



AEPSC Childress Area Transmission Improvement Project – ERCOT Independent Review Project Update

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RPG Meeting
October 28, 2025

Introduction

- American Electric Power Service Corporation (AEPSC) submitted the Childress Area Transmission Improvement Project for Regional Planning Group (RPG) review in June 2025
 - This Tier 2 project is estimated to cost \$53.0 million and will require a Certificate of Convenience and Necessity (CCN) filing
 - Estimated in-service date (ISD) is November 2031
 - Addresses the voltage violations under planned maintenance outage condition due to projected load increase in the Childress County in the North weather zone
- AEPSC provided an overview presentation and ERCOT provided the study scope at the July RPG Meeting
 - <https://www.ercot.com/calendar/07292025-RPG-Meeting>
- ERCOT provided status update at the August RPG Meeting
 - <https://www.ercot.com/calendar/08262025-RPG-Meeting>
- This project is currently under ERCOT Independent Review (EIR)

Recap – Study Assumptions

- Study Region
 - North Weather Zone, focusing on the transmission elements in the Childress and surrounding counties
- Steady-State Base Case
 - Final 2024RTP_2030_SUM_12202024
 - Final 2024RTP_2030_MaintenanceOutage_12202024
- Transmission
 - See Appendix A for the list of transmission projects added
 - See Appendix B for the list of placeholder projects that were removed
- Generation
 - See Appendix C for the list of generation projects added
- Load
 - Loads were maintained to be consistent with 2024 RTP

Recap – 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	# of Unsolved Contingencies	# of Thermal Overloads	# of Bus Voltage Violations
N-0 (P0)	None	None	None
N-1 (P1, P2-1, P7)	None	1	0
G-1+N-1 (P3)*	None	None	4
X-1+N-1 (P6-2)**	None	None	None
Total	None	1	4

*G-1 Generator tested: Whirlwind

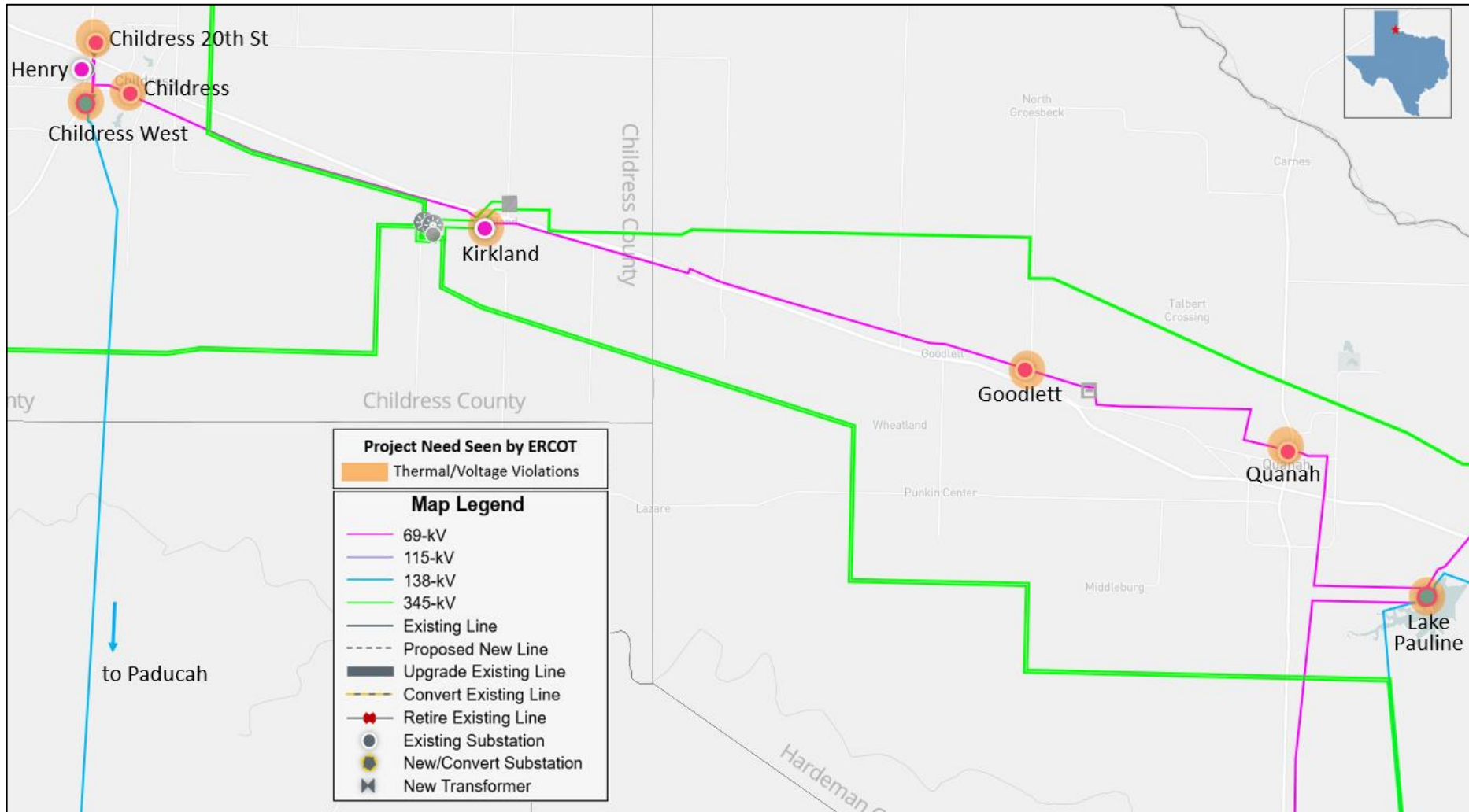
**X-1 Transformers tested: Oklaunion 345/138-kV auto

