



TNMP – Pecos County Transmission Improvement Project ERCOT Independent Review Status Update

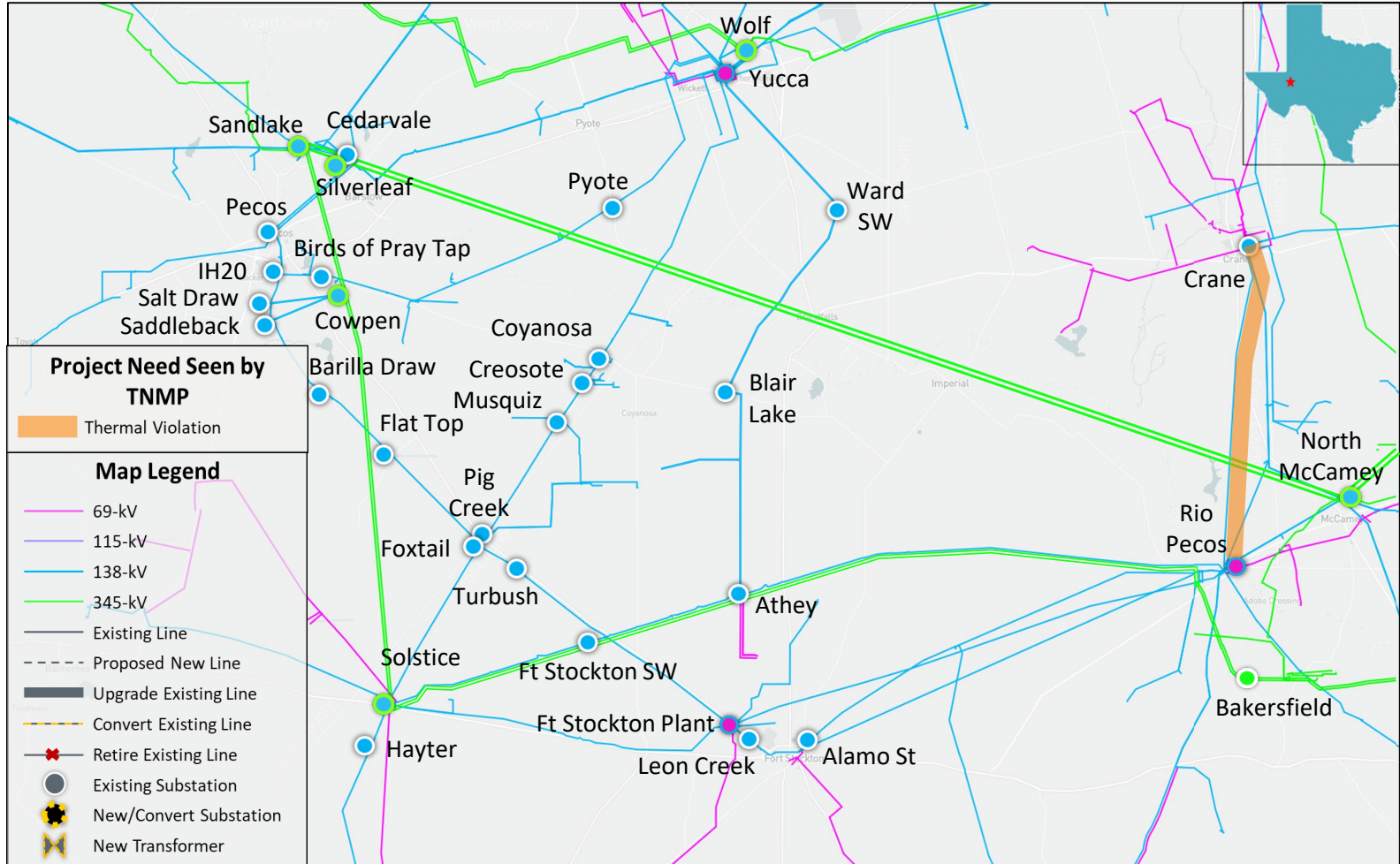
Tanzila Ahmed

RPG meeting
November 14, 2023

Recap

- TNMP submitted the Pecos County Transmission Improvement Project for Regional Planning Group (RPG) review in August 2023
 - This Tier 1 project is estimated to cost \$108.0 million and will require Certificate of Convenience and Necessity (CCN) filings
 - Estimated in-service date is May 2026
 - Addresses both thermal overloads and voltage violations under maintenance outage conditions due to new load additions in the Pecos County in the Far West weather zone
 - TNMP has expressed need for “critical status designation”
- TNMP provided an overview presentation and ERCOT presented the study scope at the October RPG Meeting
 - <https://www.ercot.com/calendar/10182023-RPG-Meeting>

Recap: Study Area Map with Project Need as Seen by TNMP



The reliability need includes the planned maintenance outage condition

Recap: Study Assumption

- Final 2022 Regional Transmission Planning (RTP) 2027 summer peak case for West and Far West (WFW) weather zones was used as the start case
- Transmission updates
 - ERCOT’s preferred option for TNMP Silverleaf and Cowpen 345/138-kV Substation Project was added as placeholder
 - Newly added the Tier 4 TPIT # 76232 of upgrading the existing Cedarvale – MiDiva 138-kV line with in-service date of summer 2026
 - Newly added the Tier 4 TPIT # 76291 of upgrading the existing Cedarvale – Bone Springs Tap - Fishhook 138-kV lines with in-service date of summer 2026
 - Newly added the Tier 4 TPIT # 76293 of reconductor the existing MiDiva – Coachwhip - Fishhook 138-kV line with in-service date of summer 2026
- Generation updates
- Load updates
 - Loads in the Far West weather zone will be reviewed and updated to reflect the load level in the 2023 RTP

	Load (MW)
Far West Total	14,349
Far West Large Flexible Load (LFL)	3,959

Analysis Performed

- Reliability Assessment – Need Analysis
 - N-1, G-1+N-1, and X-1+N-1
 - Planned maintenance outage analysis (N-2 as a proxy for N-1-1)
- Initial Options Identified

