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CPS Energy (CPS) – Combined Reactive Power Planning Project & Helotes 345/138-kV Switching Station and Autotransformer Addition at Eastside Switching Station Project (25RPG013 & 25RPG017) – ERCOT Independent Review (EIR) Recommendation

Travis Head

Regional Planning Group (RPG) Meeting
April 13, 2026

Introduction

CPS Energy (CPS) submitted the Reactive Power Planning Project (25RPG013) for Electric Reliability Council of Texas' (ERCOT) Regional Planning Group (RPG) review in May 2025

- This is a Tier 1 project with an estimated cost of approximately $116.5 million and will not require a Certificate of Convenience and Necessity (CCN)
- Estimated in-service date (ISD) is December 2029
- This project is needed to address post-contingency voltage violations in Bexar County in the South Central Weather Zone

CPS submitted the Helotes 345/138-kV Switching Station and Autotransformer Addition at Eastside Switching Station Project (25RPG017) for ERCOT's RPG review in June 2025

- This is a Tier 1 project with an estimated cost of approximately $110.0 million and will not require a CCN
- Estimated ISD is Summer 2028 and Summer 2029
- This project is needed to address post-contingency thermal violations in Bexar County in the South Central Weather Zone

Introduction (Continued)

This project is currently under a single ERCOT Independent Review (EIR) by combing these two projects (25RPG013 and 25RPG017) and ERCOT is presenting its recommendation

- CPS presented a project overview and ERCOT provided a project scope at the July 2025 RPG Meeting
- ERCOT provided EIR status updates at previous RPG Meetings
  - August 2025 RPG Meeting
  - October 2025 RPG Meeting
  - December 2025 RPG Meeting
  - January 2026 RPG Meeting
  - February 2026 RPG Meeting
  - March 2026 RPG Meeting

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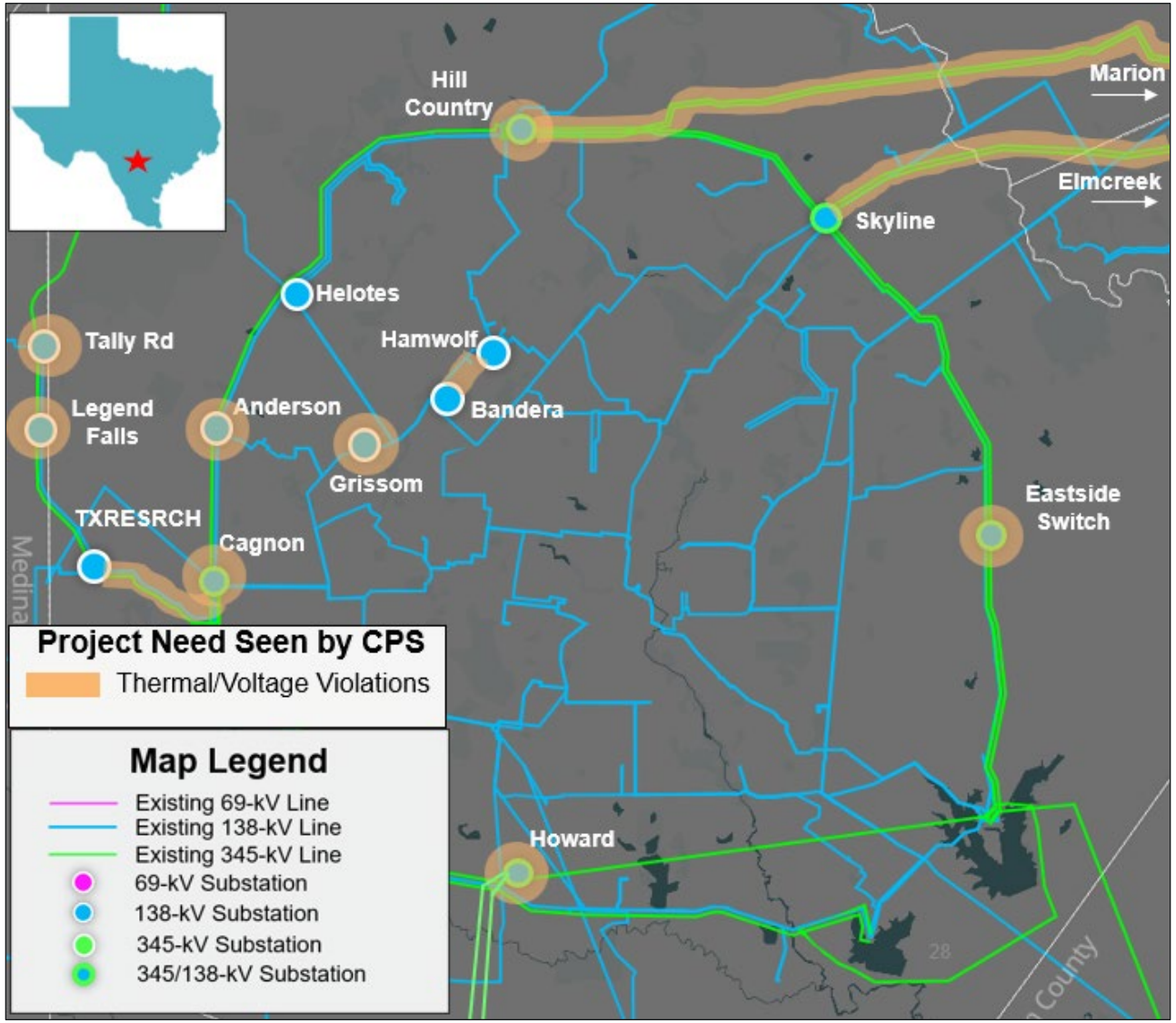
Study Area Map with Project Needs Seen by CPS



Study Assumptions

Study Region

- The project is located in Bexar County in the South Central Weather Zone and all transmission elements in counties that are electrically close were be monitored

Steady-State Base Case

- Final 2024 Regional Transmission Planning (RTP) 2030 summer peak load case, published on Market Information System (MIS) on December 22, 2024, was updated to construct the study base case

Load Updates

- Approximately 5,140 MW of confirmed loads (listed in Appendix C) in the study region was updated to create the study base case

Reserve

- The reserve was kept consistent with the 2024 RTP

Study Assumptions (continued)

Transmission Updates

- New transmission projects (listed in Appendix A1), based on the February 2025 Transmission Project and Information Tracking (TPIT) report, were added to the base case
- Transmission projects (listed in Appendix A2) identified in the 2024 RTP in the study area that have not been approved by RPG were removed