Recap – Preliminary Results of Reliability Assessment – Need Analysis under Planned Maintenance Outage Condition

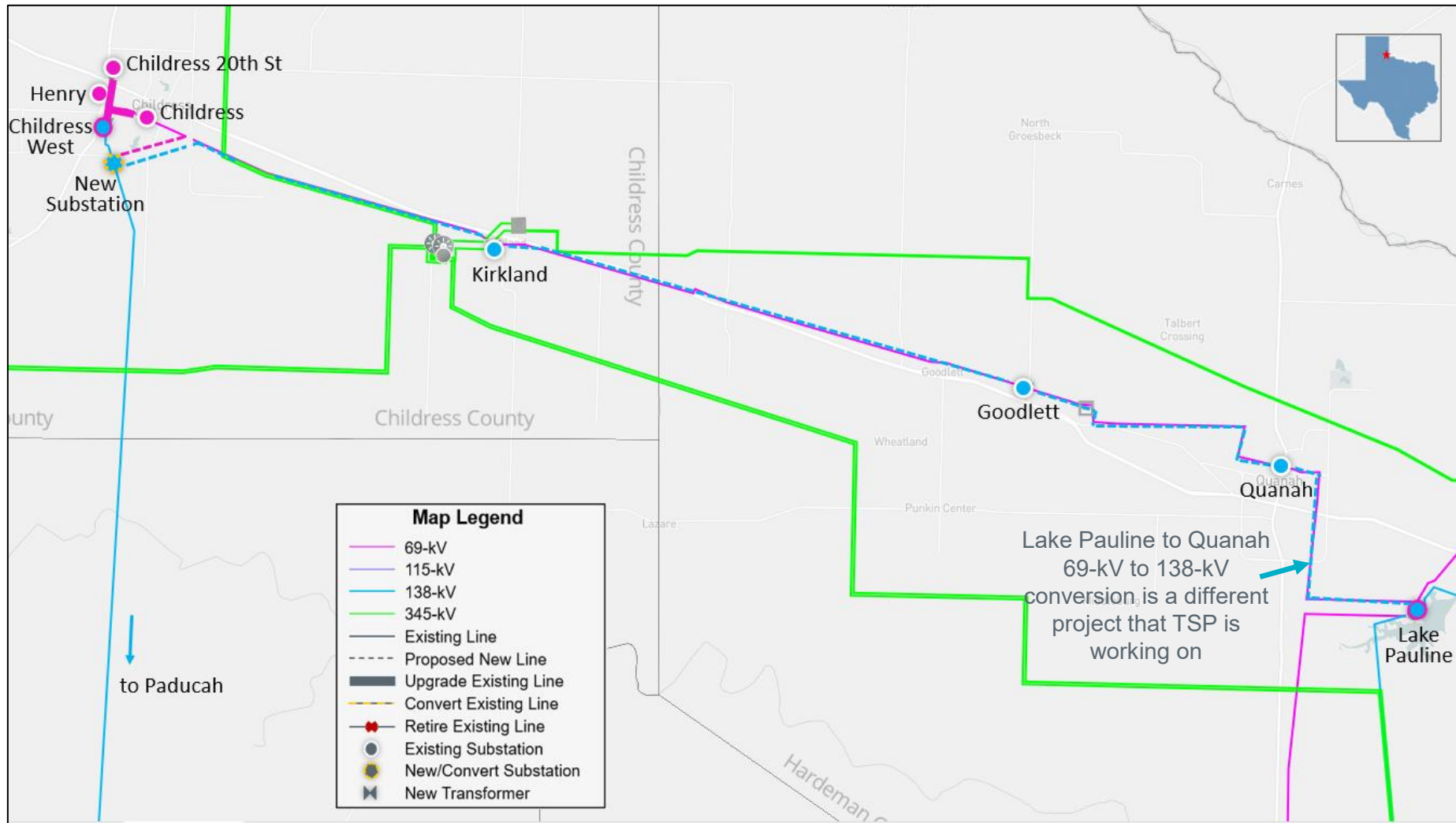
- The project is submitted to address the reliability violations under planned maintenance outage condition, as such, ERCOT also conducted the planned maintenance outage analysis to identify any reliability needs
 - The final 2024 RTP 2030 maintenance outage case was updated reflecting the transmission and generation updates to perform this analysis
 - Based on the review of system topology of the area, ERCOT tested N-2 contingency combinations, and then tested all applicable contingency violations with system adjustments (N-1-1)
- Preliminary need analysis results under planned maintenance outage condition

