BTU Texas A&M University System RELLIS Campus Reliability Project – ERCOT Independent Review Project Update

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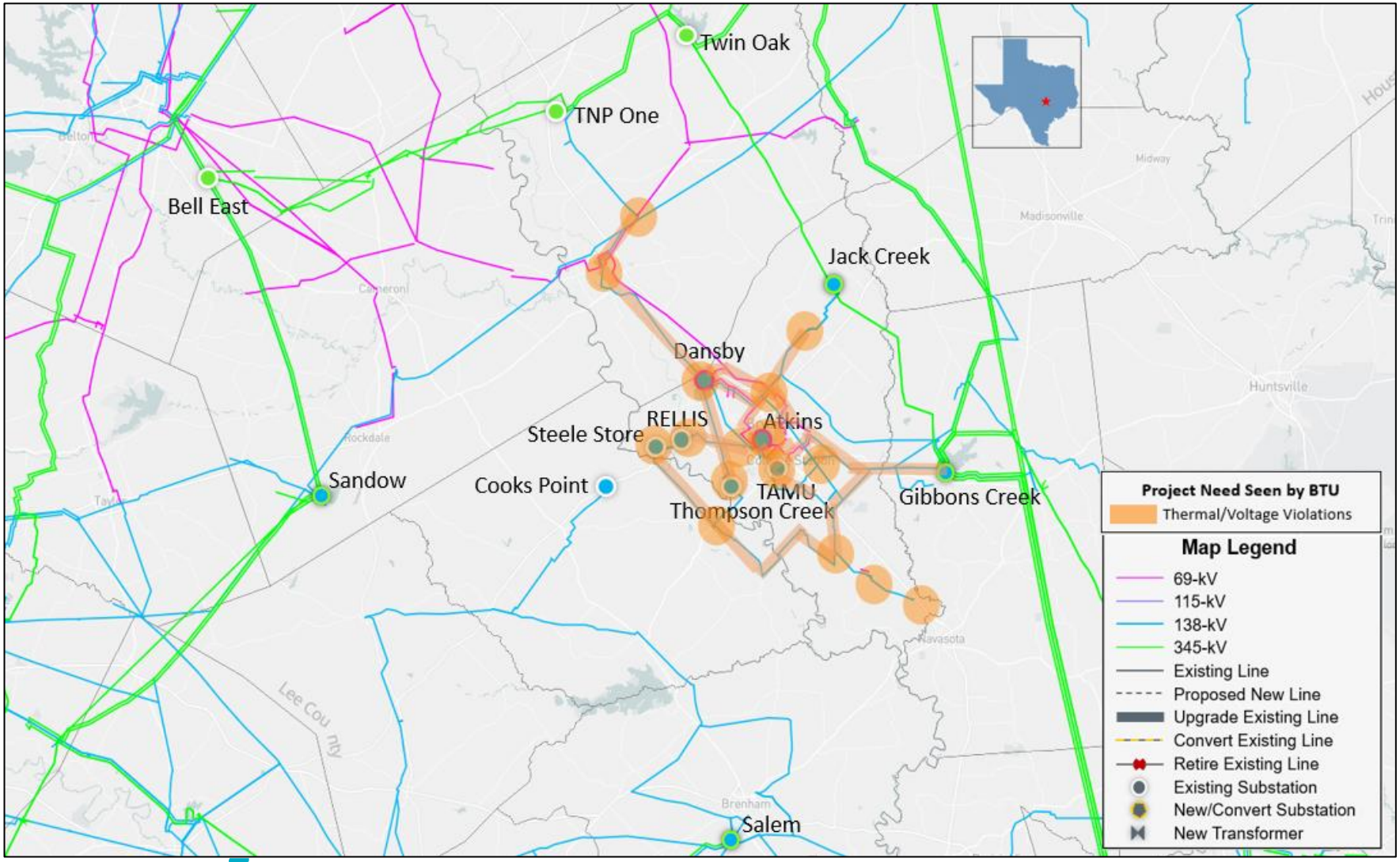
RPG Meeting
April 29, 2025

Recap – Introduction

- Bryan Texas Utilities (BTU) submitted the Texas A&M University System RELLIS Campus Reliability Project for Regional Planning Group (RPG) review in January 2025
  - This Tier 1 project is estimated to cost $271.5 million and will require a Certificate of Convenience and Necessity (CCN) filing
  - Estimated in-service date (ISD) is May 2029
  - Addresses the thermal overloads and voltage violations due to proposed load additions in the Brazos County in the East weather zone
- BTU provided an overview presentation and ERCOT provided the study scope at the March RPG Meeting
  - https://www.ercot.com/calendar/03182025-RPG-Meeting
- ERCOT will present the reliability need analysis and project evaluation during this presentation
- This project is currently under ERCOT Independent Review (EIR)