Preliminary Results of Reliability Assessment – Need Analysis

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

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
Total	None	None	None

* G-1: Permian Basin all five units, and Riggins Solar

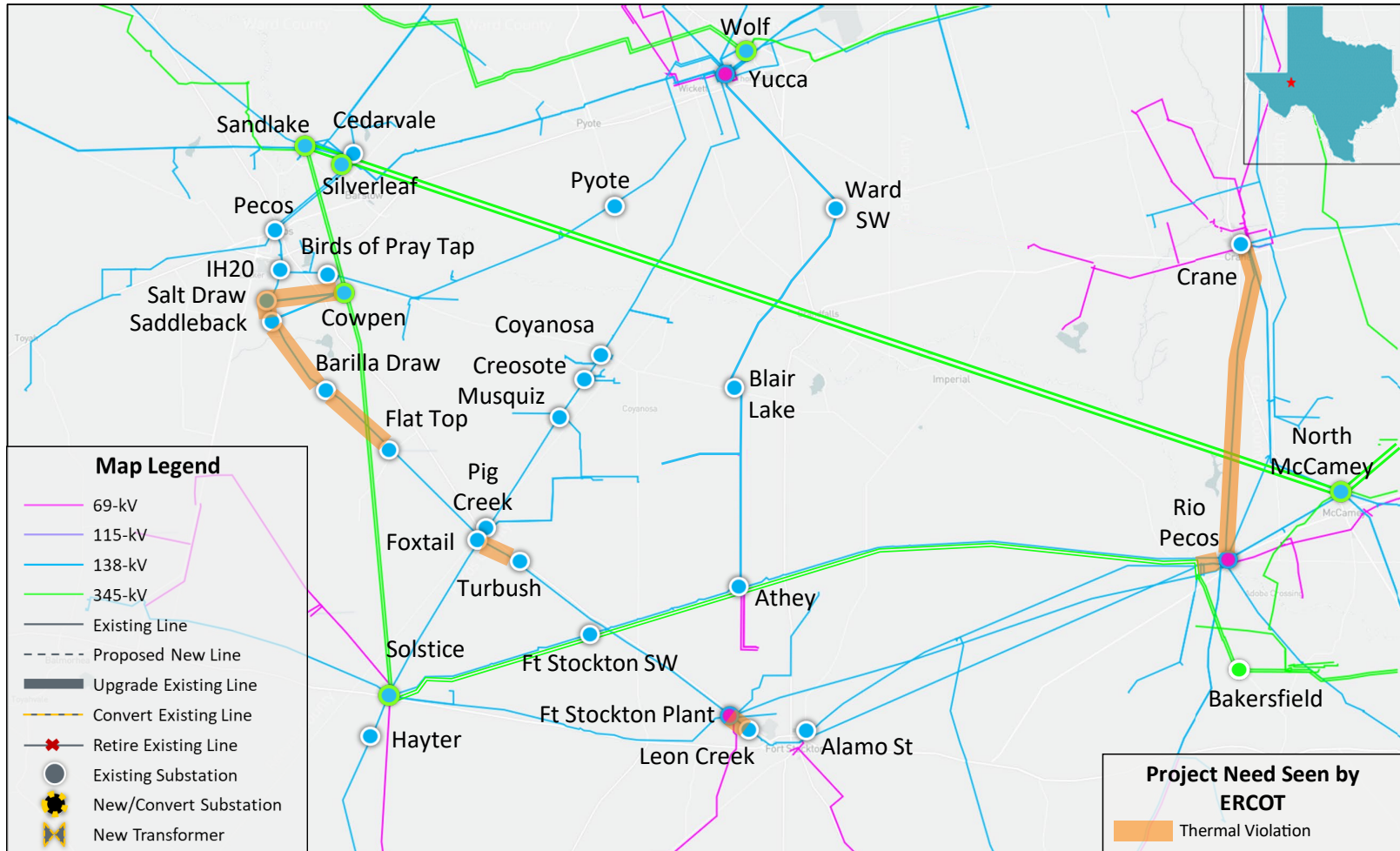
** X-1: Cowpen, North McCamey, and Solstice 345/138-kV transformers

Preliminary Results of Planned Maintenance Outage Analysis – Need Analysis

- ERCOT conducted planned maintenance outage analysis on the base case to identify project need
 - 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

Voltage Violations	Thermal Overloads	Unsolved Power Flow
37	52.21 miles of 138-kV line	6

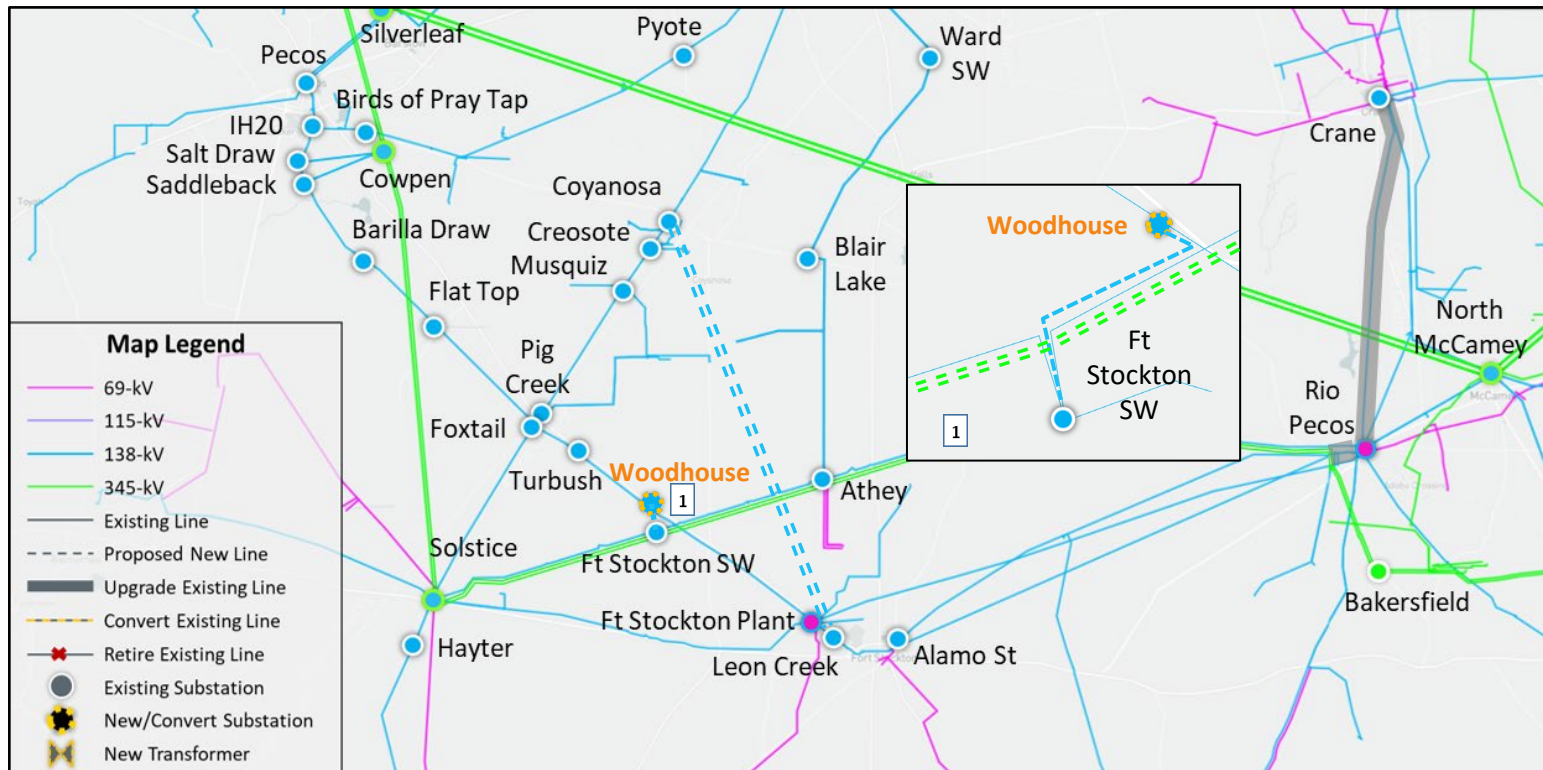
Study Area Map with Project Need as Seen by ERCOT under Planned Maintenance Outage Scenarios



