Attachment 3

San Antonio South Reliability Project

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January 25, 2023

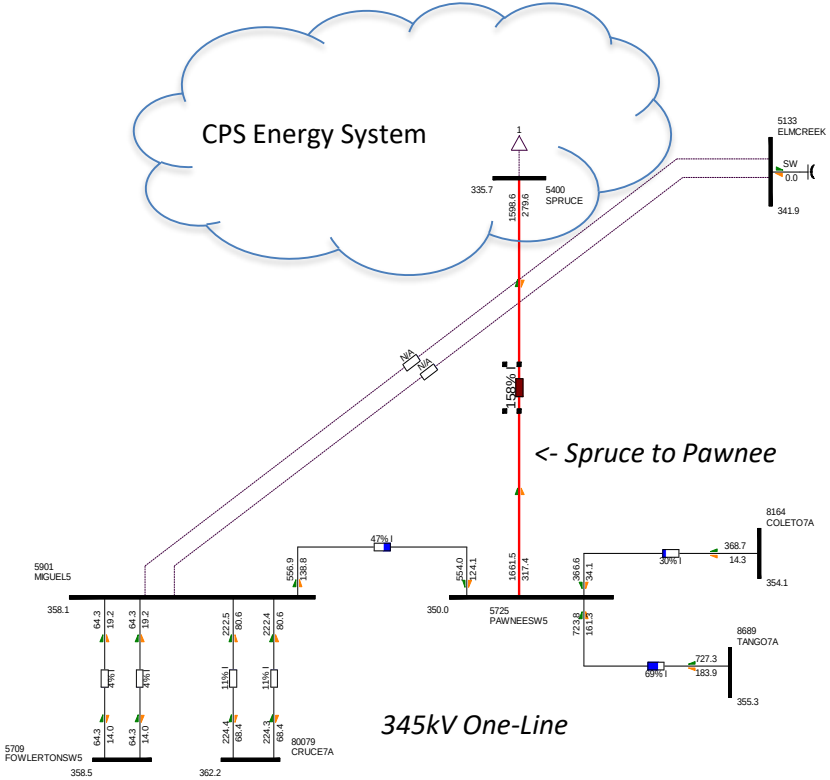
Agenda

- **PROJECT OVERVIEW**
- **PROJECT NEED**
- **RECOMMENDED PROJECT**

PROJECT OVERVIEW

- Reliability driven Tier-1 Project
- Driven by new generation additions in areas south and east of San Antonio, 345kV projects planned for the LRGV area, and generation retirements local to CPS Energy
- Cost Estimate: $281M
- Need By: Summer Peak 2027
- ~50-mile new double-circuit 345kV transmission line
- Multiple 138 kV and 345 kV upgrades and additions
- CPS Energy requests ERCOT to designate the project as Critical to the reliability of the ERCOT system

PROJECT NEED



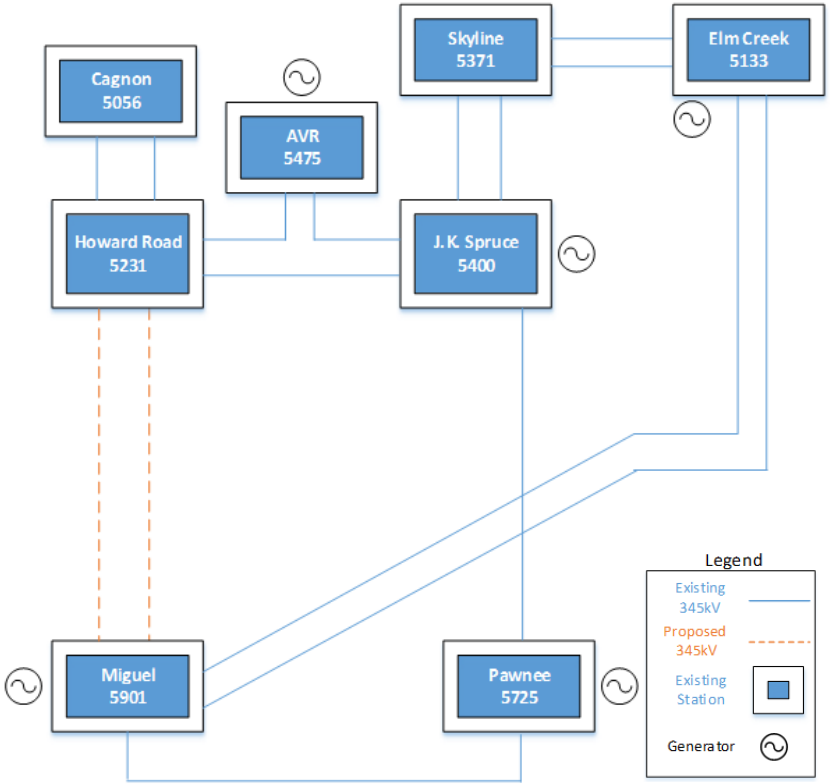
- **Spruce to Pawnee overloads under contingency conditions**