Recap – Study Area Map with Violations Seen by BTU



Recap – Study Assumptions

- Study Region
  - East Weather Zone, focusing on the transmission elements in the Brazos and surrounding counties
- Steady-State Base Case
  - Final 2024RTP_2030_SUM_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
  - Newly confirmed loads (377.97 MW in 2030) in the study area were already modelled in the 2024 RTP

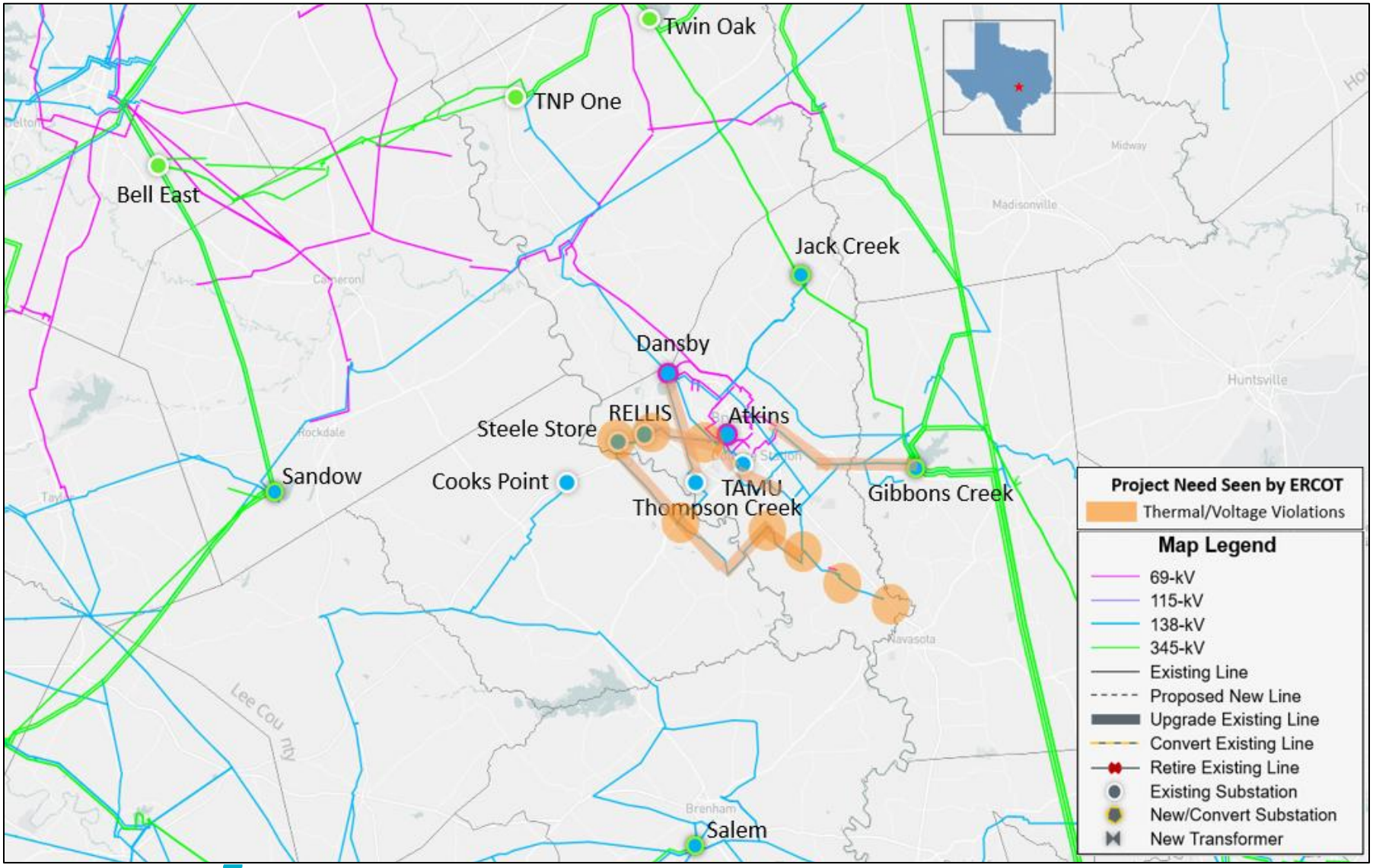
Preliminary Results of Reliability Assessment – Need Analysis