Details of Reliability (N-2) Assessment – Need Analysis

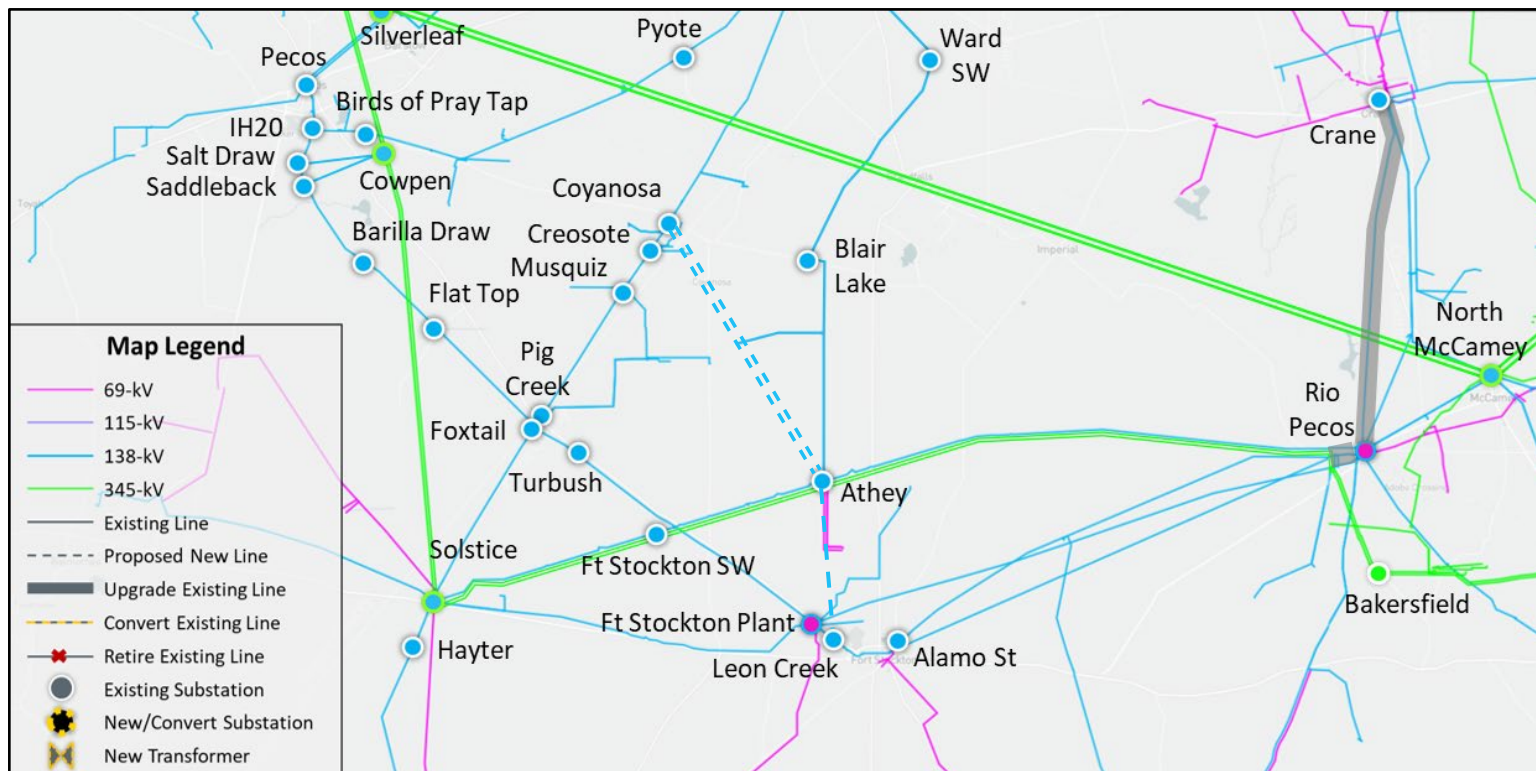
Overloaded Element	Worst Contingency (N-1-1)	Length (miles)	Worst Overload (%)
Rio Pecos - Girvin 138-kV Line Ckt 2	Rio Pecos - Girvin 138-kV Line + Rio Pecos - Lynx 138-kV Line	0.6	163.55
Cowpen - Saltdraw 138-kV Line	Solstice – Pig Creek 138-kV Line + Gaspad Tap - Other_134 138-kV Line	9.97	134.73
Foxtail - Tarbush 138-kV Line	Tombstone – Lynx 138-kV Line + P7 Soaptree – Holiday 138-kV DCKT Lines	2.3	124.65
Saltdraw - Saddleback 138-kV Line	Solstice – Pig Creek 138-kV Line + Gaspad Tap - Other_134 138-kV Line	0.5	123.9
Saddleback - Barilla Draw 138-kV Line	Riverview - Other_134 138-kV Line + Solstice – Pig Creek 138-kV Line	6.8	117.9
Rio Pecos - Crane 138-kV Line	P7 Rio Pecos – Soda Lake & Rio Pecos – Horsecar 138-kV Lines + P7 Rio Pecos – Oxtail SW – Spud & Rio Pecos – Spud 138-kV Lines	23.65	117.19
Ft. Stockton Plant - Leon Creek 138-kV Line	P7 Alamo St-Holiday 138-kV DCKT Lines + Tarbush – Foxtail 138-kV Line	0.12	115.52
Barilla Draw - Flattop 138-kV Line	Riverview - Other_134 138-kV Line + Solstice – Pig Creek 138-kV Line	5.8	107.47
Girvin - Soaptree 138-kV Line	Rio Pecos – Lynx 138-kV Line + Tarbush – Foxtail 138-kV Line	1.94	104.14
Rio Pecos - Girvin 138-kV Line Ckt 1	Rio Pecos - Girvin 138-kV Line Ckt 2 + Rio Pecos - Lynx 138-kV Line	0.53	101.61