Generation Updates

- New generation (listed in Appendix B) that met ERCOT Planning Guide Section 6.9(1) condition with Commercial Operation Date (COD) before June 2030 in and outside the study area at the time of the study, but not already modeled in the RTP cases, was added to the case based on June 2025 Generator Interconnection Status (GIS) report published in MIS in July 2025
- All generation was dispatched consistent with the 2024 RTP methodology

Results of Reliability Assessment – Base Case

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

Contingency Category	Thermal Overloads	Voltage Violations	Unsolved Power Flow
P0: N-0	None	None	None
P1, P2-1, P7	14*	144*	2*
P2-2, P2-3, P4, P5	None	None	None
P3: (G-1+N-1)**	12*	144*	37*
P6-2: (X-1+N-1)**	17*	145*	11*

* Violations seen in the basecase under P1 and P7 events were also seen under G-1+N-1 and/or X-1+N-1 events

** See Appendix D for the list of G-1 generators and X-1 transformers being tested

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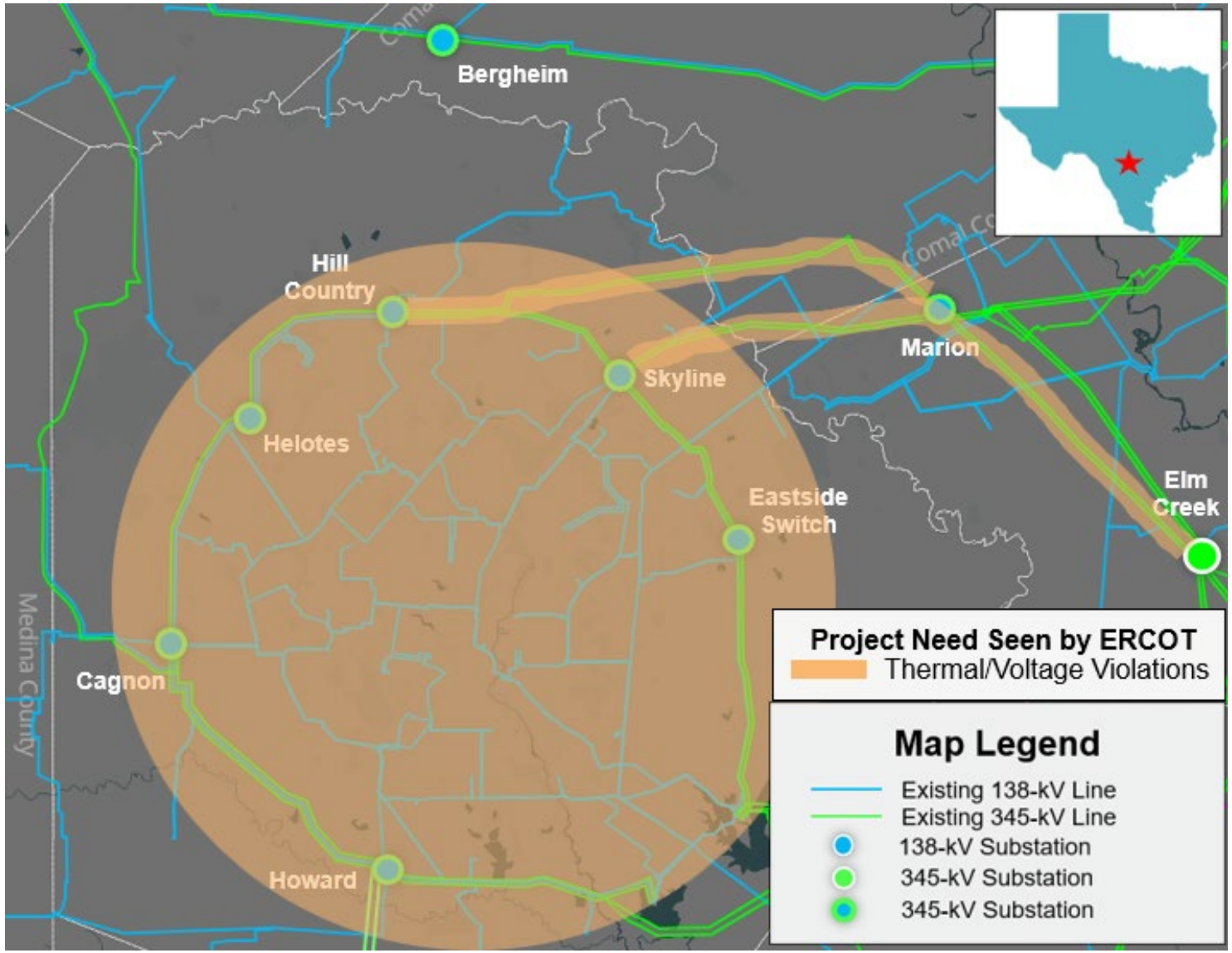
Study Area Map with Project Needs Seen by ERCOT