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

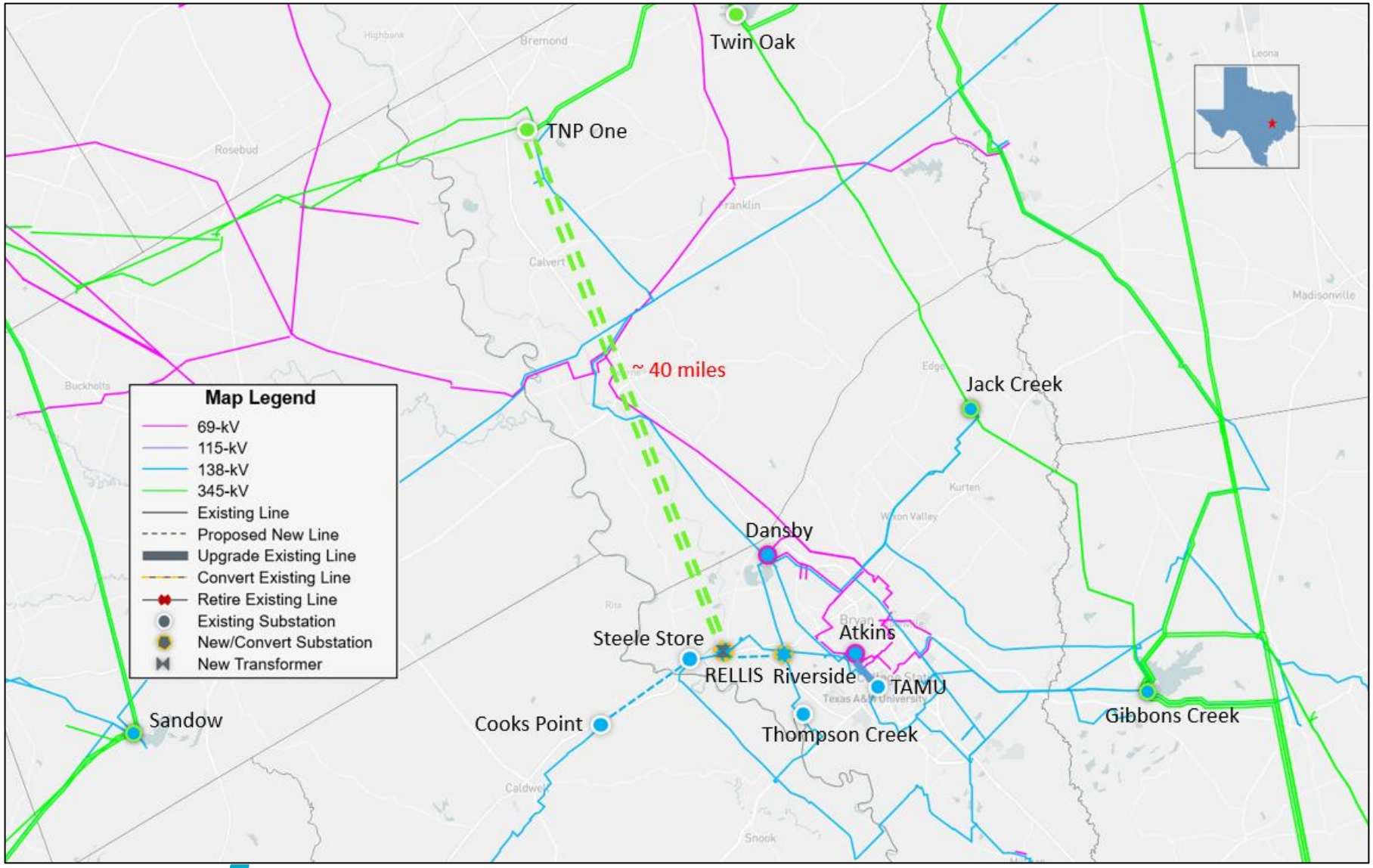
Contingency Category*	# of Unsolved Contingencies	# of Thermal Overloads	# of Bus Voltage Violations
N-0 (P0)	None	None	3
N-1 (P1, P2-1, P7)	None	11	12
G-1+N-1 (P3)*	None	3	None
X-1+N-1 (P6-2)**	None	1	None
Total	**None**	**15**	**15**

*G-1 Generator tested: Dansby Unit 1 and Frontier Combined Cycle Train
**X-1 Transformers tested: Jack Creek T1 and Gibbons Creek T2