Option 1 - Proposed Project by TNMP



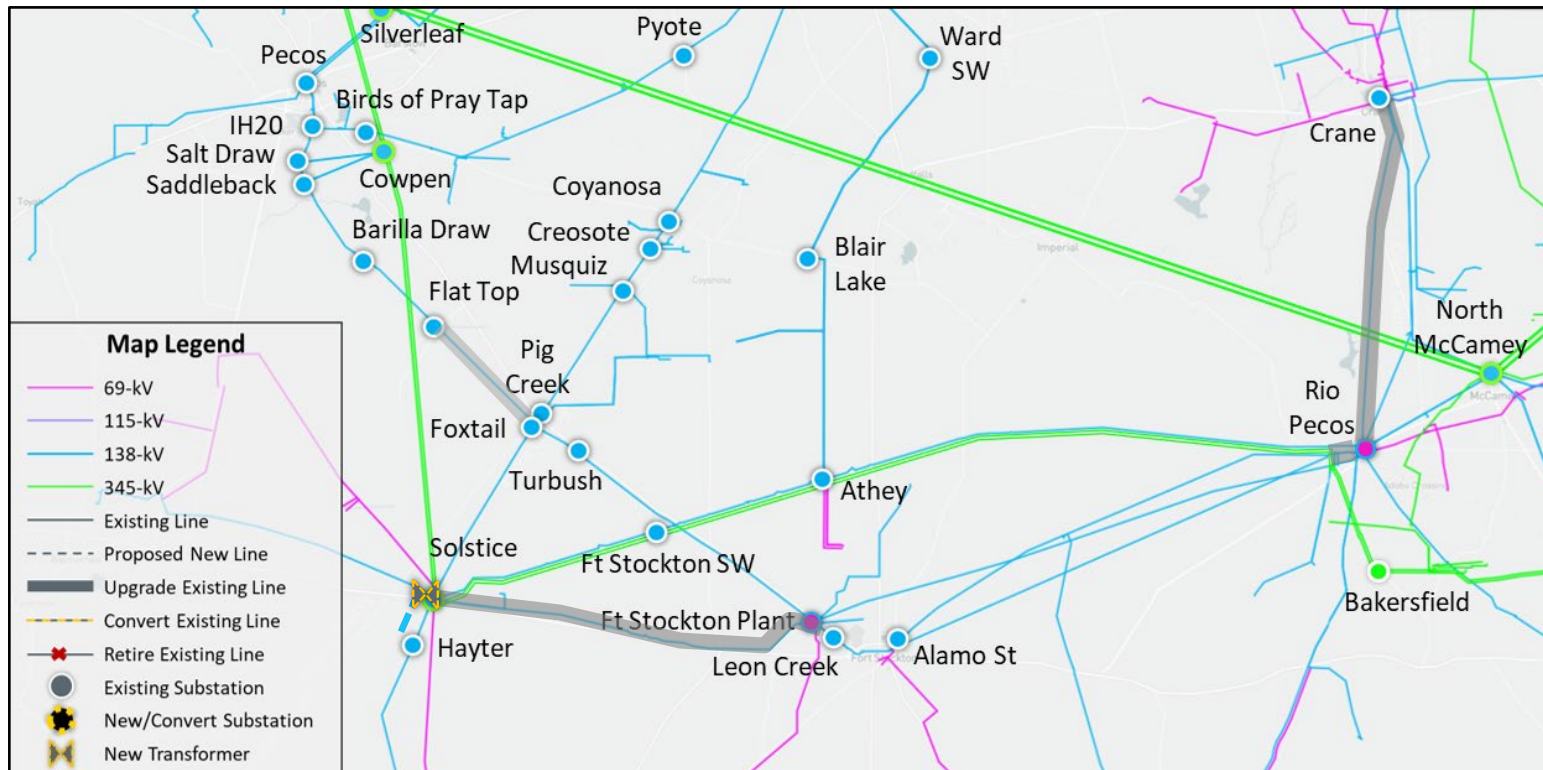
- Construct a new ~28.5-mile Coyanosa – Leon Creek 138-kV double-circuit lines with rating of 717 MVA or above
- Construct a new Woodhouse 138-kV station by cutting into Tarbush – Leon Creek 138-kV line near Ft. Stockton SW
- Create a new ~0.1-mile Woodhouse – Ft. Stockton SW 138-kV tie-line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above

