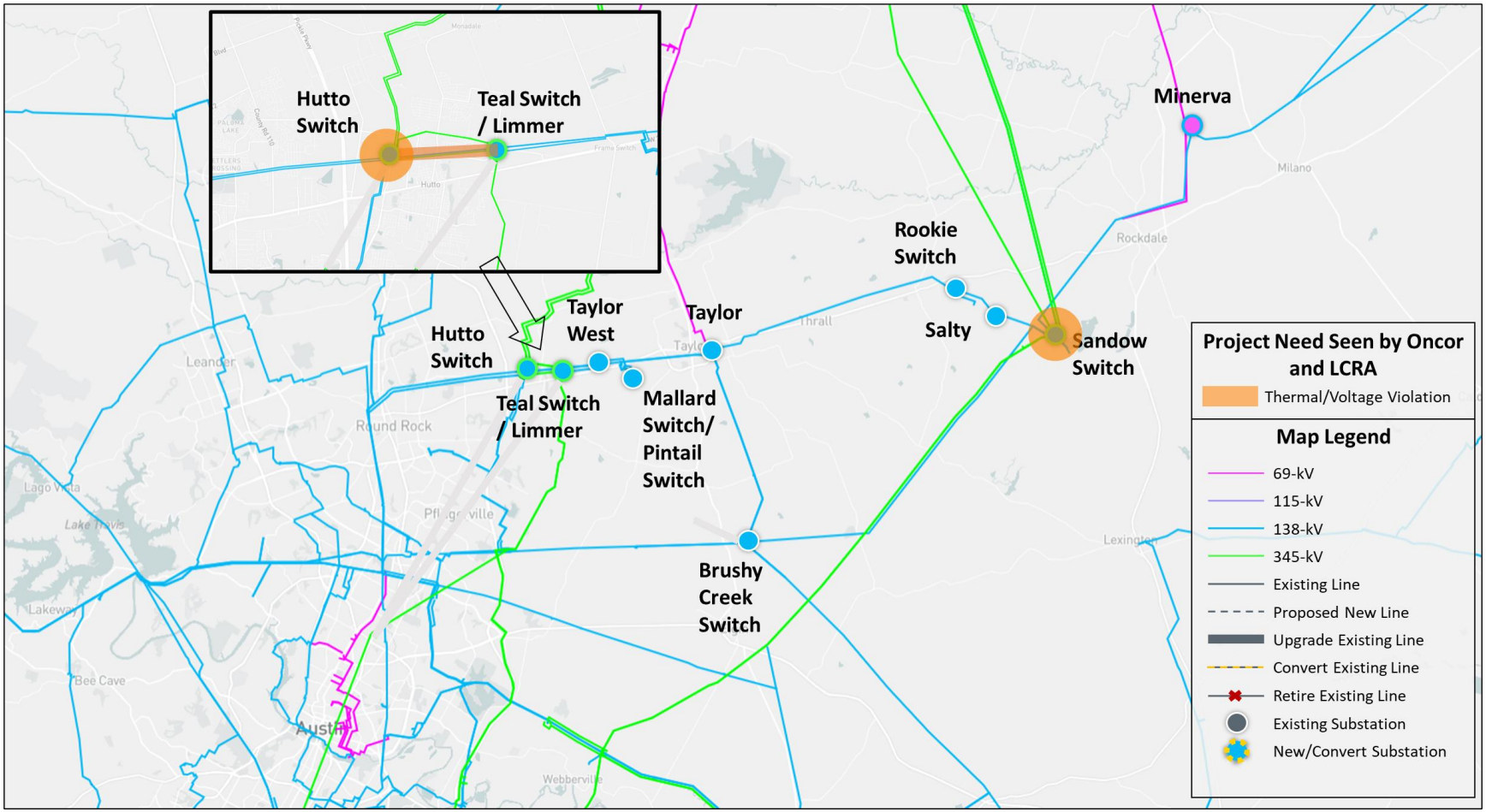
RPG Meeting
May 20, 2025

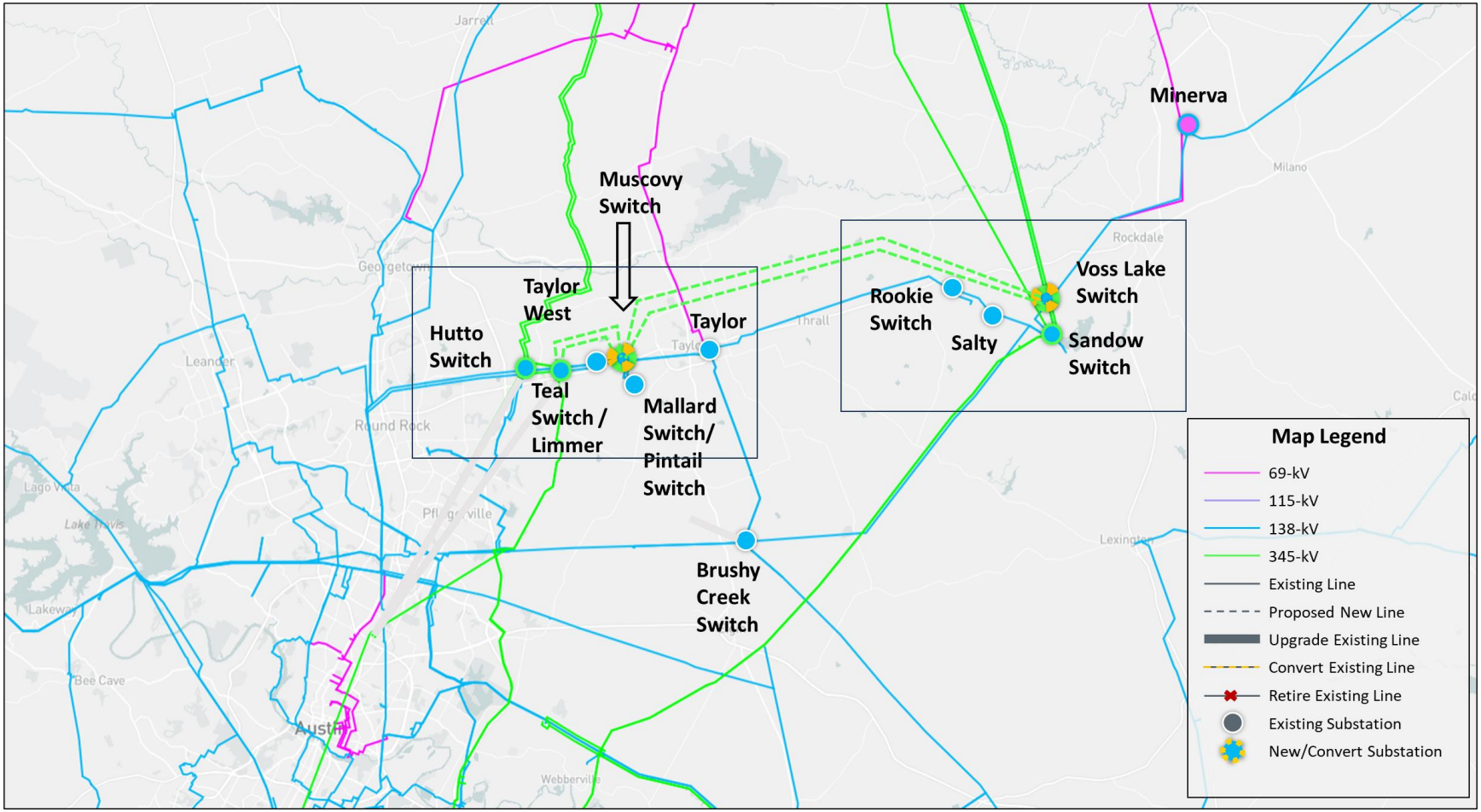
Introduction

- Oncor and LCRA TSC submitted the Muscovy and Voss Lake Project for Regional Planning Group (RPG) review in April 2025.
  - This Tier 1 project is estimated to cost $381.83 million and will require a Certificate of Convenience and Necessity (CCN)
  - Estimated in-service date (ISD) is December 2028
  - To address reliability violations seen by Oncor and LCRA TSC
  - Observed similar violations in 2024 RTP (2024-SC28 and 2024-SC29)
- This project is currently under ERCOT Independent Review (EIR)