Study Area Map with Project Need Seen by ERCOT



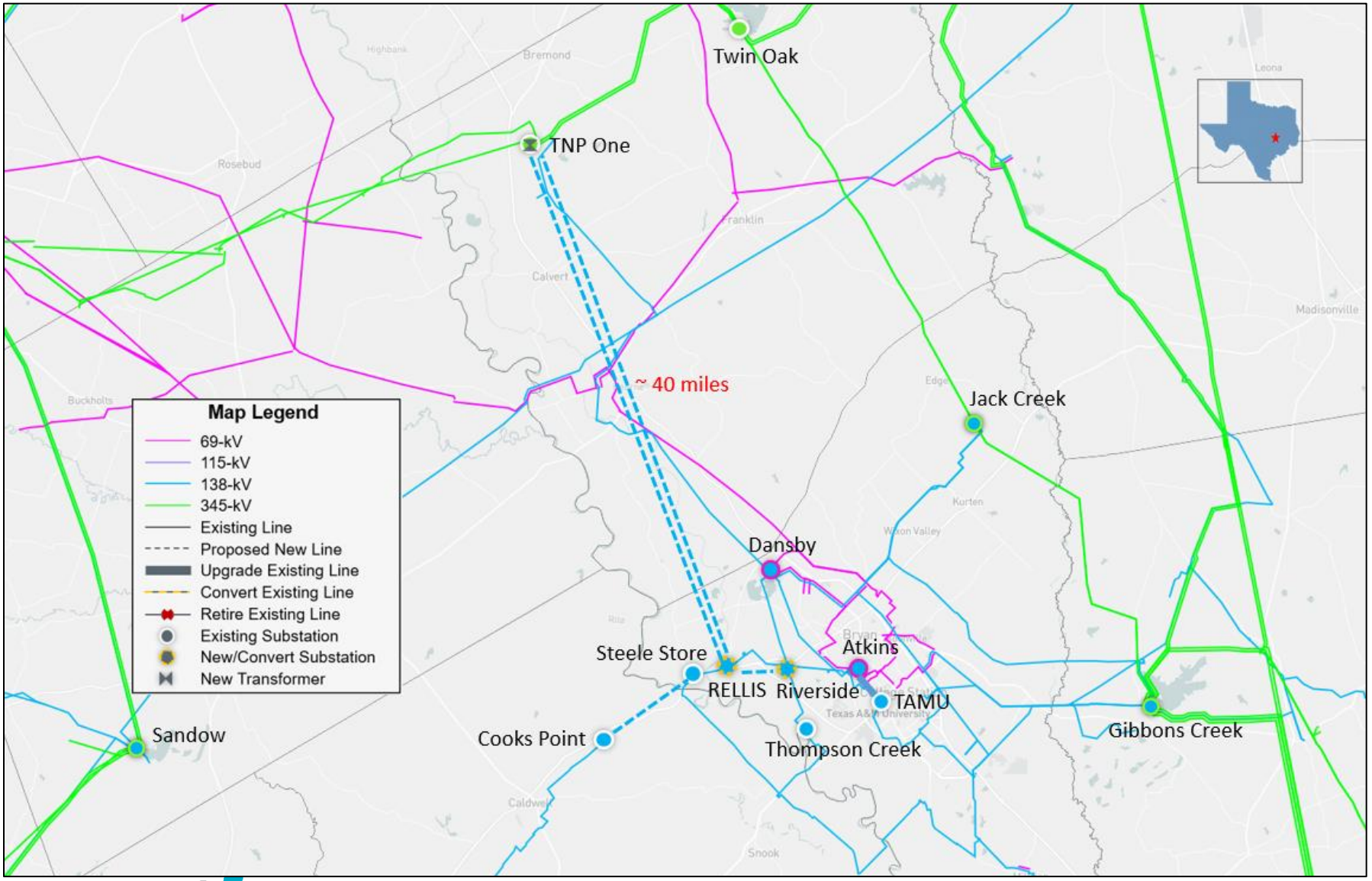
Option 1 (BTU Proposed Project)



Option 1 (BTU Proposed Project)

- Expand the existing RELLIS 138-kV substation to establish a new RELLIS 345/138-kV switchyard by installing four additional 138-kV breakers in the existing 138-kV ring bus and adding four 345-kV breakers in a ring bus configuration
  - Install two 345/138-kV autotransformers with normal and emergency rating of at least 600 MVA for each transformer
  - Install two capacitor banks (54 MVAr each) at RELLIS 138-kV substation
- Construct a new TNP One to RELLIS 345-kV double-circuit transmission line on double-circuit capable structures with both circuits in place with normal and emergency rating of at least 1765 MVA for each circuit, approximately 40 miles
- Construct a new Riverside 138-kV switching station by cutting into the existing Dansby to Thompson Creek 138-kV line using a 3-breaker ring bus configuration
- Construct a new RELLIS to Riverside 138-kV transmission line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 6.1 miles
- Construct a new Steele Store to Cooks Point 138-kV transmission line on single-circuit structures with normal and emergency rating of at least 440 MVA, approximately 7.2 miles
- Re-build the existing Atkins to TAMU 138-kV single-circuit line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 3.3 miles