Option 2



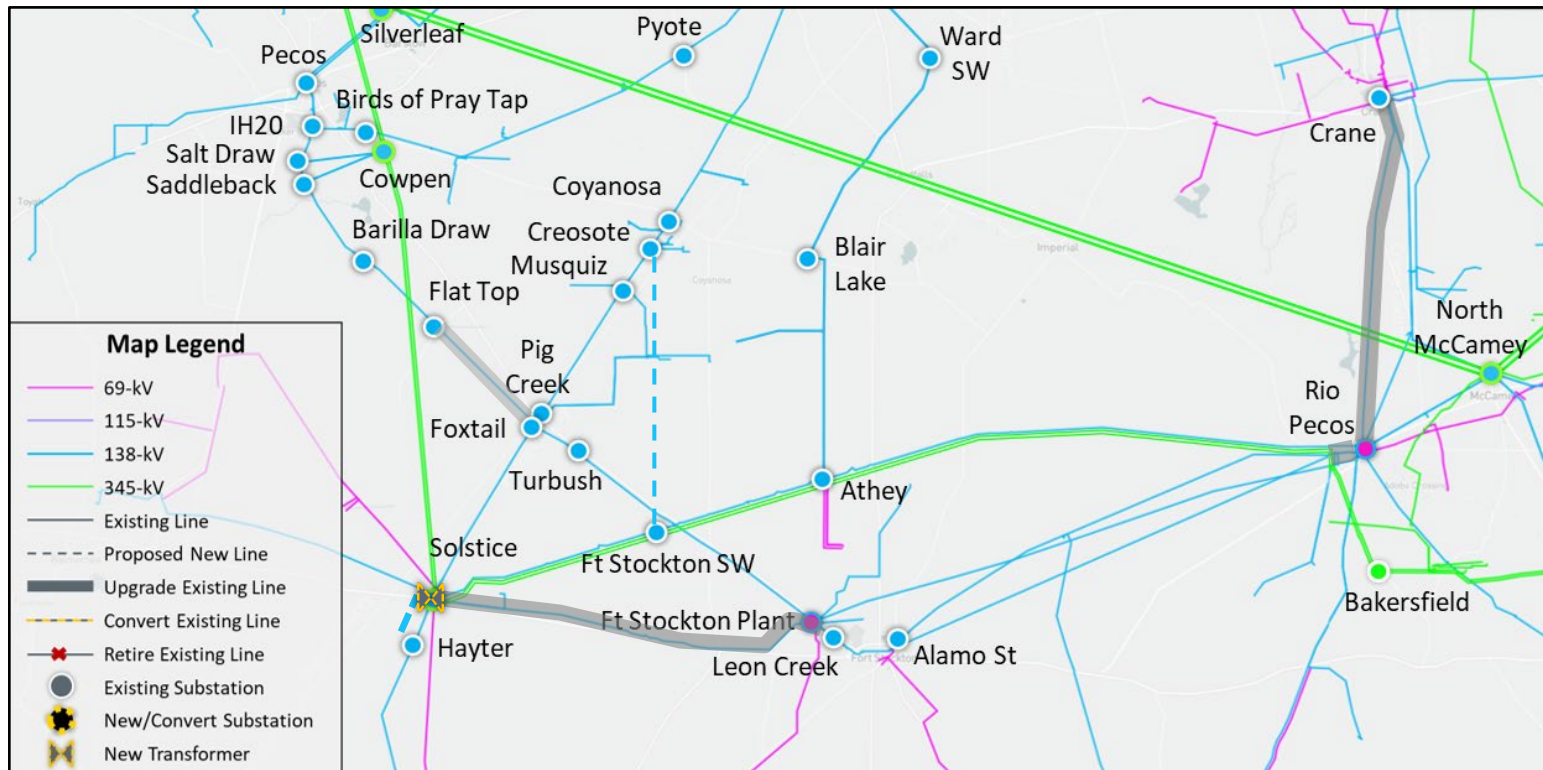
- Construct a new ~20-mile Coyanosa – Athey 138-kV double-circuit lines with rating of 717 MVA or above
- Construct a new ~10-mile Athey – Leon Creek 138-kV line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above

Option 3



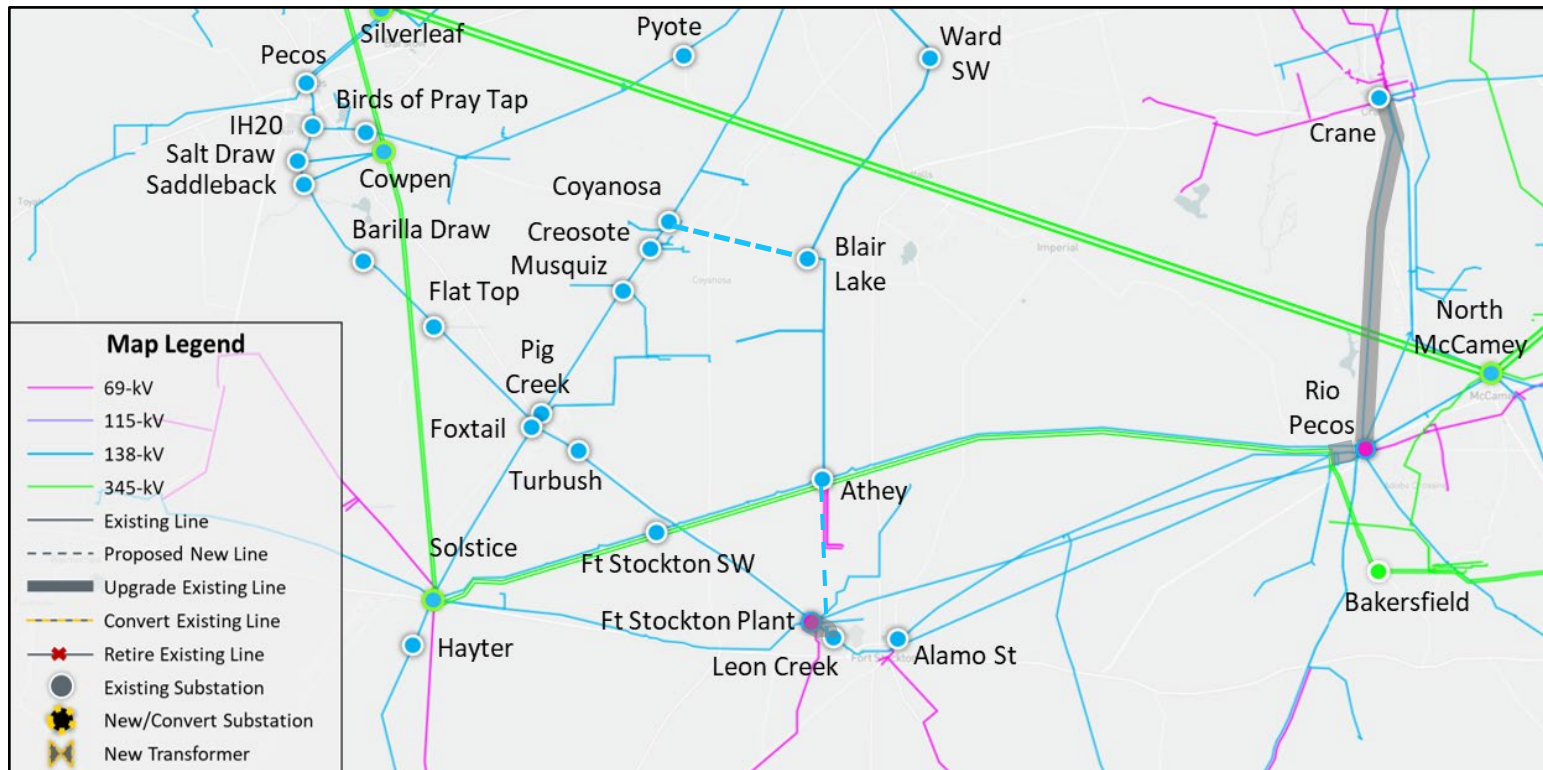
- Upgrade the existing 8.6-mile Flattop – Foxtail 138-kV line with rating of 717 MVA or above
- Add a second circuit to the existing 1.67-mile Hayter – Solstice 138-kV line with rating of 717 MVA or above
- Upgrade the two existing Solstice Transformers to 800 MVA rating & Bypass the PST at Solstice
- Upgrade the existing 25.6-mile Solstice – Ft. Stockton Plant – Leon Creek 138-kV line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above