Study Area Map with project need as seen by Oncor and LCRA



Project Proposed by Oncor and LCRA TSC



Project Proposed by Oncor and LCRA

- Establish the new Muscovy 345/138-kV Switch by installing ten 345-kV, 5000 A and twelve 138-kV, 3200 A breakers in a breaker-and-a-half bus arrangement, approximately 3.3 miles east of the co-located 345-kV Limmer Substation (LCRA TSC) and 138-kV Teal Switch (Oncor);
  - Install two 345/138-kV autotransformers with normal rating of 700 MVA and emergency rating of 750 MVA
  - Install three 36.8 MVar capacitor banks
  - Ensure all line terminal and associated equipment elements are rated to meet or exceed 5000 A for 345-kV and 3200 A for 138-kV
- Construct a new 345-kV double-circuit transmission line which will require a CCN from Limmer Substation (LCRA TSC) to Muscovy Switch with a normal and emergency ratings of at least 2987 MVA or greater, approximately 4-mile;
- Construct a loop of the existing Teal Switch - Pintail Switch 138-kV double-circuit transmission line with a normal and emergency ratings of at least 614 MVA into the new Muscovy 138 kV Switch, approximately 0.1-mile;

Project Proposed by Oncor and LCRA

- Establish the new Voss Lake 345/138-kV Switch by installing ten 345-kV, 5000 A and nine 138-kV, 3200 A breakers in a breaker-and-a-half bus arrangement, approximately 1.9 miles north of Sandow 345/138-kV Switch;
  - Install one 345/138-kV autotransformer with normal ratings of at least 700 MVA and emergency ratings of atleast 750 MVA
  - Ensure all line terminal and associated equipment elements are rated to meet or exceed 5000 A for 345-kV and 3200 A for 138-kV
- Construct a loop of the existing Sandow Switch to Bell County East Switch 345-kV double-circuit transmission line into the Voss Lake 345-kV Switch with a normal and emergency ratings of at least 2987 MVA or greater, approximately 0.1-mile;
- Construct a loop of the existing Sandow Switch to Temple Switch 138-kV transmission line into the Voss Lake 138-kV Switch with a normal and emergency ratings of at least 614 MVA or greater, approximately 0.1-mile;
- Construct a loop of the existing Sandow Switch to Minerva Switch 138-kV line into the Voss Lake 138-kV Switch with a normal and emergency ratings of at least 614 MVA or greater, approximately 0.1-mile;

Project Proposed by Oncor and LCRA

- Construct a new 345-kV transmission line which will require a certificate of convenience and necessity (CCN) from Voss Lake Switch to Walleye Creek Switch with a normal and emergency ratings of at least 2987 MVA or greater on double-circuit structures with one circuit installed initially, approximately 2-mile; and
- Construct a new, 345-kV double-circuit line which will require a CCN from Muscovy Switch to Voss Lake Switch with a normal and emergency ratings of at least 2987 MVA or greater, approximately 25-mile.
- Install terminal equipment in existing bays at Limmer Substation to connect both circuits of the new 345-kV double-circuit transmission lines to Muscovy Switch, including two circuit breakers, two switches, six coupling capacitor voltage transformers (CCVTs), and six surge arrestors, as well as two A-frame structures. All associated terminal equipment will have a minimum rating of 5000 A.