Contingency Category	# of Unsolved Contingencies	# of Thermal Overloads	# of Bus Voltage Violations
N-1-1 (P6-1, P6-3)	2	None	7

Recap – Study Area Map with Project Need Seen by ERCOT



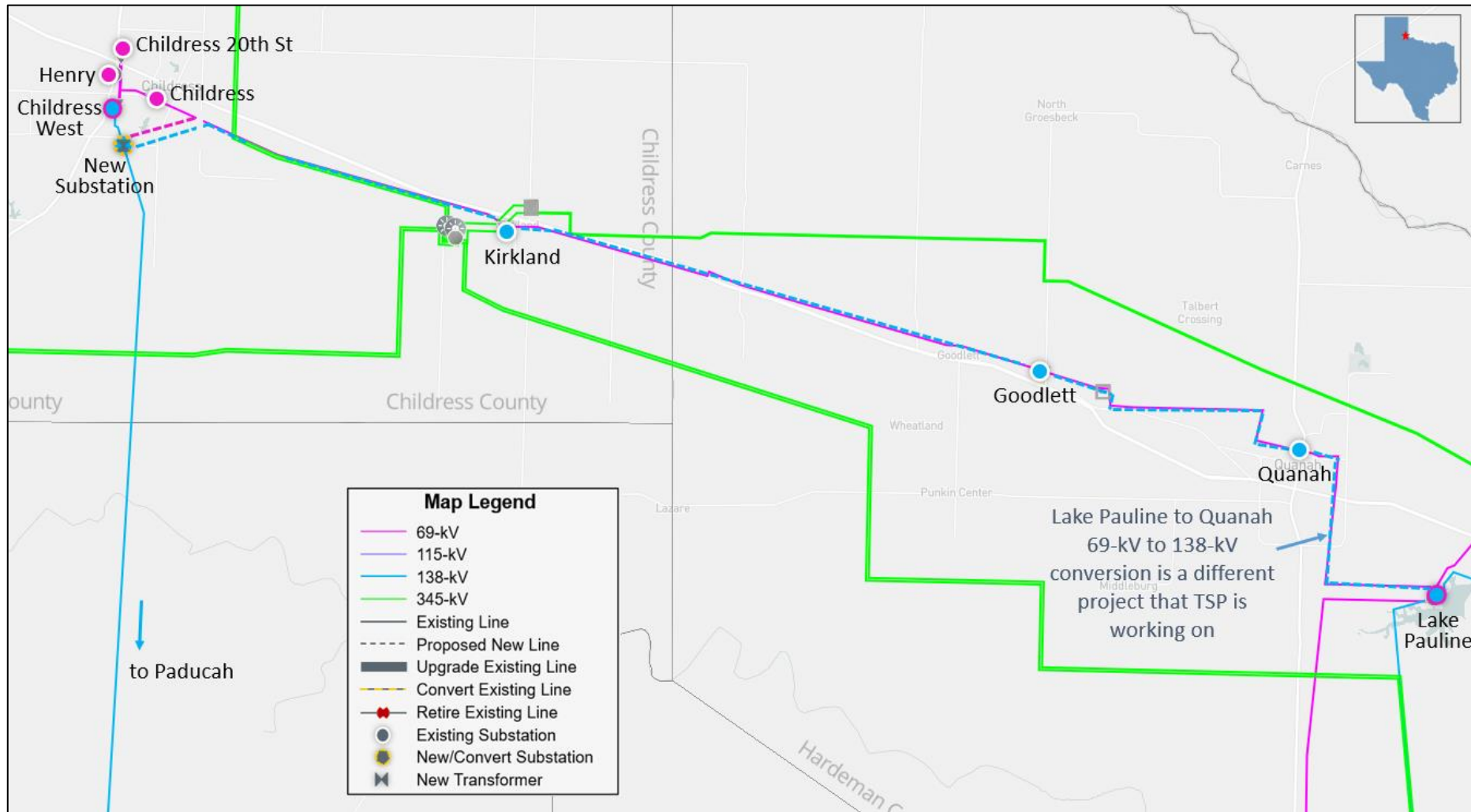
Recap – Option 1 (Project Proposed by AEPSC)