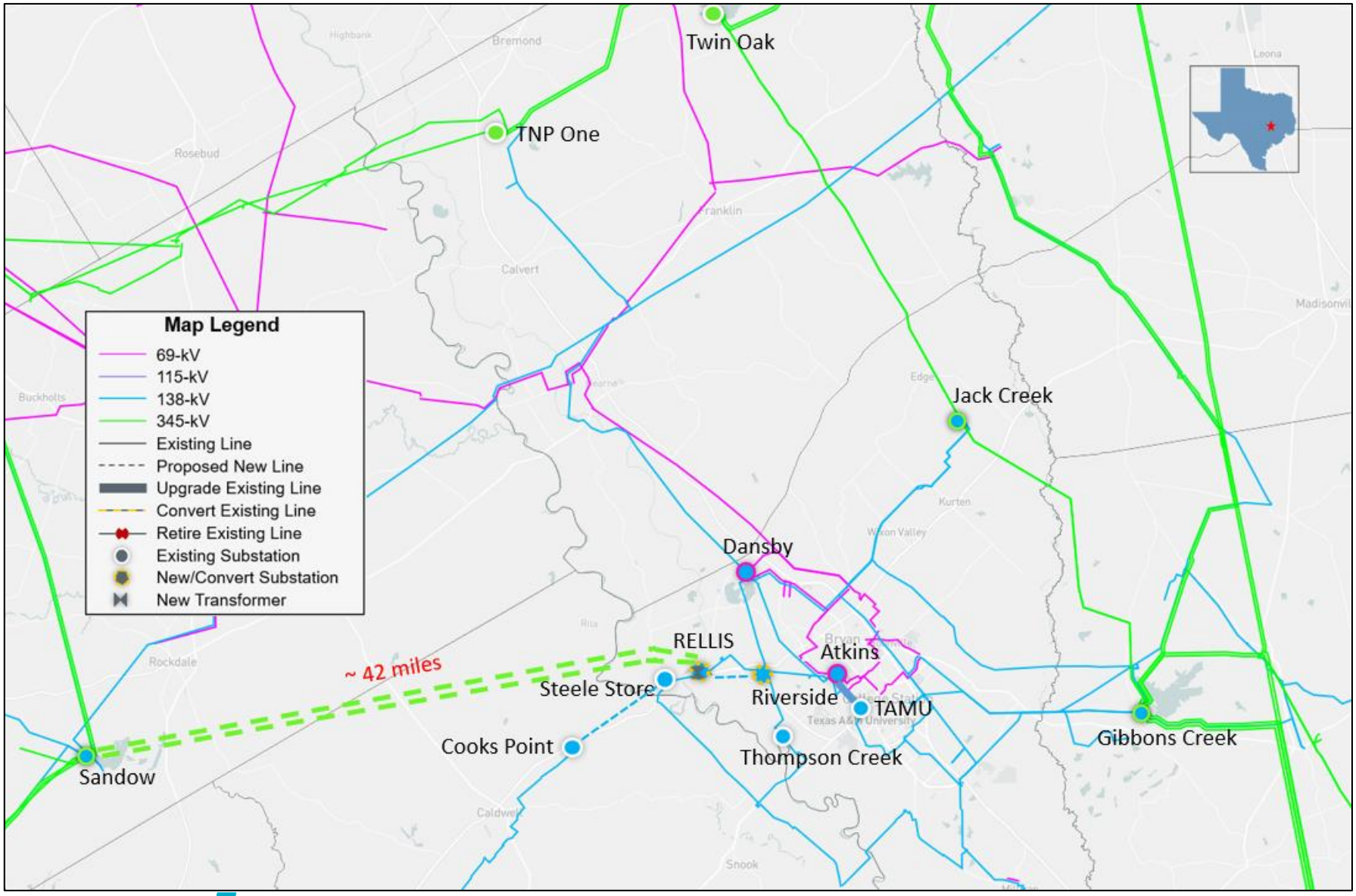
Option 2: TNP One to RELLIS 138-kV Line



Option 2: TNP One to RELLIS 138-kV Line

- Establish a new 138-kV switchyard at the existing TNP One 345-kV substation and include one 345/138-kV autotransformer with normal and emergency rating of at least 600 MVA
- Construct a new TNP One to RELLIS 138-kV double-circuit transmission line on double-circuit capable structures with both circuits in place with normal and emergency rating of at least 495 MVA for each circuit, approximately 40 miles
- Install two capacitor banks (54 MVAr each) at RELLIS 138-kV substation
- Construct a new Riverside 138-kV switching station by cutting into the existing Dansby to Thompson Creek 138-kV line using a 3-breaker ring bus configuration
- Construct a new RELLIS to Riverside 138-kV transmission line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 6.1 miles
- Construct a new Steele Store to Cooks Point 138-kV transmission line on single-circuit structures with normal and emergency rating of at least 440 MVA, approximately 7.2 miles
- Re-build the existing Atkins to TAMU 138-kV single-circuit line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 3.3 miles