List of Options Considered

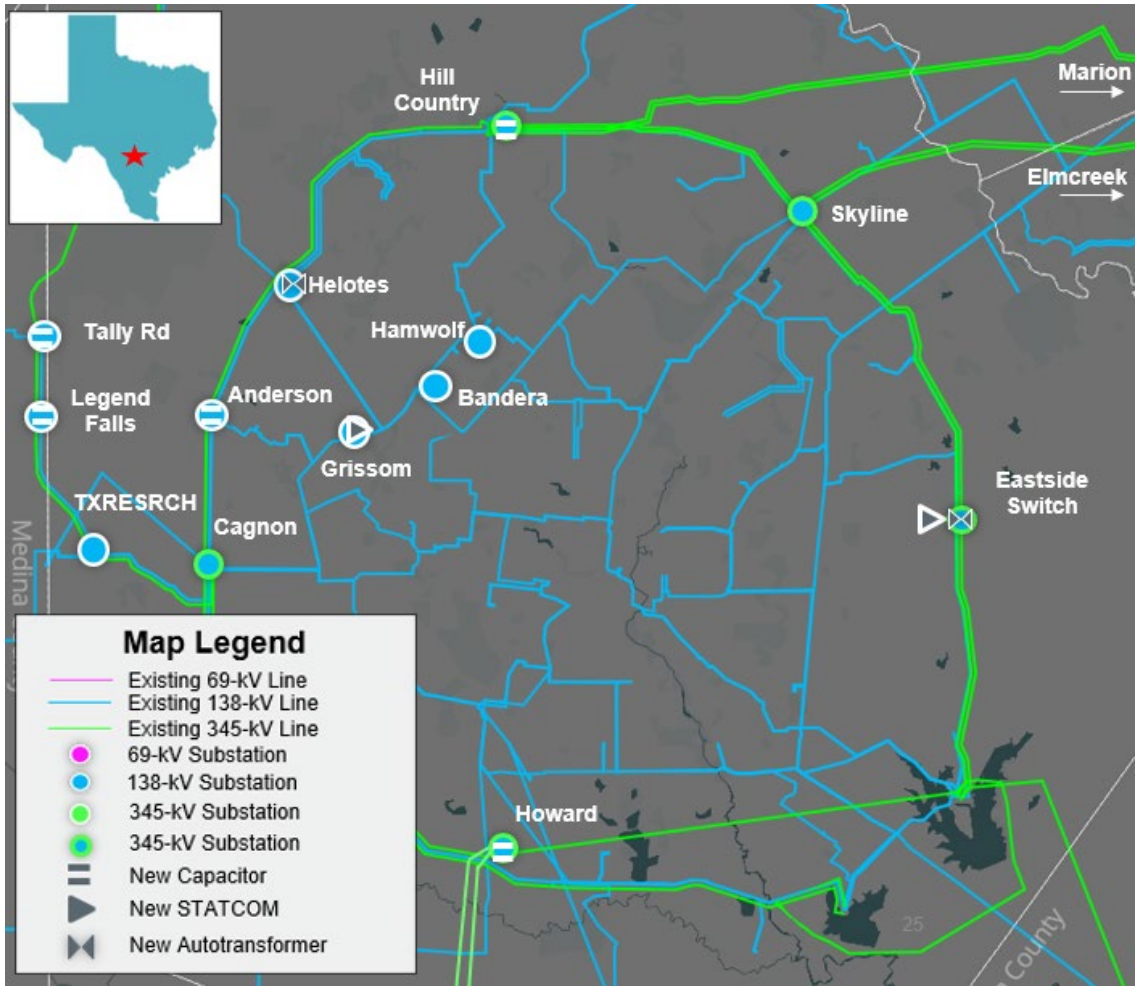
ERCOT evaluated the following options to resolve the reliability violation seen in the study area by ERCOT:

- Option 1 – Combined CPS Proposed Project
- Option 2 – ERCOT Alternative Option
- Option 3 – ERCOT Alternative Option
- Option 3A – ERCOT Alternative Option

Option 1 – Combined CPS Proposed Project

Option 1 Summary of Upgrades

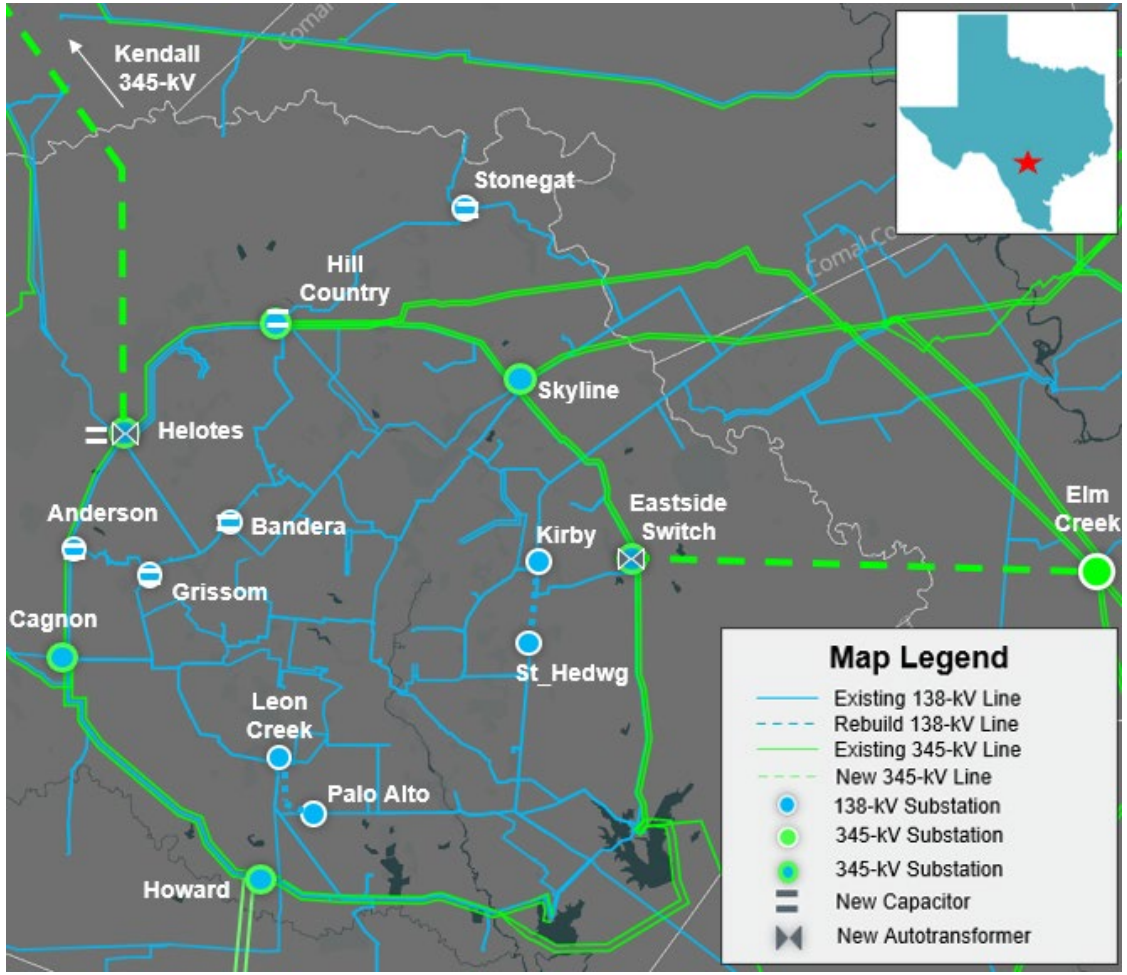
- Convert the existing Helotes 138-kV substation into a new 345-kV switching substation looping into the adjacent 345-kV transmission lines
- Install three 345/138-kV autotransformers
- Install sized capacitors totaling 200 MVAr
- Install two STATCOMs totaling 600 MVAr
- Detailed list of upgrades are in Appendix F1