Recap – Option 1 (Project Proposed by AEPSC)

- Construct a new 138/69-kV substation (New Substation) by cutting into the existing West Childress to Paducah 138-kV transmission line
 - Install one 138/69-kV transformer with normal and emergency ratings of at least 90 MVA
 - The 138-kV substation will have a ring bus design
 - The 69-kV substation will have a single bus design
- Loop the existing Childress to Quanah 69-kV transmission line between the Childress to Kirkland substations into the New Substation
 - Construct two new transmission lines (one 69-kV transmission line with normal and emergency ratings of at least 52 MVA and 67 MVA, respectively, and one 138-kV transmission line with normal and emergency ratings of at least 278 MVA and 408 MVA, respectively) on double-circuit structures from the cut-ins to the New Substation, which will require a new right of way (ROW), approximately 3.5-mile
- Convert the existing 69-kV transmission lines and tap stations between the New Substation and Quanah to 138-kV
 - The converted Quanah to Goodlett to Kirland to New Substation 138-kV transmission lines will have normal and emergency ratings of at least 278 MVA and 408 MVA, respectively, which will require a new ROW for the transmission spans outside of Kirkland substation, approximately 0.8-mile
- Rebuild the existing Childress to West Childress 69-kV transmission lines and tap stations
 - The Childress to Childress 20th St Tap to West Childress 69-kV transmission lines will have normal and emergency ratings of at least 122 MVA and 176 MVA, respectively
 - The Childress 20th St Tap to Childress 20th St 69-kV transmission line will have normal and emergency ratings of at least 122 MVA and 173 MVA, respectively