Study Assumptions Base Case

- Study Region
  - Williamson and Milam county in South Central Weather Zone, focusing on the transmission elements near the Bastrop, Bell, Burleson, Burnet, Falls, Lee, Robertson and Travis Counties.
  - Monitor surrounding counties that are electrically close to the area
- Steady-State Base Case
  - Final 2024 Regional Transmission Planning (RTP) 2029 summer peak case was used as a seed case, posted in Market Information System (MIS), will be updated to construct the summer peak load study base case
    - Case: 2024RTP_2029_SUM_12202024
    - Link: https://mis.ercot.com/secure/data-products/grid/regional-planning

Study Assumptions – Transmission

- Based on the February 2025 Transmission Project and Information Tracking (TPIT) posted on MIS, projects with in-service dates before December 1, 2028, within the study area will be added to the study base case if not already modeled in the case
  - TPIT Link: https://www.ercot.com/gridinfo/planning
  - See Appendix A for a list of transmission projects added
- Transmission projects identified in the 2024 RTP as placeholder projects within the study area will be removed to develop the study base case
  - See Appendix B for a list of placeholder projects removed

Study Assumptions – Generation

- New generation that met Planning Guide Section 6.9(1) condition with Commercial Operation Date (COD) before the end of December 1, 2028, in the study area at the time of the study, but not already modeled in the RTP cases, will be added to the case based on the April 2025 Generator Interconnection Status (GIS) report posted in MIS in May 2025
  - GIS Link: https://www.ercot.com/gridinfo/resource
  - See Appendix C for a list of generation projects added
- Generation will be dispatched consistent with the 2024 RTP methodology
- All recent retired/indefinitely mothballed units will be reviewed and opened (turned off), if not already reflected in the 2024 RTP final case

Study Assumptions – Load & Reserve

- Load in study area
  - New loads in the study area will be added to the study base case
- Reserve
  - Load outside of study Weather Zone(s) will be adjusted to maintain the reserve consistent with the 2024 RTP

Contingencies & Criteria

- Contingencies for Study Region
  - NERC TPL-001-5.1 and ERCOT Planning Criteria
  - Link: http://www.ercot.com/mktrules/guides/planning/current)
    - P0 (System Intact)
    - P1, P2-1, P7 (N-1 conditions)
    - P2-2, P2-3, P4, and P5 (345-kV only)
    - P3: G-1+N-1 (G-1: Bastrop Energy Center, Giga Energy Storage and East Backland Solar)
    - P6: X-1+N-1 (X-1: Sandow, Hutto, Teal, Austrop, Dunlap, Gilleland Creek 345/138-kV transformers)
- Criteria
  - Monitor all 69-kV and above busses, transmission lines, and transformers in the study region (excluding generator step-up transformers)
    - Thermal
      - Use Rate A for normal conditions
      - Use Rate B for emergency conditions
    - Voltage
      - Voltages exceeding their pre-contingency and post-contingency limits
      - Voltage deviations exceeding 8% on non-radial load buses

Study Procedure

- Need Analysis
  - The reliability analysis will be performed to identify the need to serve Williamson, Milam counties and surrounding area load using the study base case
- Project Evaluation
  - Project alternatives will be tested to satisfy the NERC and ERCOT reliability requirements
  - ERCOT may also perform the following studies:
    - Planned maintenance outage
    - Long-Term Load-Serving Capability Assessment
  - The TSP will provide the Cost Estimate and Feasibility Assessment
- Additional analyses may be performed on the preferred option
  - Congestion Analysis to ensure that the identified transmission upgrades do not result in new congestion within the study area
  - Generation Addition and Load Scaling Sensitivity Analyses
    - Planning Guide Section 3.1.3(4)
  - Subsynchronous Resonance (SSR) Assessment
    - Nodal Protocol Section 3.22.1.3(2)

Deliverables

- Tentative Timelines
  - Status updates at future RPG meetings
  - Final recommendation – Q3 2025

Thank you!

Stakeholder comments also welcomed through:

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Appendix A – Transmission Projects