Option 4



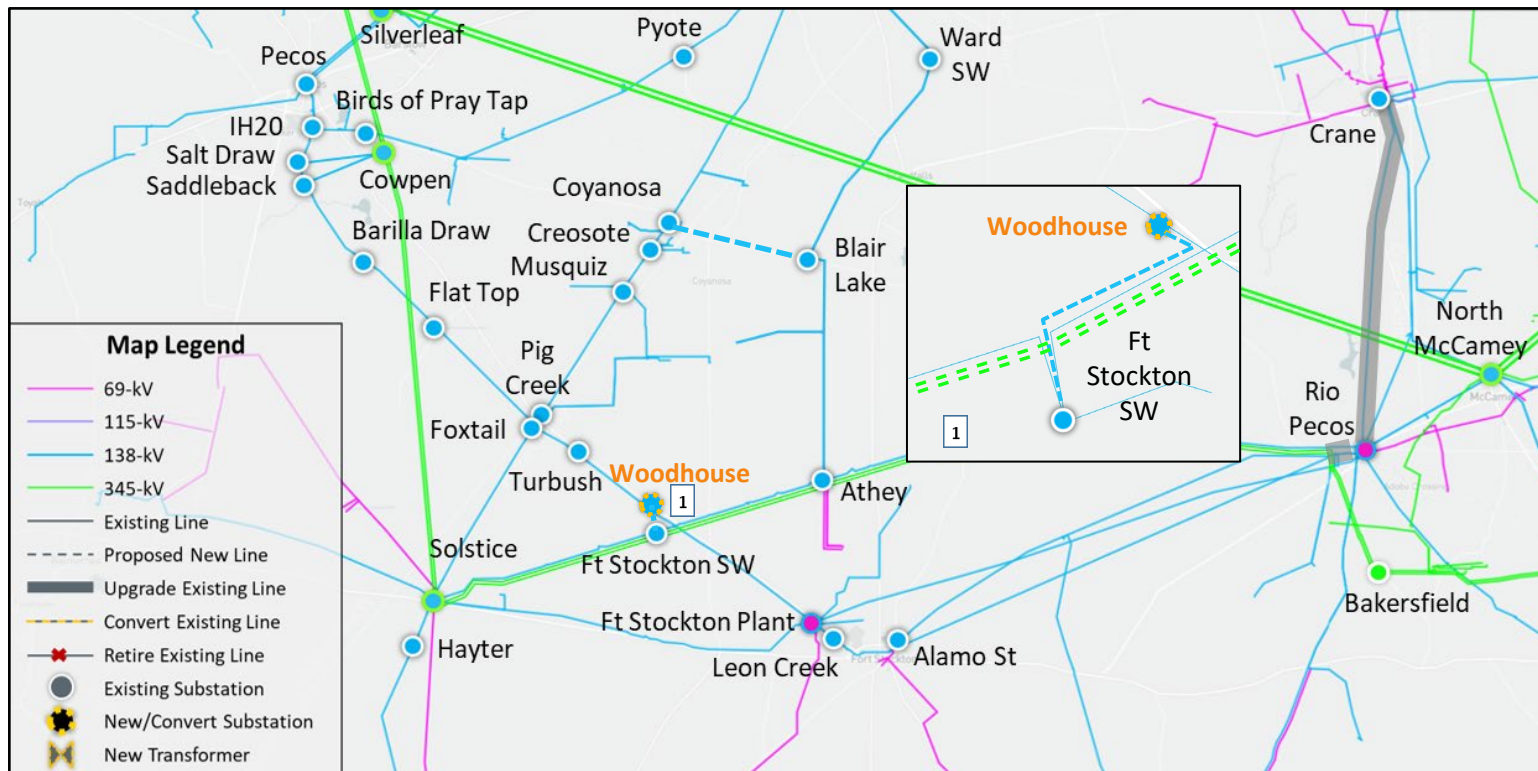
- Upgrade the existing 8.6-mile Flattop – Foxtail 138-kV line with rating of 717 MVA or above
- Add a new second circuit to the existing 1.67-mile Hayter – Solstice 138-kV line with rating of 717 MVA or above
- Upgrade the two existing Solstice Transformers to 800 MVA rating & Bypass the PST at Solstice
- Upgrade the existing 25.6-mile Solstice – Ft. Stockton Plant – Leon Creek 138-kV line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above
- Construct a new ~21.64-mile Creosote – Fort Stockton Switch 138-kV line with rating of 717 MVA or above