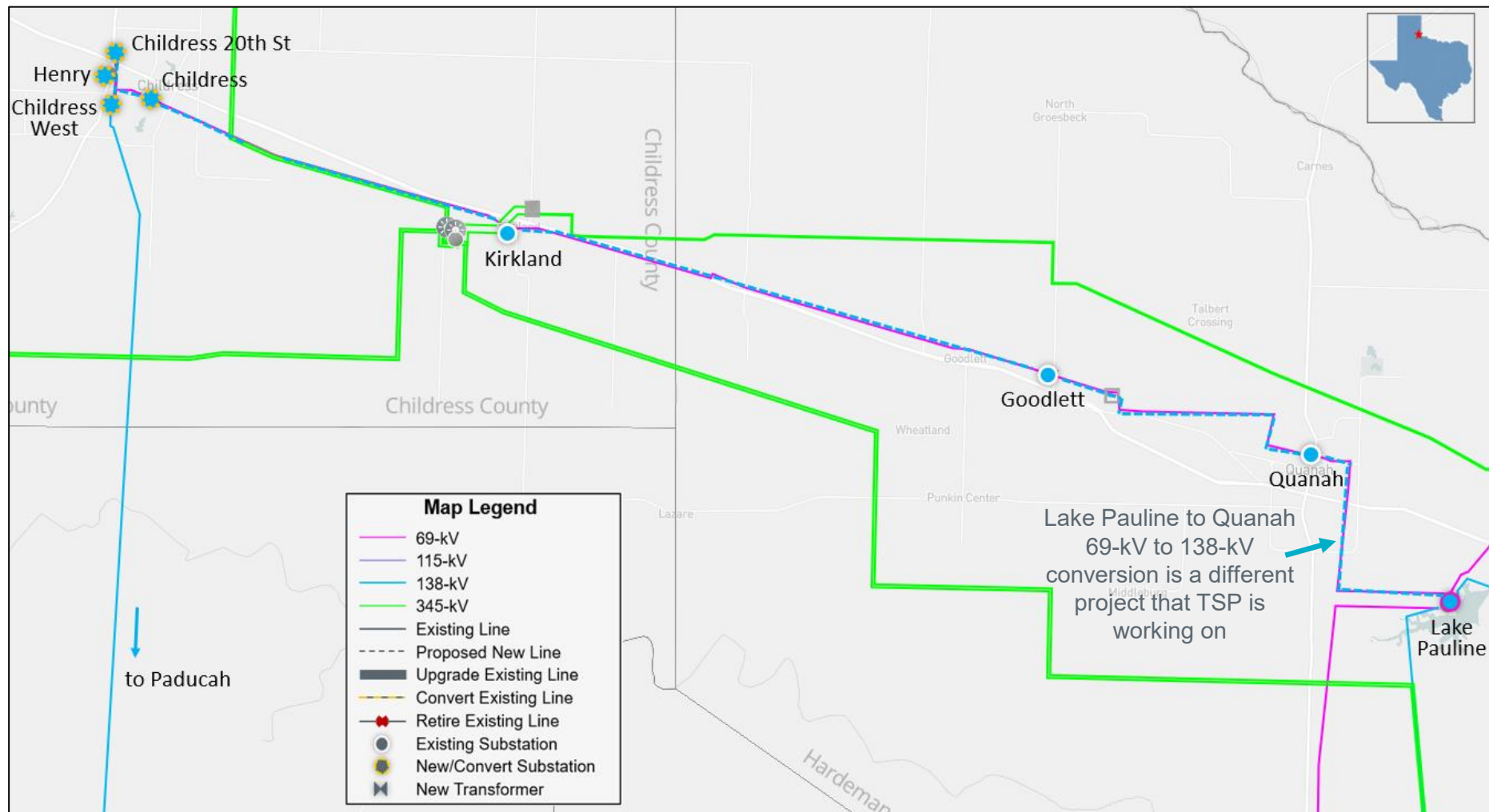
Option 1A: Modification to Option 1



Option 1A: Modification to Option 1

- Construct a new 138/69-kV substation (New Substation) by cutting into the existing West Childress to Paducah 138-kV transmission line
 - Install one 138/69-kV transformer with normal and emergency ratings of at least 90 MVA
 - The 138-kV substation will have a ring bus design
 - The 69-kV substation will have a single bus design
- Loop the existing Childress to Quanah 69-kV transmission line between the Childress to Kirkland substations into the New Substation
 - Construct two new transmission lines (one 69-kV transmission line with normal and emergency ratings of at least 52 MVA and 67 MVA, respectively, and one 138-kV transmission line with normal and emergency ratings of at least 278 MVA and 408 MVA, respectively) on double-circuit structures from the cut-ins to the New Substation, which will require a new right of way (ROW), approximately 3.5-mile
- Convert the existing 69-kV transmission lines and tap stations between the New Substation and Quanah to 138-kV
 - The converted Quanah to Goodlett to Kirland to New Substation 138-kV transmission lines will have normal and emergency ratings of at least 278 MVA and 408 MVA, respectively, which will require a new ROW for the transmission spans outside of Kirkland substation, approximately 0.8-mile