Contingency Type	Monitored Element	Rating MVA	2027 Summer Peak (%) *	2026 High Wind Low Load (%) *
P1 Single	Spruce to Pawnee	1058	**112**	**117**
P7/ERCOT1 Common Twr	Spruce to Pawnee	1058	**157**	**165**
ERCOT2 Generator & Common Twr	Spruce to Pawnee	1058	**174**	**176**

**Overloads defined greater than 100% of circuit rating*

NERC and ERCOT criteria violations observed by Summer Peak 2027

RECOMMENDED PROJECT



- Construct Howard Rd to San Miguel double circuit 345kV transmission line
- Rebuild Cagnon to Howard Rd 345kV double circuit transmission line
- Rebuild Howard Rd to Leon Creek 138kV transmission line
- Add third autotransformer at Howard Rd switching station

Thank You

CPS Energy – San Antonio South Reliability Project ERCOT Independent Review Scope

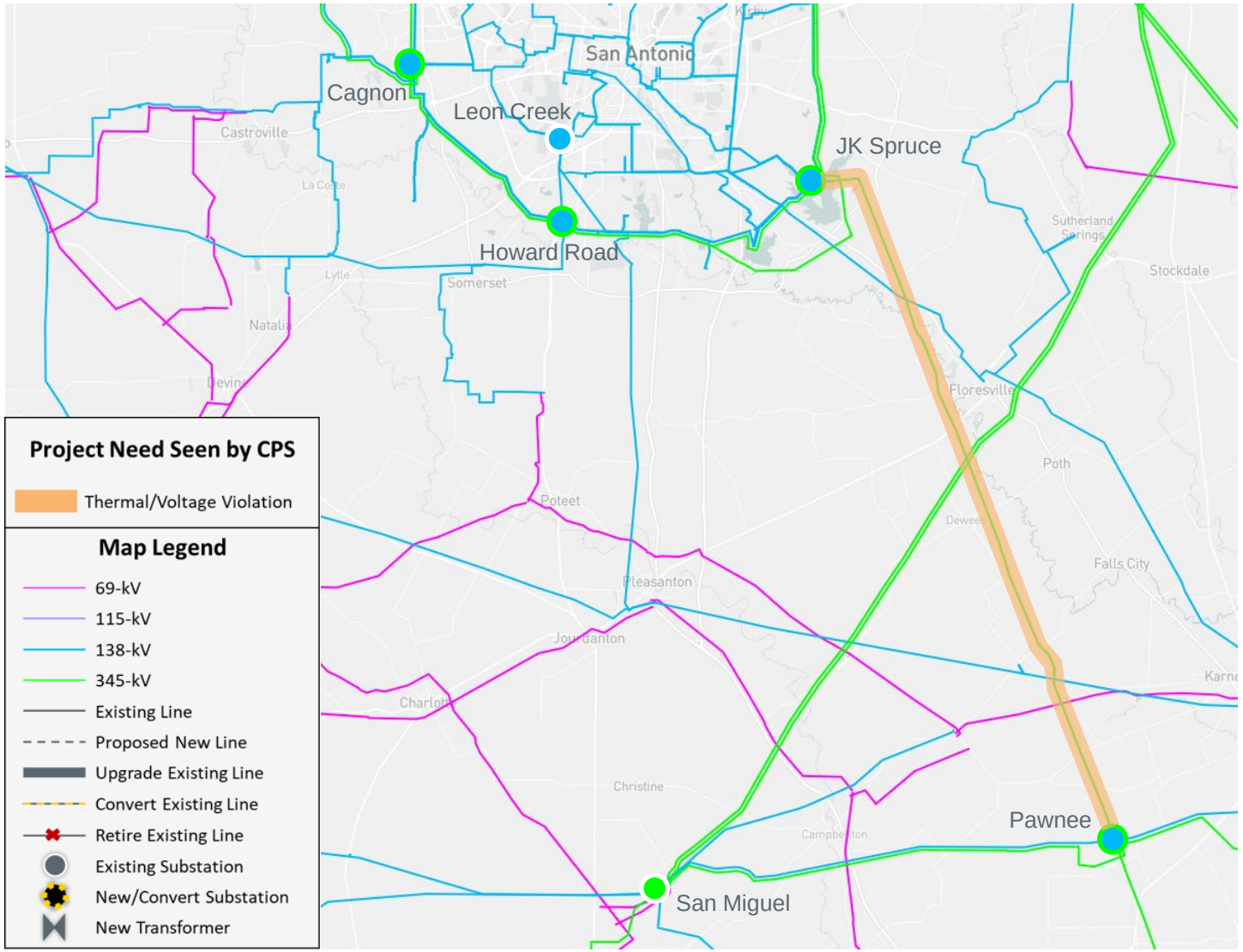
Caleb Holland

RPG Meeting
February 14, 2023

Introduction

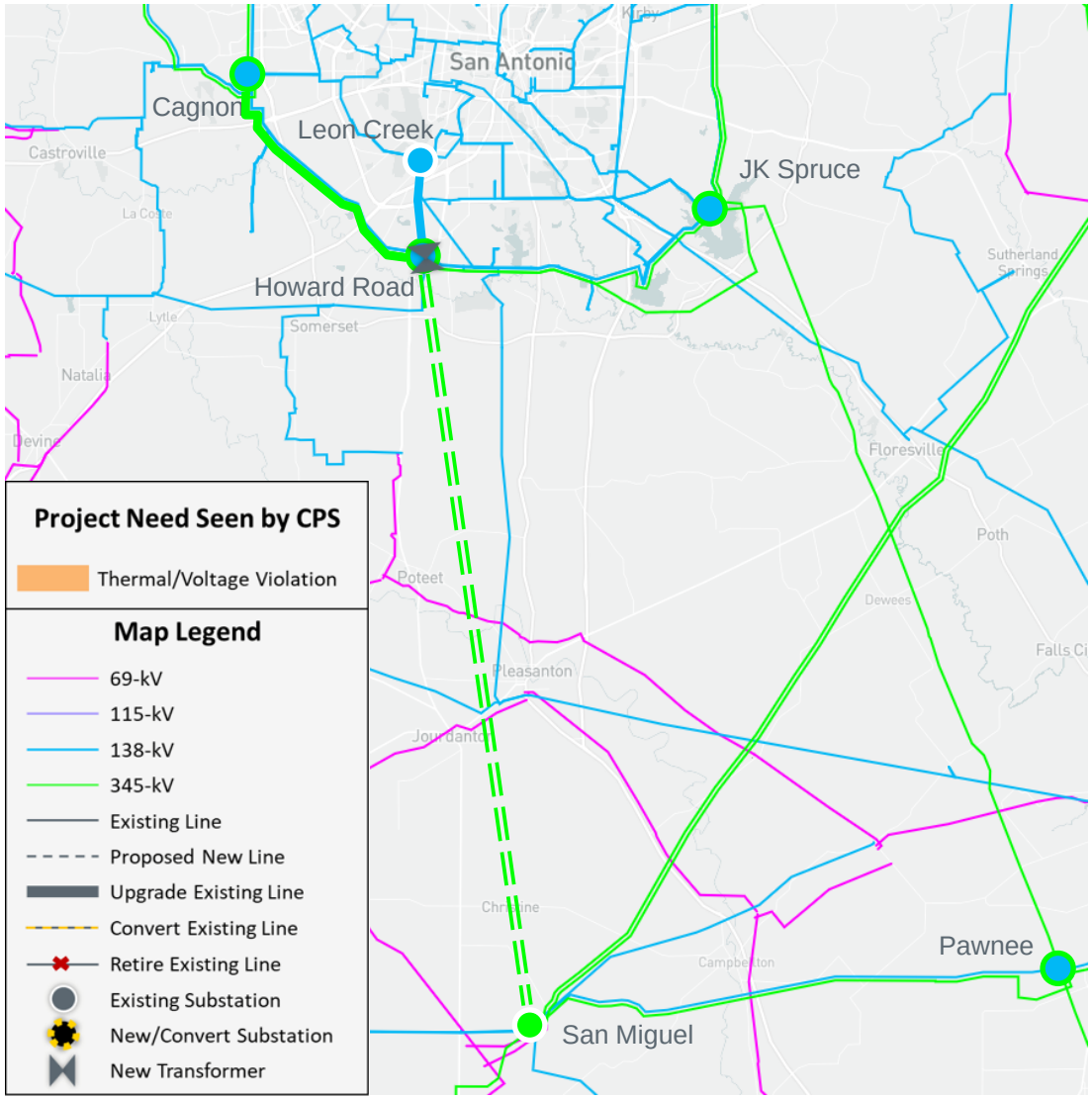
- CPS Energy (CPS) submitted the San Antonio South Reliability Project for Regional Planning Group (RPG) review in December 2022
  - This Tier 1 project is estimated to cost $281 million and will require a Certificate of Convenience and Necessity (CCN)
  - Estimated in-service date
    - June 2027
  - Addresses thermal overloads in the San Antonio South area
  - CPS has expressed need for “critical status designation”
- This project is currently under ERCOT Independent Review (EIR)