Option 5



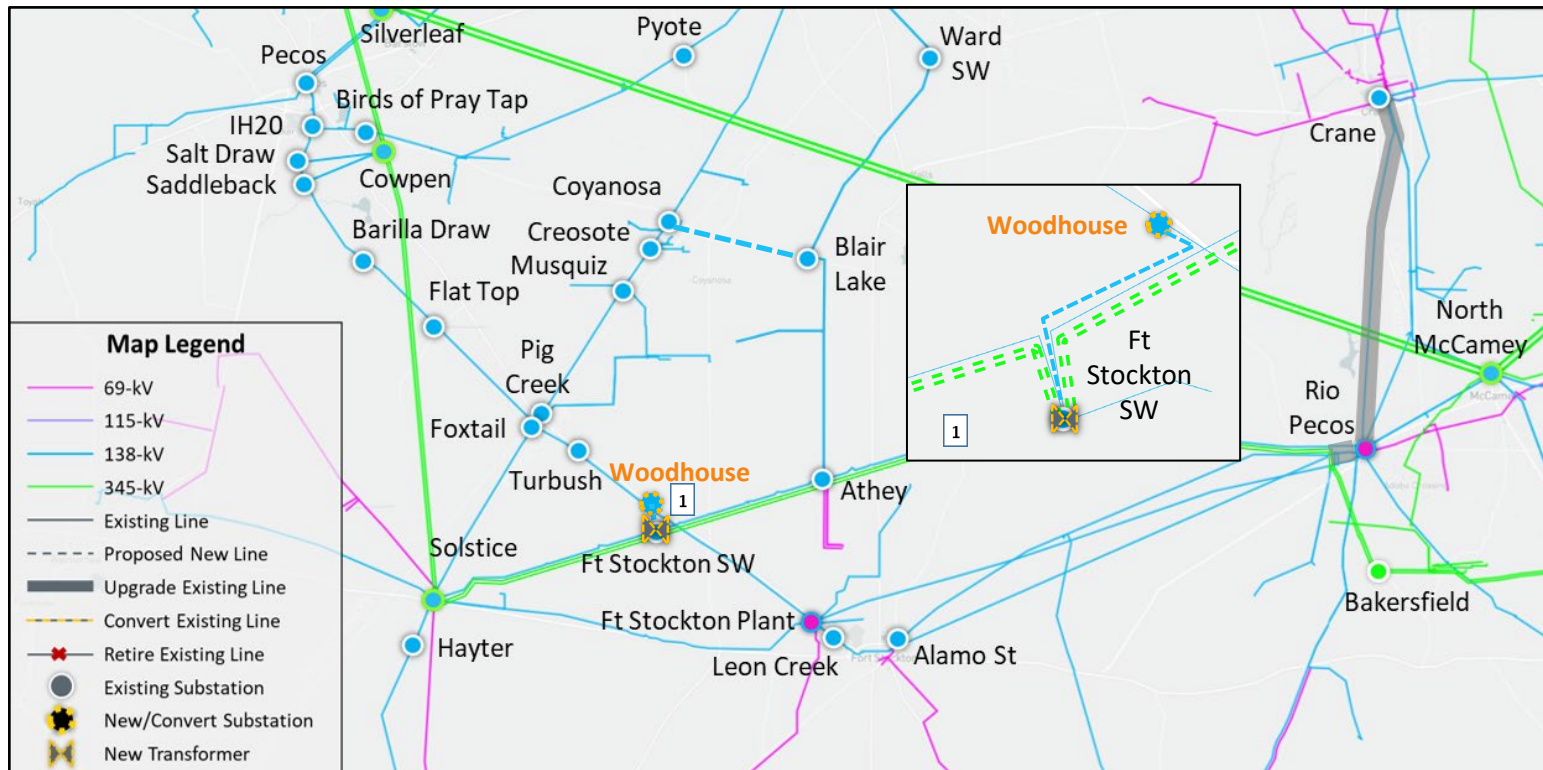
- Construct a new ~12.24-mile Coyanosa – Blair Lake 138-kV double-circuit line with rating of 717 MVA or above
- Construct a new ~10-mile Athey – Leon Creek 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.12-mile Ft. Stockton Plant – Leon Creek 138-kV line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above

Option 6



- Construct a new ~12.24-mile Coyanosa – Blair Lake 138-kV double-circuit line with rating of 717 MVA or above
- Construct a new Woodhouse 138-kV station by cutting into Tarbush – Leon Creek 138-kV line near Ft. Stockton SW
- Create a new ~0.1-mile Woodhouse – Ft. Stockton SW 138-kV tie-line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above

Option 7 – Similar to Option 6



- Construct a new ~12.24-mile Coyanosa – Blair Lake 138-kV double-circuit line with rating of 717 MVA or above
- Construct a new Woodhouse 138-kV station by cutting into Tarbush – Leon Creek 138-kV line near Ft. Stockton SW
- Create a new ~0.1-mile Woodhouse – Ft. Stockton SW 138-kV tie-line with rating of 717 MVA or above
- Upgrade the existing 23.65-mile Rio Pecos – Crane 138-kV line with rating of 717 MVA or above
- Upgrade the existing 0.6-mile second circuit Rio Pecos – Girvin 138-kV double-circuit line with rating of 717 MVA or above
- Install two new 345/138-kV transformers with 800 MVA rating at the existing Ft. Stockton SW 138-kV substation and cut into the existing Solstice – Bakersfield 345-kV double-circuit lines

Next Steps and Tentative Timeline

- ERCOT will continue to evaluate options and provide status updates at future RPG meetings
 - Planned maintenance outage analysis
 - Long-term load serving capability assessment
 - Cost estimates and feasibility assessment
 - Congestion analysis
 - Congestion analysis may be performed based on the recommended transmission upgrades 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 (PG) section 3.1.3 (4)
 - Subsynchronous Resonance (SSR) Assessment
 - Nodal Protocol Section 3.22.1.3(2)
- Tentative timeline
 - Final recommendation – Q1 2024

Thank you!