Option 2 – ERCOT Alternative Option

Option 2 Summary of Upgrades

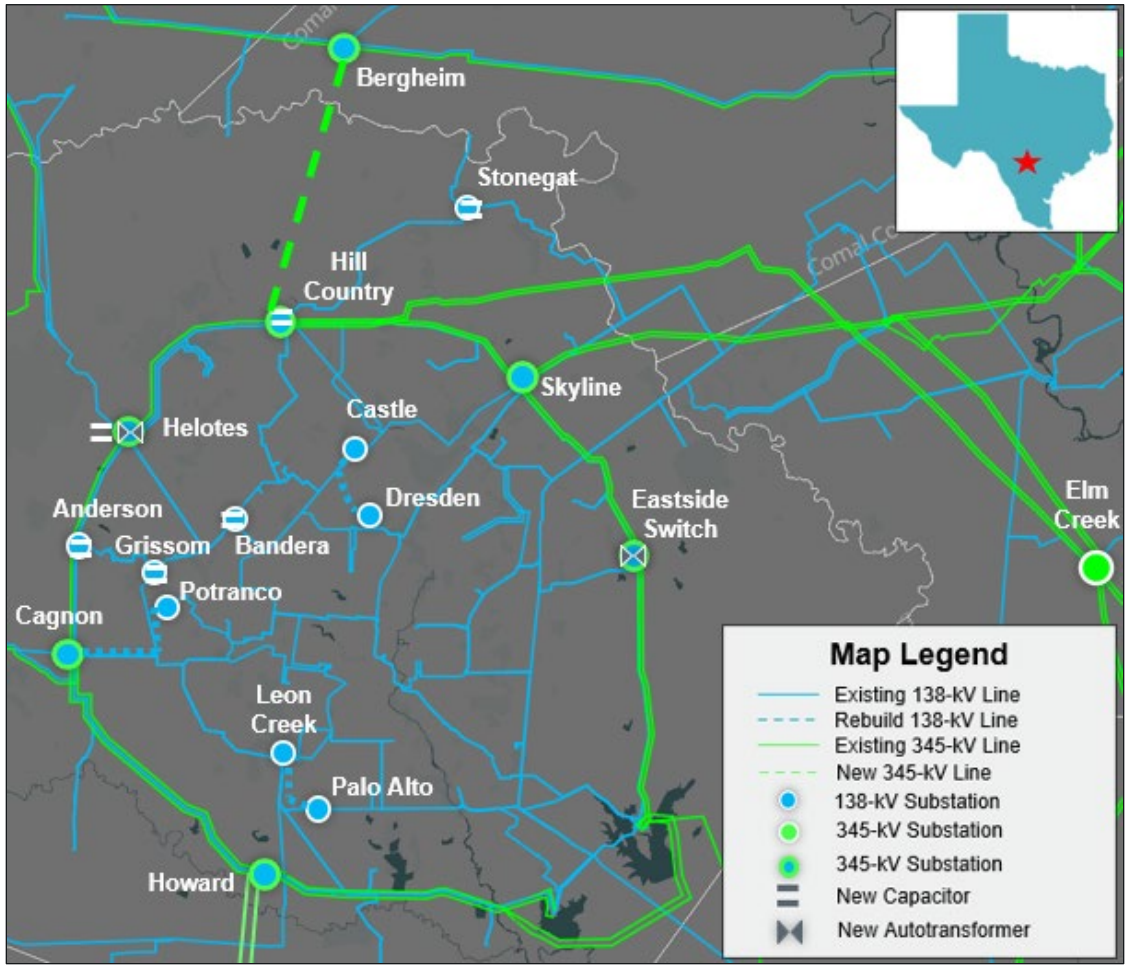
- Convert the existing Helotes 138-kV substation into a new 345-kV switching substation looping into the adjacent 345-kV transmission lines
- Install three 345/138-kV autotransformers
- Install sized capacitors totaling 300 MVAr
- Construct two new 345-kV transmission lines, ~62.5 circuit-miles
- Rebuild two existing 138-kV transmission lines, ~6.3 circuit-miles
- Detailed list of upgrades are in Appendix F2



Option 3 – ERCOT Alternative Option

Option 3 Summary of Upgrades

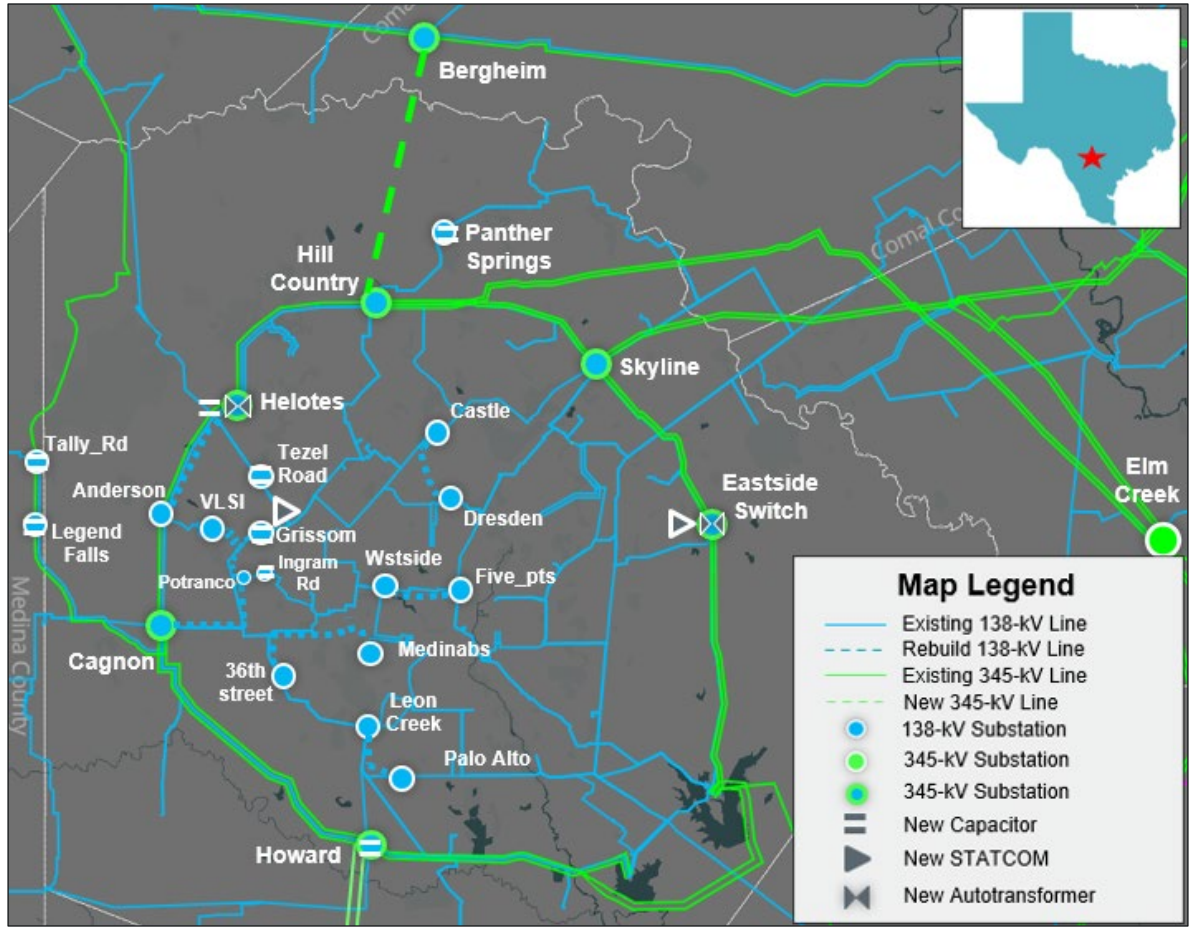
- Convert the existing Helotes 138-kV substation into a new 345-kV switching substation looping into the adjacent 345-kV transmission lines
- Install three 345/138-kV autotransformers
- Install sized capacitors totaling 300 MVAr
- Construct one new 345-kV transmission line, ~14.3 circuit-miles
- Rebuild three existing 138-kV transmission lines, ~13.3 circuit-miles
- Detailed list of upgrades are in Appendix F3