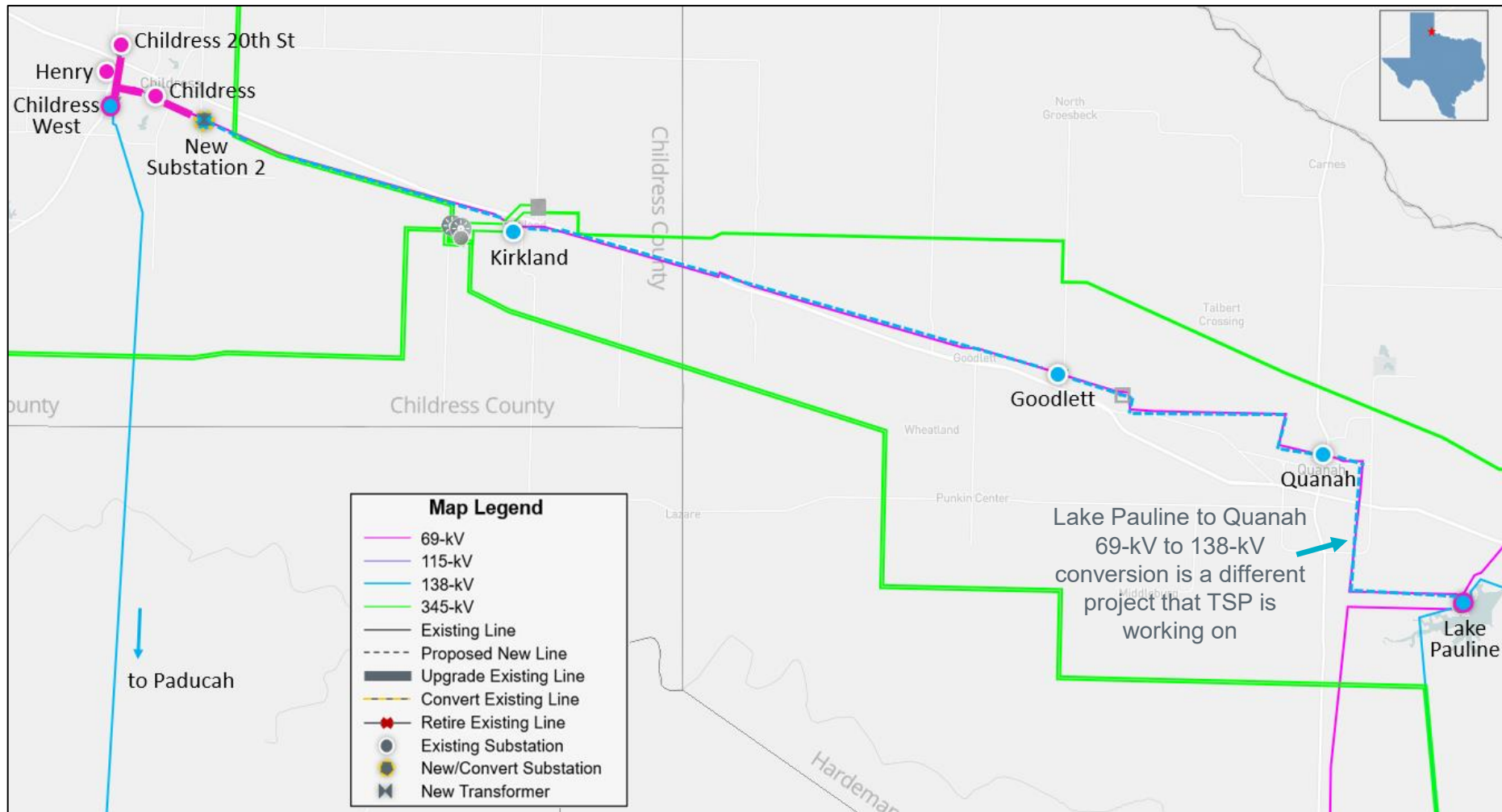
Recap – Option 2: Convert Childress Area 69-kV Transmission Lines to 138-kV



Recap – Option 2: Convert Childress Area 69-kV Transmission Lines to 138-kV

- Convert the existing 69-kV transmission lines and tap stations between Childress and West Childress to 138-kV
 - Rebuild the existing Childress to Childress 20th Street Tap to West Childress 69-kV transmission lines to 138-kV with normal and emergency ratings of at least 483 MVA, which will require a new ROW, approximately 1.27-mile
 - Rebuild the existing Childress 20th Street Tap to Childress 20th Street 69-kV transmission line to 138-kV with normal and emergency ratings of at least 483 MVA, which will require a new ROW, approximately 1.74-mile
 - Rebuild the existing Childress 20th Street to Henry to West Childress 69-kV transmission lines to 138-kV with normal and emergency ratings of at least 483 MVA, which will require a new ROW, approximately 1.40-mile
- Convert the existing 69-kV transmission lines and tap stations between Childress and Quanah to 138-kV
 - The converted Quanah to Goodlett to Kirland to Childress 138-kV transmission lines will have normal and emergency ratings of at least 278 MVA and 408 MVA, respectively
 - New ROW will be required for the transmission line between Childress and structure 4/5, approximately 3.11-mile
 - New ROW will be required for the transmission spans outside of Kirkland substation, approximately 0.8-mile