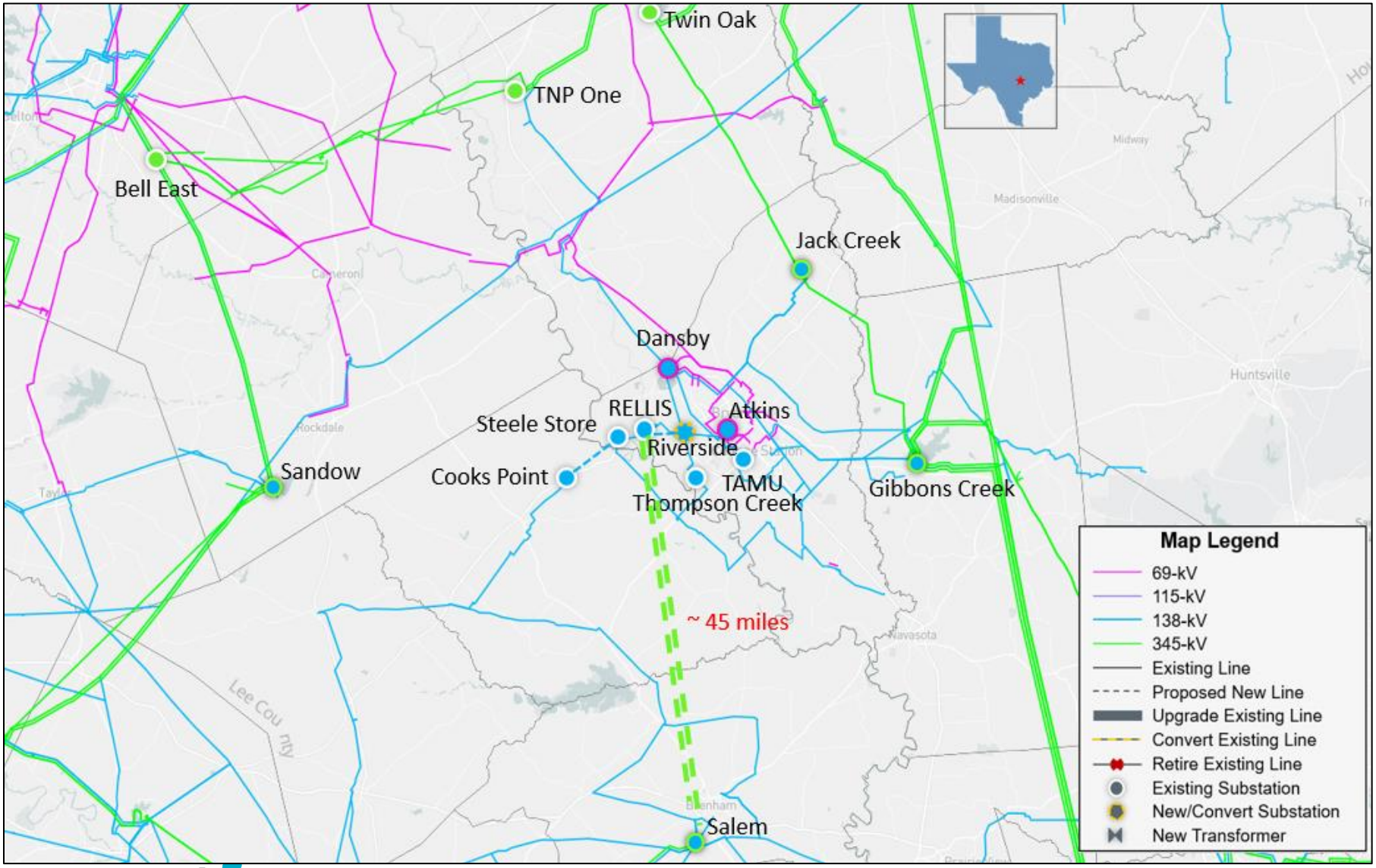
Option 3: Sandow to RELLIS 345-kV Line



Option 3: Sandow to RELLIS 345-kV Line

- Expand the existing RELLIS 138-kV substation to establish a new RELLIS 345/138-kV switchyard by installing four additional 138-kV breakers in the existing 138-kV ring bus and adding four 345-kV breakers in a ring bus configuration
  - Install two 345/138-kV autotransformers with normal and emergency rating of at least 600 MVA for each transformer
  - Install two capacitor banks (54 MVAr each) at RELLIS 138-kV substation
- Construct a new Sandow to RELLIS 345-kV double-circuit transmission line on double-circuit capable structures with both circuits in place with normal and emergency rating of at least 1765 MVA for each circuit, approximately 42 miles
- Construct a new Riverside 138-kV switching station by cutting into the existing Dansby to Thompson Creek 138-kV line using a 3-breaker ring bus configuration
- Construct a new RELLIS to Riverside 138-kV transmission line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 6.1 miles
- Construct a new Steele Store to Cooks Point 138-kV transmission line on single-circuit structures with normal and emergency rating of at least 440 MVA, approximately 7.2 miles
- Re-build the existing Atkins to TAMU 138-kV single-circuit line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 3.3 miles

Option 4: Salem to RELLIS 345-kV Line



Option 4: Salem to RELLIS 345-kV Line

- Expand the existing RELLIS 138-kV substation to establish a new RELLIS 345/138-kV switchyard by installing four additional 138-kV breakers in the existing 138-kV ring bus and adding four 345-kV breakers in a ring bus configuration
  - Install two 345/138-kV autotransformers with normal and emergency rating of at least 600 MVA for each transformer
  - Install two capacitor banks (54 MVAr each) at RELLIS 138-kV substation
- Construct a new Salem to RELLIS 345-kV double-circuit transmission line on double-circuit capable structures with both circuits in place with normal and emergency rating of at least 1765 MVA for each circuit, approximately 45 miles
- Construct a new Riverside 138-kV switching station by cutting into the existing Dansby to Thompson Creek 138-kV line using a 3-breaker ring bus configuration
- Construct a new RELLIS to Riverside 138-kV transmission line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 6.1 miles
- Construct a new Steele Store to Cooks Point 138-kV transmission line on single-circuit structures with normal and emergency rating of at least 440 MVA, approximately 7.2 miles