Option 3A – ERCOT Alternative Option

Option 3A Summary of Upgrades

- Convert the existing Helotes 138-kV substation into a new 345-kV switching substation looping into the adjacent 345-kV transmission lines
- Install three 345/138-kV autotransformers
- Install sized capacitors totaling 270 MVAr
- Install two STATCOMs totaling 600 MVAr
- Construct one new 345-kV transmission line, ~14.3 circuit-miles
- Rebuild eight existing 138-kV transmission lines, ~43.1 circuit-miles
- Detailed list of upgrades are in Appendix F4



Results of Reliability Assessment – Options

ERCOT conducted steady-state load flow analysis for the all the option cases according to the NERC Reliability Standard TPL-001-5.1 and ERCOT Planning Criteria to evaluate the proposed project and alternatives options

Option	N-0		N-1		G-1+N-1*		X-1+N-1*		Unsolved Power Flows
	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	
1	None	None	None	None	None	None	7	None	None
2	None	None	None	None	None	None	None	None	None
3	None	None	None	None	None	None	None	None	None
3A	None	None	None	None	None	None	None	None	None

*See Appendix D for the list of G-1 generators and X-1 transformers being tested

Key Takeaway: Option 2, Option 3, and Option 3A observed no reliability violations while Option 1 continued to show violations

Results of Maintenance Outage Evaluation

ERCOT conducted maintenance outage analyses on all four options to compare relative performance of the options

- Load level in the South Central Weather Zone was scaled down based on the historical non-summer peak data to 80.3%, in order to mimic the non-summer peak load condition
- Based on the review of system topology of the study area, ERCOT tested N-2 contingency combinations, and then tested all applicable contingency violations with system adjustments (N-1-1)

Option	Thermal Violation	Voltage Violation	Unsolved Power Flow
Base	12	None	None
1	18	None	None
2	5	None	None
3	5	None	None
3A	None	None	None

Key Takeaway: No reliability violations were observed in the N-1-1 analysis for Option 3A

Long-Term Load-Serving Capability Assessment

ERCOT conducted a long-term load-serving capability assessment on all four options to compare relative performance of the options

- Adjusted load up in the study area, excluding non-scalable loads in the area
- Adjusted conforming load down outside of the South Central Weather Zone to balance power
- Based on N-1 contingency

Option	Incremental Load-Serving Capability (~MW)
1	37.7
2	8.7
3	136.4
3A	178.3

Key Takeaway: Option 3A provides more incremental load-serving capability than Option 1, Option 2, and Option 3

Cost Estimate and Feasibility Assessment

Transmission Service Providers (TSPs) performed feasibility assessments and provided cost estimates for the four options

Option	Cost Estimates (~$M)	CCN Required (~miles)	Feasibility	Expected ISD
1	235.0	None	No	December 2029
2	N/A	Yes (62.5)	No	N/A
3	N/A	Yes (14.3)	No	N/A
3A	477.7	Yes (14.3)	Yes	May 2031

Key Takeaways:

- **Option 3A was deemed feasible while the alternative options were deemed infeasible**
- **Option 3A has an expected ISD of May 2031**
- **A CCN will be required for Option 3A**

Comparison of Options

	Option 1	Option 2	Option 3	Option 3A
Meets ERCOT and NERC Reliability Criteria	No	No	No	Yes
Improves Long-Term Load-Serving Capability (~MW)	37.7	8.7	136.4	178.3
Requires CCN (~miles)	No	Yes (62.5)	Yes (14.3)	Yes (14.3)
Cost Estimate* (~$M)	235.0	N/A	N/A	477.7
Feasible	No	No	No	Yes
Expected ISD	December 2029	N/A	N/A	May 2031

*Cost estimates were provided by the TSP(s)

Key Takeaways:

- **Option 3A observed no reliability violations and met the project need**
- **Option 3A is feasible for construction**
- **Option 3A provides the best long-term load-serving capability**

ERCOT Preferred Option

Option 3A 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 feasible for construction

Additional Analyses

Congestion Analysis

- Congestion analysis was performed for the preferred option using the 2024 RTP 2029 economic base case
- The ERCOT preferred option did not result in significant new congestion within the study area

Generation Addition Sensitivity Analysis

- ERCOT performed a generation addition sensitivity, per ERCOT Planning Guide Section 3.1.3(4)(a), by adding new the generation listed in Appendix E 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

- Planning Guide Section 3.1.3(4)(b) requires an evaluation of the potential impact of load scaling on the criteria violations seen in this EIR. Starting 2024, ERCOT RTP adopted a new methodology of having one summer peak case for each study year with non-coincident peaks for each of the Weather Zones, which would eliminate the load scaling impact. The study case did not include load scaling as such load scaling sensitivity analysis is no longer needed

Subsynchronous Oscillations (SSO) Assessment

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

Dynamic Stability Analysis

ERCOT conducted a dynamic stability analysis for the ERCOT-preferred Option 3A. ERCOT updated the DWG 2031 Summer Peak case by incorporating the following key elements for evaluation:

- Additional PG6.9 generation in the study area
- Dynamic load models provided by CPS
- Option 3A upgrades, including STATCOM dynamic data provided by CPS
- Critical contingencies in the study area: P1, P2, P4, P5, P7, and ERCOT2

Key Takeaway: No adverse dynamic stability impacts were observed from the implementation of Option 3A (ERCOT-preferred option).