Recap – Option 3: Rebuild Childress Area 69-kV Transmission Lines



Recap – Option 3: Rebuild Childress Area 69-kV Transmission Lines

- Construct a new 138/69-kV substation (New Substation 2) by cutting into the existing Childress to Kirkland 69-kV transmission line at structure 4/5
 - Install one 138/69-kV transformer with normal and emergency rating of at least 90 MVA
 - The 138-kV substation will have a ring bus design
 - The 69-kV substation will have a single bus design
- Convert the existing 69-kV transmission lines and tap stations between the New Substation 2 and Quanah to 138-kV
 - The converted Quanah to Goodlett to Kirland to New Substation 2 138-kV transmission lines will have normal and emergency ratings of at least 278 MVA and 408 MVA, respectively, which will require a new ROW for the transmission spans outside of Kirkland substation, approximately 0.8-mile
- Rebuild the existing Childress to West Childress 69-kV transmission lines and tap stations
 - The Childress to Childress 20th St Tap to West Childress 69-kV transmission lines will have normal and emergency ratings of at least 122 MVA and 176 MVA, respectively
 - The Childress 20th St Tap to Childress 20th St 69-kV transmission line will have normal and emergency ratings of at least 122 MVA and 173 MVA, respectively
- Upgrade the existing Childress to New Substation 2 69-kV transmission line with normal and emergency ratings of at least 122 MVA and 176 MVA, respectively
- Add a new capacitor bank (28.8 MVAR) at West Childress 138-kV substation

Preliminary Results of Reliability Assessment – Options

	N-1		G-1*+N-1		X-1**+N-1	
Option	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations
1	None	None	None	None	None	None
1A	None	None	None	None	None	None
2	None	None	None	None	None	None
3	None	None	None	None	None	None

*G-1 Generator tested: Whirlwind

**X-1 Transformers tested: Oklaunion 345/138-kV auto

Planned Maintenance Outage Scenario Analysis

- Preliminary results of planned maintenance outage analysis

Option	Unsolved Power Flow	Thermal Overloads	Voltage Violations
1	None	None	None
1A	None	None	None
2	None	None	None
3	None	None	None

Long-Term Load-Serving Capability Assessment

- Assumptions
 - Loads at Henry 69-kV substation were increased to reflect future load additions based on the load forecast in June 2025 SSWG
 - With the future load forecast at Henry substation, adjusted load up in the study area (Childress County and nearby area), excluding Flexible Loads in the area
 - Adjusted conforming loads down outside of the North Weather Zone to balance power
 - Based on N-1 contingency
- Preliminary Findings

Option	Incremental Load-Serving Capability (~MW)
1	42
1A	42
2	46
3	21

Comparison of Study Options

	Option 1	Option 1A	Option 2	Option 3
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes	Yes
Improves Long-Term Load-Serving Capability	Yes (Better)	Yes (Better)	Yes (Better)	Yes
Requires CCN (miles)	~ 3.5	~ 3.5	~ 4.1	0
Cost Estimate* (\$M)	~ 94.1	~ 77.3	~ 77.4	~ 89.6
Feasible	Yes	Yes	No	Yes

* Cost estimates were provided by Transmission Service Provider (TSP)

- Option 2 is not feasible due to the expanded ROW corridors required for 138-kV
- Option 1 and Option 1A better improve the long-term load-serving capability than Option 3
- Option 1A is the least cost option