- List of transmission projects added to study base case

RPG/TPIT No	Project Name	Tier	Project ISD	TSP
24RPG001	Temple Area Project	Tier 1	Dec-28	Oncor
24RPG013	FPP Yard 2 to Lytton Springs Transmission Line Overhaul Project	Tier 4	May-26	LCRA TSC, AEN
24RPG014	Sim Gideon to Cedar Hill Transmission Line Upgrade Project	Tier 3	May-27	LCRA TSC
24RPG018	Salado Switch to Hutto Switch 138-kV Line Project	Tier 3	May-27	Oncor
72588A	Trading Post to Cedar Valley Storm Hardening	Tier 4	May-25	PEC
86319	AEN_Garfield_HiCross_CKT_963_Reconductor	Tier 4	Jun-25	AEN
86325	AEN_McNeil_Magnesium_Plant_Ckt_977_RECONDUCTOR	Tier 4	Jun-25	AEN
87758	Badger 345 kV Switch	Tier 4	Dec-25	ONCOR
87395	Caldwell Substation Addition	Tier 4	Mar-26	LCRATSC
86323	AEN_MagnesiumPlant_Northland_Ckt_979_RECONDUCTOR	Tier 4	Jun-26	AEN
86912	BEPC_TPIT_86912_Gabriel_Schwertner	Tier 4	Mar-27	BEPC
87673	Rebuild the Salado - Bell County 138 kV Line	Tier 1	May-27	ONCOR
87770	Establish a 110.4 MVAR Capacitor Bank at Midnight 138 kV Substation	Tier 4	May-27	ONCOR
87768	Establish a 110.4 MVAR Capacitor Bank at Pintail 138 kV Switch	Tier 4	May-27	ONCOR
87677	Rebuild the Fryers Creek - Temple 138 kV Line	Tier 1	May-27	ONCOR
87675	Rebuild the Bell County - Fryers Creek 138 kV Line	Tier 1	May-27	ONCOR
85973	Georgetown - Rivery Transmission Line Upgrade	Tier 4	May-26	LCRATSC

Appendix A – Transmission Projects

- List of transmission projects added to study base case

RPG/TPIT No	Project Name	Tier	Project ISD	TSP
80546C	Upgrade the Hutto & Round Rock - Salado 138 kV Line	Tier 3	May-26	ONCOR
80546E	Upgrade the Hutto & Round Rock - Salado 138 kV Line	Tier 3	May-27	ONCOR
86331	AEN_Wheless_Mueller_Ckt_1016_Reconductor	Tier 4	Jun-27	AEN
86321	AEN_Lakeshore_Northland_Ckt_916_Reconductor	Tier 4	Jun-27	AEN
86327	AEN_New_138kV_Southshore_Substation_Addition	Tier 4	Sep-27	AEN
86317	AEN_DP_OnionCreek_Ckt_924_Reconductor	Tier 4	Sep-27	AEN
86333	AEN_OnionCreek_StoneyRidge_Ckt_1026_Reconductor	Tier 4	Sep-27	AEN
87367	BEPC_TPIT_87367_TempleAreaImprovements	Tier 1	Oct-27	BEPC
87699	Belton - Killeen 138 kV Line via Belton Southwest	Tier 1	Dec-27	ONCOR
80546D	Upgrade the Hutto & Round Rock - Salado 138 kV Line	Tier 3	Dec-27	ONCOR
87707	Salado 345/138 kV Autotransformer #1 and #2	Tier 1	Dec-27	ONCOR
87701	Establish the Watercrest 138 kV Switch	Tier 1	May-28	ONCOR
86838	AEN_JustinLane_KoenigLane_Ckt__conversion_to_138kV	Tier 4	Jun-28	AEN
86315	AEN_Barton_Vega_Ckt_928_Reconductor	Tier 4	Jun-28	AEN
72588B	Trading Post to Cedar Valley Storm Hardening	Tier 4	Sep-24	PEC