ERCOT Recommendation

ERCOT recommends Option 3A

- Estimated Cost: approximately $477.7 million
- Expected ISD: May 2031
- CCN filling would be required for:
  - New Hill Country to Bergheim 345-kV transmission line on double-circuit capable structures with one circuit on place, approximately 14.3 miles of new ROW.

ERCOT Recommendation Components Summary

Summary of Upgrades

- Convert the existing Helotes 138-kV substation into a new 345-kV switching substation looping into the adjacent 345-kV transmission lines
- Install three 345/138-kV autotransformers
- Install sized capacitors totaling 270 MVAr
- Install two STATCOMs totaling 600 MVAr
- Construct one new 345-kV transmission line, ~14.3 circuit-miles
- Rebuild eight existing 138-kV transmission lines, ~43.1 circuit-miles
- Detailed list of upgrades are in Appendix F4

ERCOT Recommendation Details

- Convert the existing Helotes 138-kV substation to a new 345/138-kV switching substation
  - Construct a new 345-kV Helotes switching yard using a breaker-and-a-half configuration utilizing seven circuit breakers
  - Install two new 345/138-kV autotransformers at the new Helotes 345/138-kV switching substation, with normal and emergency ratings of at least 600 MVA
  - Loop into the existing Hill Country to Cagnon 345-kV transmission line into the new Helotes 345-kV substation
- Install a new 345/138-kV autotransformer at the existing Eastside 345/138-kV substation, with normal and emergency ratings of at least 600 MVA
- Construct a new Hill Country to Bergheim 345-kV transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 1,980 MVA, which will require a new ROW, approximately 14.28 miles
- Rebuild the existing Castle to Dresden 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.79 miles
- Rebuild the existing Cagnon to Potranco 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 5.87 miles

ERCOT Recommendation Details

- Rebuild the existing Leon Creek to Palo Alto 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.64 miles
- Rebuild the existing Medinabs to 36th Street 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 8.57 miles
- Rebuild the existing Cagnon to VLSI 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 8.74 miles
- Rebuild the existing Five_pts to Wstside 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.78 miles
- Rebuild the existing Grissom to VLSI 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.03 miles
- Rebuild the existing Anderson to Helotes 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 600 MVA, approximately 5.67 miles

ERCOT Recommendation Details

- Install the following sized capacitors at the following 138-kV substations:
  - 50 MVAr, Helotes
  - 50 MVAr, Howard
  - 35 MVAr, Ingram Road
  - 25 MVAr, Legend Falls
  - 50 MVAr, Panther Springs
  - 25 MVAr, Tally_Rd
  - 35 MVAr, Tezel Road
- Install the following STATCOMs at the following 138-kV substations:
  - 300 MVAr, Grissom
  - 300 MVAr, Eastside Switch

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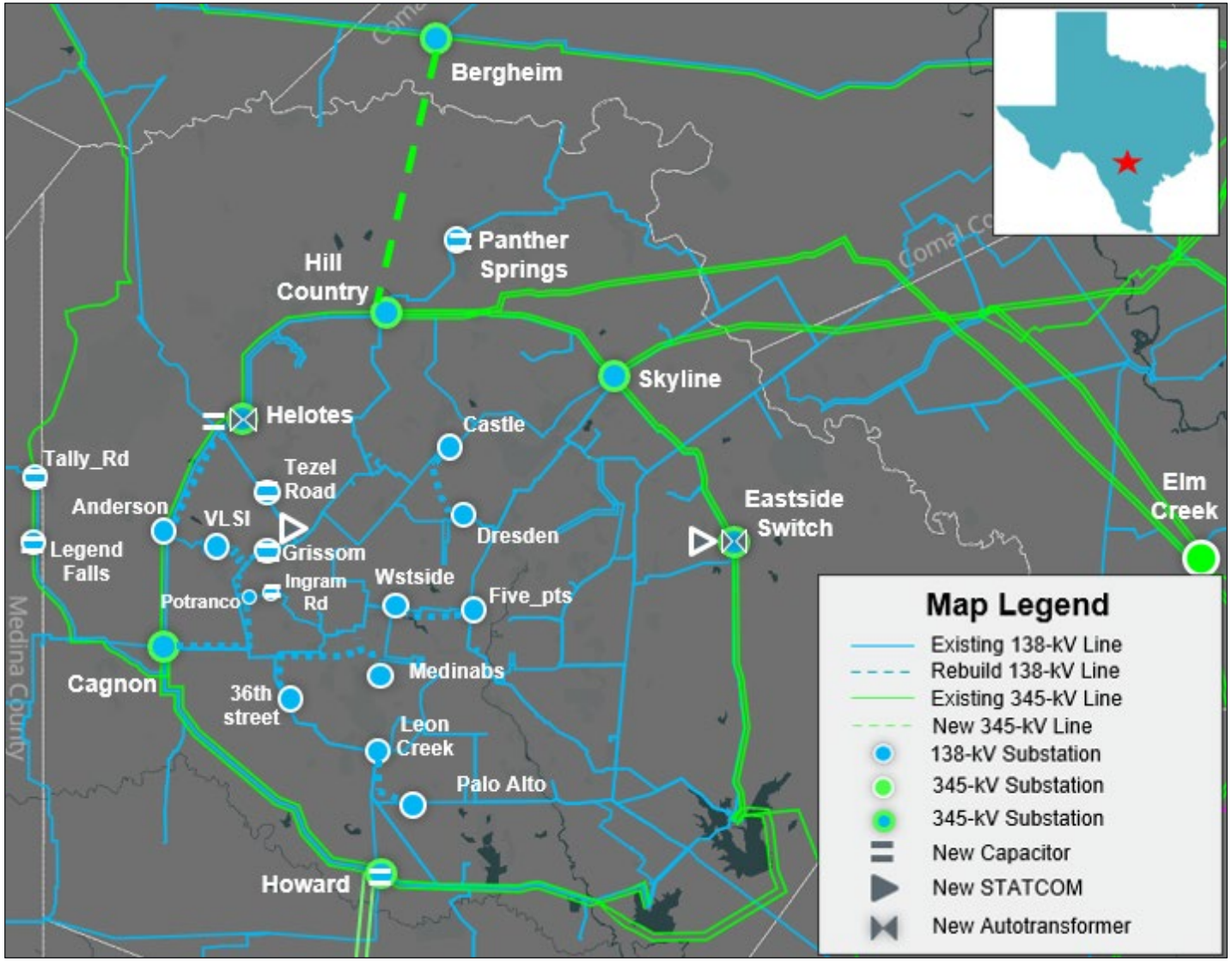
Map of ERCOT Recommendation



Deliverables or Next Step

Tentative Timelines

- EIR report to be posted in the Market Information Service (MIS) in April 2026
- EIR recommendation to Technical Advisory Committee (TAC) in May 2026
  - Post TAC material on May 12, 2026
  - Collect and consolidate questions on May 14, 2026
  - Post consolidated questions and ERCOT responses on May 15, 2026
- Seek ERCOT Board of Directors (BOD) endorsement in June 2026

Key Takeaway: Seek ERCOT BOD endorsement in June 2026

Thank you!
Questions/Comments?