- Re-build the existing Atkins to TAMU 138-kV single-circuit line on double-circuit capable structures with one circuit in place with normal and emergency rating of at least 495 MVA, approximately 3.3 miles

Preliminary Results of Reliability Assessment – Options

	N-1		G-1*+N-1		X-1**+N-1	
	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations
Option 1	None	None	None	None	None	None
Option 2	None	None	None	None	None	None
Option 3	5	None	3	None	1	None
Option 4	None	None	None	None	None	None

*G-1 Generator tested: Dansby Unit 1 and Frontier Combined Cycle Train
**X-1 Transformers tested: Jack Creek T1 and Gibbons Creek T2

- Option 1, Option 2, and Option 4 were short-listed for further evaluations

Planned Maintenance Outage Scenario Analysis

- ERCOT conducted planned maintenance outage analysis on three short-listed options to compare relative performance of the options
  - 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 results of planned maintenance outage analysis

Option	Unsolved Power Flow	Thermal Overloads	Voltage Violations
1	None	None	None
2	None	None	None
4	None	None	None

Next Steps and Tentative Timeline

- ERCOT will continue to evaluate options and provide status updates at future RPG meetings
  - Long-term load-serving capability assessment
  - Cost estimates and feasibility assessment
- 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)
- 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
- Tentative timeline
  - Final recommendation – Q3 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
87395	LCRATSC_Caldwell_Substation_Addition	Tier 4	May-25	Burleson
80404	Reroute East to Rodgers 69kV line to create East to Rayburn 69kV line to accommodate the TXDOT SH6 project	Tier 4	Jun-26	Brazos
80424	Rebuild / Reconductor Dansby to Business Park 69kV for Rail Spur	Tier 4	Jun-26	Brazos
80384	Reconductor Gibbons Creek to Greens Prairie Line	Tier 4	Jun-26	Grimes
78175	BEPC_27TPIT78175_Franklin_Capacitor	Tier 4	Oct-26	Robertson
80342	BEPC_TPIT80342_HILLTOPLAKES_SECONDAUTO	Tier 4	Mar-27	Leon
80340	BEPC_TPIT80340_KEITHSW_IOLA	Tier 4	Mar-27	Grimes
80420	Rebuild / Reconductor Greens Prairie to South Switch 138kV Line	Tier 4	Jun-28	Brazos
80346	BEPC_TPIT80346_SANDYSW_CRUTCHFIELD	Tier 4	Mar-29	Grimes
80373	BEPC_TPIT80373_IOLA_CRUTCHFIELD	Tier 4	Mar-29	Grimes

Appendix B – Transmission Projects

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

RTP Project ID	Project Name	County
2024-E4	Bryan Area Project	Brazos, Burleson, Robertson