Stakeholder comments also welcomed through:

Tanzila.Ahmed@ercot.com

Robert.Golen@ercot.com

Appendix – New Transmission Projects Added

TPIT No	Project Name	Tier	Project ISD	TSP	From County
66571	Texaco Mabee Tap - Midland East 138 kV Line Rebuild	Tier 4	Sep-23	ONCOR	Midland
66621	Sandhills - Sandhills Tap 138 kV Line Rebuild	Tier 4	May-23	ONCOR	Ector
68793	Expanse 345/138 kV Switch	Tier 3	May-23	ONCOR	Martin
70596	LCRATSC_CraneEast_CB_Sub_Upgrade	Tier 4	May-23	LCRATSC	Upton
66074	Double ckt Soaptree-Holiday-AlamoSt	Tier 4	Dec-23	TNMP	Pecos
45670	East Stiles - Rocky Road 138 kV Line	Tier 4	Dec-23	ONCOR	Reagan
45689	Pronghorn - Salt Flat Road 138 kV Line	Tier 4	Dec-23	ONCOR	Midland
48587	Tesoro 345/138 kV Switch	Tier 3	Dec-23	ONCOR	Midland
68780	Triangle - Yosemite 138 kV Line	Tier 4	Dec-23	ONCOR	Midland
71190	Einstein - St Lawrence 138 kV Line	Tier 4	Dec-23	ONCOR	Glasscock
71193	Blue Acres - Yosemite 138 kV Line	Tier 4	Dec-23	ONCOR	Midland
71196	Grey Well Draw - Pecan Grove 138 kV Line	Tier 4	Dec-23	ONCOR	Midland
50725	Coalson Draw 138 kV Switch	Tier 4	May-24	ONCOR	Reeves
51225	Driver - Hadacol Corner 138 kV Line	Tier 4	May-24	ONCOR	Midland
71172	Luther - Vealmoor 138 kV Line	Tier 4	May-24	ONCOR	Borden
45640	Spraberry - Polecat Creek 138 kV Line	Tier 3	Dec-24	ONCOR	Midland
45693	Rocky Road - Stiles 138 kV Line	Tier 4	Dec-24	ONCOR	Reagan
52332	Lamesa - Paul Davis Tap 138 kV Line Section	Tier 3	Dec-24	ONCOR	Dawson
71175	Tall City - Pecan Grove 138 kV Line	Tier 4	Dec-24	ONCOR	Midland

Appendix – New Transmission Projects Added (cont.)

TPIT No	Project Name	Tier	Project ISD	TSP	From County
71968	Midkiff - Pemkiff 138 kV Line	Tier 4	Dec-24	ONCOR	Upton
71971	Peck - Driver 138 kV Line	Tier 2	Dec-24	ONCOR	Glasscock
71989	Big Spring West - Stanton East 138 kV Line	Tier 4	Dec-24	ONCOR	Martin
71993	Tributary - Vincent 138 kV Line Section	Tier 4	Dec-24	ONCOR	Howard
68669	Adds Staghorn Switching Station	Tier 4	Jun-25	TNMP	Ward
23RPG008	Fort Stockton Plant to Lynx 138-kV Line Rebuild Project	Tier 4	May-25	AEPSC	Pecos
68955	Meteor 345 kV Switch	Tier 4	May-24	ONCOR	Ward
68790	Wolf - General Tire - Odessa EHV 138 kV Line	Tier 3	Dec-25	ONCOR	Ector
71199	Yucca Drive - Moss 138 kV Line	Tier 4	May-24	ONCOR	Ector
70964	WETT 345 kV Volta witch	Tier 3	Jan-24	WETT	Howard
71960	Upgrade Grady - Expanse 138 kV Line	Tier 4	Dec-24	ONCOR	Martin
73452	TNMP_WINK_FISHHOOK_RECONDUCTOR_AC_4-5-2023	Tier 4	Nov-23	TNMP	Pecos
73476	TNMP_KERMIT_RECONDUCTOR	Tier 4	Jan-24	TNMP	Pecos
72884	Gonzales: Build 69 kV STATCOM	Tier 4	May-24	ETT	Presidio
73406	TMentone 138 kV POD	Tier 4	May-25	ONCOR	Loving
68671	Adds Foxtail Switching Station	Tier 4	Oct-22	TNMP	Reeves
72863	Delaware River 138 kV Switch	Tier 4	May-24	ONCOR	Culberson
73434	Shaw 138 kV POD	Tier 4	May-24	ONCOR	Reagan
76348	TNMP_76348_Reconductor Foxtail-PIGCreek	Tier 4	May-26	TNMP	Pecos
77320	TNMP_77320_PMCR_Add_CapBank_COYANOSA	Tier 4	Jun-26	TNMP	Pecos

Appendix – New Generation Projects Added

GINR	Project Name	Fuel	Projected COD	Capacity (MW)	County
18INR0043	Lacy Creek wind	Wind	06/01/2023	301.30	Glasscock
20INR0249	Appaloosa Run Wind	Wind	07/07/2023	175.00	Upton
20INR0269	Texas Solar Nova 2	Solar	12/29/2023	201.14	Kent
20INR0296	Sand Bluff Wind Repower	Wind	05/11/2023	89.50	Glasscock
21INR0253	Ulysses Solar	Solar	11/01/2024	150.00	Coke
21INR0532	Brazos Wind Repower	Wind	08/14/2023	22.40	Scurry
22INR0349	BRP Antlia BESS	Battery	12/01/2023	70.95	Val Verde
22INR0363	Hayhurst Texas Solar	Solar	11/01/2023	24.76	Culberson
22INR0412	Andromeda Solar	Solar	06/30/2023	326.6	Scurry
22INR0454	DR Solar	Solar	06/01/2024	46.02	Culberson
22INR0455	Blue Sky Sol	Solar	06/15/2024	101.20	Crockett
22INR0485	House Mountain	Battery	08/25/2023	63.00	Brewster
22INR0495	TIMBERWOLF BESS 2	Battery	09/01/2023	150.00	Crane
22INR0502	Shamrock	Wind	07/01/2024	223.92	Crockett

Appendix – New Generation Projects Added (Cont.)

GINR	Project Name	Fuel	Projected COD	Capacity (MW)	County
22INR0524	St. Gall I Energy Storage	Battery	12/01/2023	102.60	Pecos
23INR0371	Rodeo Ranch Energy Storage	Battery	07/31/2023	307.46	Reeves
23INR0387	Pioneer DJ Wind	Wind	04/20/2024	140.32	Midland
19INR0203	Angelo Solar	Solar	05/03/2024	195.41	Tom Green
23INR0418	Angelo Storage	Battery	05/03/2024	102.97	Tom Green
21INR0424	Tierra Bonita Solar	Solar	08/01/2024	309.68	Pecos
23INR0219	Dogfish BESS	Battery	12/31/2024	75.00	Pecos