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Appendix

- Appendix A1: Transmission Projects Added
- Appendix A2: Transmission Backed Out
- Appendix B: Generation Added
- Appendix C: List of Newly Confirmed Load
- Appendix D: List of G-1 Generators and X-1 Transformers Tested
- Appendix E: New Generation Projects to Add for Generation Sensitivity Analysis
- Appendix F1: Option 1 – Combined CPS Proposed Project Details
- Appendix F2: Option 2 – ERCOT Alternative Option Details
- Appendix F3: Option 3 – ERCOT Alternative Option Details
- Appendix F4: Option 3A – ERCOT Alternative Option Details

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Appendix A1: Transmission Projects Added

TPIT	Project Name	Tier	Project ISD	County(s)
89912	GVEC_Olmos to Wilson 138 kV TL, T297	Tier 4	12/01/26	Guadelupe

Appendix A2: Transmission Backed Out

RTP Project ID	Project Name	County(s)
2024-SC19	Hillje (44200) to Zorn (7042) 345-kV Line Upgrades	Wharton, Fayette, Bastrop, Caldwell, Guadalupe
2024-SC26	Shaula (5380) to Elm Creek (5133) to Cachena (5068) 345-kV Line Upgrades	Wilson, Guadalupe, Dewitt

Appendix B: Generation Added

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
20INR0162	Diamondback Solar	SOL	12/31/2027	203.8	Starr
21INR0359	Hickerson Solar	SOL	11/21/2025	311.1	Bosque
22INR0220	Lamkin Solar	SOL	08/08/2027	101.5	Comanche
22INR0239	Rockefeller Storage	BESS	06/01/2027	206.8	Schleicher
22INR0437	TORMES SOLAR	SOL	03/31/2027	382.1	Navarro
22INR0457	Anson BAT	BESS	08/01/2026	150.6	Jones
22INR0605	Camino Santiago Solar	SOL	02/18/2027	196.3	Milam
23INR0078	Shaw Solar	SOL	04/29/2026	124.7	Bandera
23INR0181	Starling Storage	BESS	05/15/2027	63.6	Gonzales
23INR0225	MRG GOODY SOLAR	SOL	05/02/2026	170.8	Lamar
23INR0479	Taormina Storage	BESS	05/26/2029	231.9	Bexar
23INR0538	Roadrunner Crossing BESS SLF	BESS	12/31/2025	150.4	Eastland
24INR0126	High Noon Storage	BESS	05/09/2028	94.0	Hill
24INR0181	Bynum Solar Project	SOL	12/01/2025	56.0	Coryell
24INR0188	Tehuacana Creek Solar SLF	SOL	03/10/2027	505.5	Navarro

Appendix B: Generation Added (Continued)

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
24INR0189	Tehuacana Creek BESS SLF	BESS	03/10/2027	419.0	Navarro
24INR0305	MRG Goody Storage	BESS	05/02/2026	52.3	Lamar
24INR0355	Anatole Renewable Energy Storage	BESS	03/31/2027	207.8	Henderson
24INR0364	Pitts Dudik II	SOL	02/04/2026	30.2	Hill
24INR0386	Black & Gold Energy Storage	BESS	06/30/2027	254.6	Menard
24INR0453	Longfellow BESS I	BESS	01/31/2026	55.0	Pecos
24INR0455	Longfellow BESS II	BESS	01/31/2026	105.8	Pecos
24INR0493	Crowned Heron BESS 2	BESS	03/31/2026	154.2	Fort Bend
24INR0528	Blanquilla BESS	BESS	05/15/2026	200.8	Nueces
24INR0533	Padua Grid BESS Unit 2	BESS	03/15/2026	150.9	Bexar
24INR0584	Houston IV BESS	BESS	06/03/2026	164.6	Harris
25INR0018	Yellow Cat Wind	WIN	04/01/2027	262.0	Navarro
25INR0046	Blue Skies BESS	BESS	12/31/2027	306.3	Hill
25INR0199	Bonham Solar 1	SOL	08/31/2026	138.4	Limestone
25INR0229	OCI Cobb Creek Solar	SOL	12/01/2026	203.1	Hill

Appendix B: Generation Added (Continued)

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
25INR0233	OCI Cobb Creek ESS	BESS	12/01/2026	201.6	Hill
25INR0391	Purple Sage BESS 1	BESS	05/30/2027	156.0	Collin
25INR0392	Purple Sage BESS 2	BESS	05/30/2027	156.0	Collin
26INR0034	Bracero Pecan Storage	BESS	04/01/2027	232.0	Reeves
26INR0296	Sherbino II BESS SLF	BESS	02/08/2026	77.4	Pecos
26INR0543	Three Canes Solar SLF	SOL	03/10/2027	333.0	Navarro
28INR0024	Padua Grid BESS Unit 3	BESS	05/15/2026	201.4	Bexar

Appendix C: List of Newly Confirmed Load

TSP	Year	Capacity (~MW)
CPS Energy	2030	1,927
Lower Colorado River Authority	2030	3,213

Appendix D: List of G-1 Generators and X-1 Transformers Tested

Generator	Transformer
Leon Creek U1	Cagnon X1 345/138-kV
Guadalupe Energy Center CTG 1	Howard Road X1 345/138-kV
	Hill Country X1 345/138-kV
	Martinez X1 345/138-kV

Appendix E: New Generation Projects to Add for Generation Sensitivity Analysis

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
23INR0088	Nockenut Springs Solar 1	SOL	06/05/2029	203.2	Guadalupe
23INR0467	Lavender Storage Project	BESS	09/13/2029	231.9	Bexar
24INR0007	Nockenut Springs Solar 2	SOL	06/05/2029	203.3	Guadalupe
26INR0330	Alamo City BESS	BESS	09/21/2027	128.2	Bexar
24INR0108	Louisa Energy Storage	BESS	03/12/2029	102.8	Bexar