Appendix C – New Generation Projects to Add

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
21INR0359	Hickerson Solar	SOL	03/01/2026	316.3	Bosque
22INR0525	St. Gall II Energy Storage	OTH	07/01/2025	100.2	Pecos
23INR0372	Cross Trails Storage	OTH	05/26/2025	58.3	Scurry
24INR0493	Crowned Heron BESS 2	OTH	07/31/2025	154.2	Fort Bend
24INR0578	Panther Creek 1 Repower	WIN	04/01/2025	11.0	Glasscock
24INR0582	Panther Creek 2 Repower	WIN	04/01/2025	8.0	Glasscock
24INR0631	Radian Storage SLF	OTH	04/22/2025	160.3	Brown
25INR0231	Apache Hill BESS	OTH	11/15/2026	200.9	Hood
25INR0578	Forest Creek Wind Repower	WIN	12/15/2025	125.1	Glasscock
25INR0672	Fagus Solar Park 2 SLF	SOL	02/11/2026	166.6	Childress
26INR0524	Fagus Solar Park 3 SLF	SOL	04/01/2026	186.8	Childress
20INR0162	Diamondback solar	SOL	12/31/2027	203.8	Starr
22INR0239	Rockefeller Storage	OTH	06/01/2027	206.8	Schleicher
22INR0437	TORMES SOLAR	SOL	03/31/2027	382.1	Navarro
22INR0457	Anson BAT	OTH	05/29/2026	150.6	Jones
23INR0181	Starling Storage	OTH	05/15/2027	63.6	Gonzales
23INR0244	Tiger Solar	SOL	06/30/2027	255.0	Jones
24INR0126	High Noon Storage	OTH	12/01/2027	94.0	Hill
24INR0188	Tehuacana Creek Solar SLF	SOL	03/10/2027	505.5	Navarro
24INR0189	Tehuacana Creek BESS SLF	OTH	03/10/2027	419.0	Navarro

Appendix C – New Generation Projects to Add (cont.)

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
24INR0201	Short Creek Solar	SOL	03/02/2029	625.0	Wichita
24INR0305	MRG Goody Storage	OTH	01/31/2026	52.3	Lamar
24INR0355	Anatole Renewable Energy Storage	OTH	01/11/2026	207.8	Henderson
24INR0364	Pitts Dudik II	SOL	01/29/2026	30.2	Hill
24INR0386	Black & Gold Energy Storage	OTH	06/30/2027	254.6	Menard
24INR0498	Fort Watt Storage	OTH	04/20/2027	205.4	Tarrant
24INR0528	Blanquilla BESS	OTH	05/15/2026	200.8	Nueces
24INR0584	Houston IV BESS	OTH	06/03/2026	168.6	Harris
25INR0018	Yellow Cat Wind	WIN	09/30/2026	301.2	Navarro
25INR0046	Blue Skies BESS	OTH	12/31/2027	306.3	Hill
25INR0103	Elio BESS	OTH	12/02/2026	317.2	Brazoria
25INR0282	Hornet Solar II SLF	SOL	06/01/2026	209.0	Swisher
25INR0283	Hornet Storage II SLF	OTH	06/01/2026	208.0	Swisher
25INR0319	Northington Solar	SOL	07/15/2027	129.8	Wharton
25INR0391	Purple Sage BESS 1	OTH	05/30/2027	156.0	Collin
25INR0392	Purple Sage BESS 2	OTH	05/30/2027	156.0	Collin
25INR0425	Aldrin 345 BESS	OTH	12/01/2027	362.0	Brazoria
25INR0492	Blue Summit Energy Storage	OTH	07/01/2026	100.0	Wilbarger
26INR0034	Bracero Pecan Storage	OTH	06/01/2026	232.0	Reeves
26INR0189	Skipjack Energy Storage	OTH	04/05/2027	150.6	Brazoria

Appendix C – New Generation Projects to Add (cont.)

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
26INR0226	First Capitol BESS	OTH	05/01/2026	257.5	Brazoria
26INR0269	Moccasin Solar	SOL	06/01/2027	806.8	Stonewall
26INR0296	Sherbino II BESS SLF	OTH	02/08/2026	77.4	Pecos
26INR0333	VERTUS ENERGY STORAGE	OTH	02/01/2026	401.4	Galveston
26INR0447	Honey Mesquite Wind Farm	WIN	12/15/2026	180.5	Glasscock
26INR0452	Cannibal Draw Solar	SOL	04/10/2028	149.5	Glasscock
26INR0453	Cannibal Draw Storage	OTH	04/10/2028	98.6	Glasscock
26INR0543	Three Canes Solar SLF	SOL	12/31/2026	333.0	Navarro