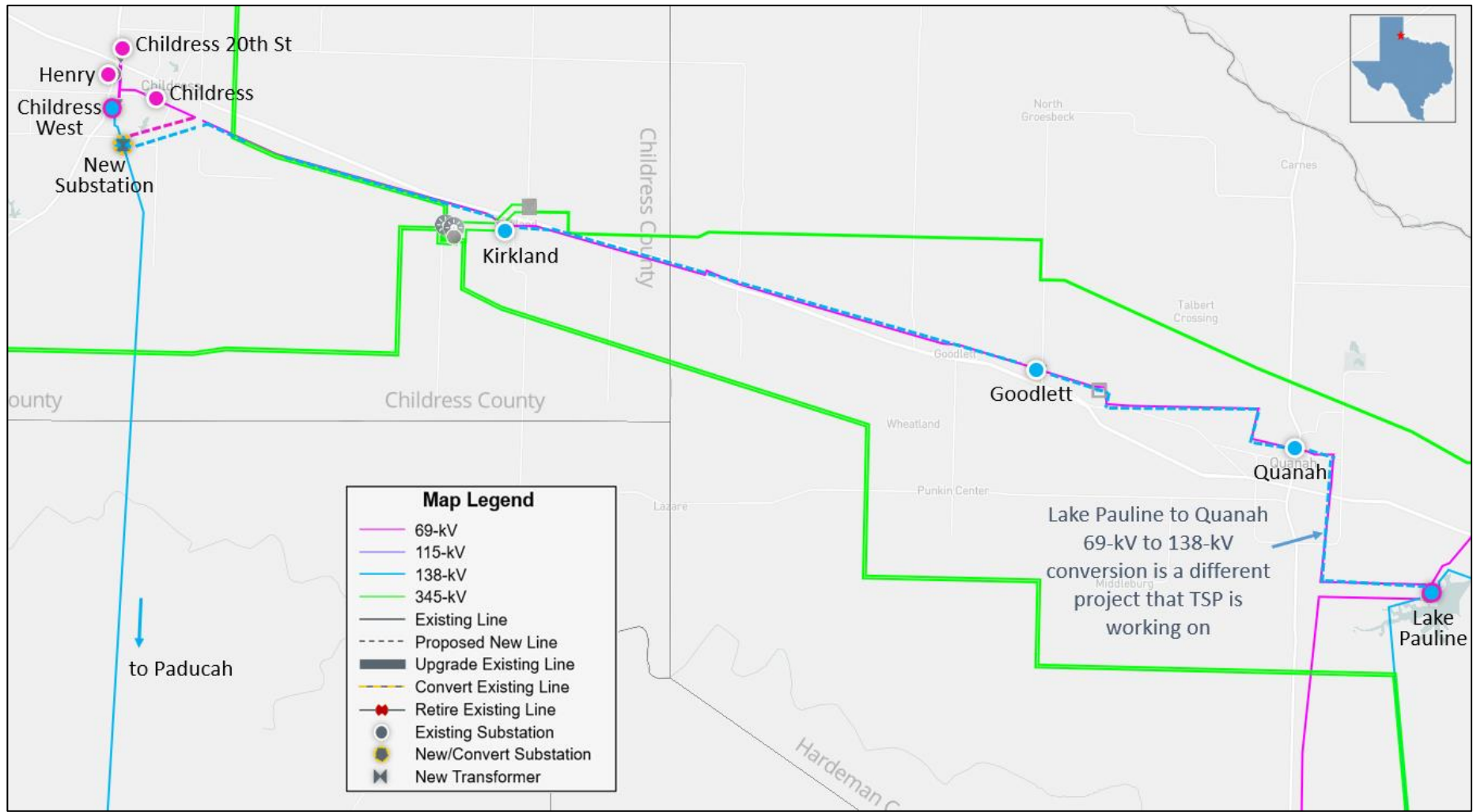
Preferred Option

- Option 1A was selected as the ERCOT preferred option because it
 - Addresses the project need in the study area
 - Meets both ERCOT and NERC reliability criteria
 - Improves long-term load-serving capability for future load growth in the area
 - Is the least cost solution
- Congestion analysis will not be needed for this project

ERCOT Recommendation

- ERCOT recommends Option 1A
 - Estimated Cost: approximately \$77.3 million
 - Expected ISD: November 2031
 - CCN filling will be required to
 - Construct the new 138-kV and 69-kV double-circuit line from the New Substation to the structure 4/5, requiring approximately 3.5-mile new ROW

Map of ERCOT Recommended Option



ERCOT Recommended Option

- Construct a new 138/69-kV substation (New Substation) by cutting into the existing West Childress to Paducah 138-kV transmission line
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Next Steps and Tentative Timeline

- Tentative timeline
 - ERCOT Independent Review Report to be posted in the MIS in early November 2025

Thank you!



Stakeholder comments also welcomed through:

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Appendix A – Transmission Projects

- List of transmission projects to be added to study base case

RPG/TPIT No	Project Name	Tier	Project ISD	From County
81215	Oklaunion: Reconfigure 138 kV Station	Tier 4	May-26	Wilbarger
90002	Salvare: Install New 345 kV Capacitor Bank	Tier 4	May-26	Childress

Appendix B – Transmission Projects

- List of transmission projects to be removed from the study base case

RTP Project ID	Project Name	County
2024-N01	Childress West (6030/6028) 138/69-kV Transformer Upgrade and Cap Bank Addition	Childress
2024-N02	Lake Pauline (6050/6048) 138/69-kV Transformer Upgrade	Hardeman

Appendix C – New Generation Projects to Add

GINR	Project Name	Fuel	Projected COD	Max Capacity (~MW)	County
25INR0672	Fagus Solar Park 2 SLF	SOL	10/03/2025	166.6	Childress
26INR0524	Fagus Solar Park 3 SLF	SOL	04/01/2026	186.8	Childress