Appendix F1: Option 1 – Combined CPS Proposed Project Details

Details of Option 1 – Combined CPS Proposed Project

- Convert the existing Helotes 138-kV substation to a new 345/138-kV switching substation;
  - Construct a new 345-kV Helotes switching yard using a breaker-and-a-half configuration utilizing seven circuit breakers;
  - Install two new 345/138-kV autotransformers at the new Helotes 345/138-kV switching substation, with normal and emergency ratings of at least 600 MVA;
  - Loop into the existing Hill Country to Cagnon 345-kV transmission line into the new Helotes 345-kV substation;
- Install a new 345/138-kV autotransformer at the existing Eastside 345/138-kV substation, with normal and emergency ratings of at least 600 MVA;
- Install a 50 MVAr sized capacitor at the existing Anderson 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Hill Country 138-kV substation;
- Install a 25 MVAr sized capacitor at the planned Howard 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Legend Falls 138-kV substation;
- Install a 25 MVAr sized capacitor at the existing Tally_Rd 138-kV substation;
- Install a 300 MVAr STATCOM at the existing Grissom 138-kV substation; and
- Install a 300 MVAr STATCOM at the existing Martinez 138-kV substation.

Appendix F2: Option 2 – ERCOT Alternative Option Details

Details of Option 2 – ERCOT Alternative Option

- Convert the existing Helotes 138-kV substation to a new 345/138-kV switching substation;
  - Construct a new 345-kV Helotes switching yard using a breaker-and-a-half configuration utilizing seven circuit breakers;
  - Install two new 345/138-kV autotransformers at the new Helotes 345/138-kV switching substation, with normal and emergency ratings of at least 600 MVA;
  - Loop into the existing Hill Country to Cagnon 345-kV transmission line into the new Helotes 345-kV substation;
  - Install a new 345/138-kV autotransformer at the existing Eastside 345/138-kV substation, with normal and emergency ratings of at least 600 MVA;
- Construct a new Kendall to Helotes 345-kV transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 1,980 MVA, which will require a new right of way (ROW), approximately 39.1 miles;
- Construct a new Elm Creek to Eastside 345-kV transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 1,980 MVA, which will require a new ROW, approximately 23.4 miles;

Appendix F2: Option 2 – ERCOT Alternative Option Details (Continued)

Details of Option 2 – ERCOT Alternative Option

- Rebuild the existing Kirby to St_Hedwg 138-kV transmission line on double-circuit structures with one circuit in place where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 2.67 miles;
- Rebuild the existing Leon Creek to Palo Alto 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.64 miles;
- Install a 50 MVAr sized capacitor at the existing Anderson 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Bandera 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Grissom 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Helotes 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Hill Country 138-kV substation; and
- Install a 50 MVAr sized capacitor at the existing Stonegat 138-kV substation.

Appendix F3: Option 3 – ERCOT Alternative Option Details

Details of Option 3 – ERCOT Alternative Option

- Convert the existing Helotes 138-kV substation to a new 345/138-kV switching substation;
  - Construct a new 345-kV Helotes switching yard using a breaker-and-a-half configuration utilizing seven circuit breakers;
  - Install two new 345/138-kV autotransformers at the new Helotes 345/138-kV switching substation, with normal and emergency ratings of at least 600 MVA;
  - Loop into the existing Hill Country to Cagnon 345-kV transmission line into the new Helotes 345-kV substation;
- Install a new 345/138-kV autotransformer at the existing Eastside 345/138-kV substation, with normal and emergency ratings of at least 600 MVA;
- Construct a new Hill Country to Bergheim 345-kV transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 1,980 MVA, which will require a new ROW, approximately 14.28 miles;
- Rebuild the existing Castle to Dresden 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.79 miles;
- Rebuild the existing Cagnon to Potranco 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 5.87 miles;

Appendix F3: Option 3 – ERCOT Alternative Option Details (Continued)

Details of Option 3 – ERCOT Alternative Option

- Rebuild the existing Leon Creek to Palo Alto 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.64 miles;
- Install a 50 MVAr sized capacitor at the existing Anderson 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Bandera 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Grissom 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Helotes 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Hill Country 138-kV substation; and
- Install a 50 MVAr sized capacitor at the existing Stonegat 138-kV substation.

Appendix F4: Option 3A – ERCOT Alternative Option Details

Details of Option 3A – ERCOT Alternative Option

- Convert the existing Helotes 138-kV substation to a new 345/138-kV switching substation;
  - Construct a new 345-kV Helotes switching yard using a breaker-and-a-half configuration utilizing seven circuit breakers;
  - Install two new 345/138-kV autotransformers at the new Helotes 345/138-kV switching substation, with normal and emergency ratings of at least 600 MVA;
  - Loop into the existing Hill Country to Cagnon 345-kV transmission line into the new Helotes 345-kV substation;
- Install a new 345/138-kV autotransformer at the existing Eastside 345/138-kV substation, with normal and emergency ratings of at least 600 MVA;
- Construct a new Hill Country to Bergheim 345-kV transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 1,980 MVA, which will require a new ROW, approximately 14.28 miles;
- Rebuild the existing Castle to Dresden 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.79 miles;
- Rebuild the existing Cagnon to Potranco 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 5.87 miles;

Appendix F4: Option 3A – ERCOT Alternative Option Details (Continued)

Details of Option 3A – ERCOT Alternative Option

- Rebuild the existing Leon Creek to Palo Alto 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.64 miles;
- Rebuild the existing Medinabs to 36th Street 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 8.57 miles;
- Rebuild the existing Cagnon to VLSI 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 8.74 miles;
- Rebuild the existing Five_pts to Wstside 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.78 miles;
- Rebuild the existing Grissom to VLSI 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 478 MVA, approximately 3.03 miles;

Appendix F4: Option 3A – ERCOT Alternative Option Details (Continued)

Details of Option 3A – ERCOT Alternative Option

- Rebuild the existing Anderson to Helotes 138-kV transmission line on single-circuit structures where not sharing a common tower, with normal and emergency ratings of at least 600 MVA, approximately 5.67 miles;
- Install a 50 MVAr sized capacitor at the existing Helotes 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Howard 138-kV substation;
- Install a 35 MVAr sized capacitor at the existing Ingram Road 138-kV substation;
- Install a 25 MVAr sized capacitor at the existing Legend Falls 138-kV substation;
- Install a 50 MVAr sized capacitor at the existing Panther Springs 138-kV substation;
- Install a 25 MVAr sized capacitor at the existing Tally_Rd 138-kV substation;
- Install a 35 MVAr sized capacitor at the existing Tezel Road 138-kV substation;
- Install a 300 MVAr STATCOM at the existing Grissom 138-kV substation; and
- Install a 300 MVAr STATCOM at the existing Martinez 138-kV substation.