Appendix B – Transmission Projects

- List of transmission projects removed from the study base case

TPIT No	Project Name	County
2022-SC7	Decker (9188) 138-kV Bus Tie Breaker Upgrade	Travis
2023-SC3	Dessau (9193) to McNeil AEN (9076) 138-kV Circuit 2 Upgrade	Travis
2023-SC15	Sim Gideon Area 138-kV Line Upgrades	Bastrop, Fayette, Williamson
2023-SC17	Georgetown Area 138-kV Line Upgrades	Williamson
2024-SC2	Trading Post (70505) 138-kV Cap Bank Addition	Travis
2024-SC8	Milano (64) to Minerva (3683) and Cannon (3707) 138-kV Line Upgrades	Milam
2024-SC11	Vega (9285) to Barton (9158) 138-kV Line Upgrade	Travis
2024-SC14	Elroy (7209) 138-kV Cap Bank Addition	Travis
2024-SC16	Limmer (7341) 345-kV Cap Bank Addition	Williamson
2024-SC17	SLR AMLC (3740) 138-kV Cap Bank Addition	Milam
2024-SC18	Lytton (9074) to Fayette Plant (7055) to Winchester (9042) 345-kV Upgrades	Caldwell, Bastrop, Fayette
2024-SC19	Hillje (44200) to Zorn (7042) 345-kV Line Upgrades	Wharton, Fayette, Bastrop, Caldwell, Guadalupe
2024-SC20	Lytton Area 138-kV Line Upgrades	Caldwell, Travis, Bastrop

Appendix B – Transmission Projects

- List of transmission projects removed from the study base case

TPIT No	Project Name	County
2024-SC21	Austrop (9328) to Dunlap (9045) 138-kV Double Circuit Line Addition	Travis
2024-SC22	Austrop 345/138-kV Transformer Addition	Travis
2024-SC23	Dunlap 345/138-kV Transformer Addition	Travis
2024-SC24	Gillelend Creek (7340) 345-kV Cap Bank Addition	Travis
2024-SC27	Lytton Springs (9074) to Garfield (7048) to Austrop (7040) 345-kV Line Upgrades	Caldwell, Bastrop, Travis
2024-SC28	Voss Lake 345/138-kV Substation Expansion and Bell County East (3687) to Voss Lake (3751) 345-kV Double Circuit Line Upgrade	Milam
2024-SC29	Muscovy 345/138-kV Substation Addition and Salado (3699) to Muscovy (3700) to Voss Lake (3751) 345-kV Double Circuit Addition	Bell, Williamson, Milam
2024-SC32	McNeil AEN (9076) 138-kV Bus Tie Breaker Upgrade	Travis
2024-E4	Bryan Area Project	Brazos, Burleson, Robertson
2024-NC12	Knob Creek Switch (3413) to Salado Switch (3699) 345-kV Line Upgrade	Bell
2024-NC23	Bale (3711) to St Johns Switch (3384) to Lake Creek SES (3409) 345-kV Line Upgrades	Falls, McLennan
2024-NC24	Lake Creek SES (3410) to Riesel Switch (3702) 138-kV Line Upgrade	Falls, McLennan
2024-NC37	Bell East (3687) to Salado (3699) 345-kV Line Addition	Bell, Williamson

Appendix B – Transmission Projects

- List of transmission projects removed from the study base case

TPIT No	Project Name	County
2024-NC43	Temple Switch (3415) to Belton (3610) 138-kV Line Upgrades	Bell
2024-NC60	Bell County East Switch (3687) to Littlepond (3377) , and Bell County East Switch (3687) to Brangus Switch (3705) 345-kV Line Upgrades	Milam, Bell

Appendix C – New Generation Projects to Add

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
21INR0517	Tidwell Prairie Storage 1	OTH	07/31/2025	204.00	Robertson
23INR0079	Chillingham Storage	OTH	07/15/2025	153.93	Bell
23INR0118	Blevins Solar	SOL	10/30/2025	271.58	Falls
23INR0119	Blevins Storage	OTH	07/28/2025	181.33	Falls
23INR0235	Hoyte Solar	SOL	12/15/2026	206.75	Milam
23INR0249	Limewood Solar	SOL	12/31/2025	204.60	Bell
23INR0344	Hermes Solar	SOL	09/30/2025	100.36	Bell
24INR0031	Stoneridge Solar	SOL	04/30/2025	201.60	Milam
24INR0166	Stillhouse Solar	SOL	09/02/2025	210.80	Bell
24INR0169	Yaupon Storage SLF	OTH	07/01/2028	102.04	Milam
24INR0365	Hermes Storage	OTH	09/30/2025	100.42	Bell
25INR0389	Stoneridge BESS	OTH	09/01/2025	101.90	Milam