Study Area Map



Proposed Project by CPS

- Construct new Howard Road – San Miguel 345-kV double circuit transmission line (~50 miles)
- Rebuild the existing Cagnon to Howard Road 345-kV double circuit transmission line (~15 miles)
- Rebuild the existing Howard Road to Leon Creek 138-kV transmission line (~5 miles)
- Add a third 345/138-kV Autotransformer at Howard Road substation



Study Assumptions – Base Case

- Study Region
  - South Central Weather Zone (WZ), focusing on the transmission elements near the South San Antonio Area in Bexar and Atascosa Counties
  - Monitor surrounding counties that are electrically close to the area
- Steady-State Base Case
  - Final 2022 Regional Transmission Planning (RTP) 2027 summer peak case for South-South Central (SSC) WZs, posted in Market Information System (MIS), was updated to construct the summer peak load study base case
    - Case: 2022RTP_2027_SUM_SSC_12222022
    - Link: https://mis.ercot.com/secure/data-products/grid/regional-planning

Study Assumption - Transmission

- Based on the October 2022 Transmission Project and Information Tracking (TPIT) posted on MIS, Tier 3 and Tier 4 projects with in-service dates on or before June 2027 within the study area were added to the study base case if not already modeled in the case
  - TPIT Link: https://www.ercot.com/gridinfo/planning
  - See table on the next slide for the list of transmission projects added
- All other Tier projects approved by RPG are already modeled in the RTP cases
- Transmission projects identified in the 2022 RTP as placeholders for CPS San Antonio South Reliability project were removed to develop the study base case

RTP Project ID	Project Name	TSP	County
2022-SC6	Howard - San Miguel 345-kV Double Circuit Line Addition and Beck Road 345/138-kV Substation Expansion	CPS, STEC	Bexar, Atascosa

Study Assumption – Transmission (cont.)

- List of Tier 3 and Tier 4 transmission projects added to study base case

TPIT No	Project Name	Tier	Project ISD	TSP	County
45084B	Braunig to Highland Rebuild	Tier 4	Jul-23	CPS	Bexar
70536	New 138 kV Verde Circle Substation	Tier 4	Oct-24	CPS	Bexar
45029	Grandview Highland Hills Rebuild	Tier 4	Jun-25	CPS	Bexar
45084A	Braunig to Highland Rebuild	Tier 4	Jun-25	CPS	Bexar
67992B	CPSE_345KV_Howard_Switching_Station,CPSE_Hamilton_to_MedCtr_Upgrade,CPSE_Medina_to_36th_Street_Upgrade	Tier 3	Jun-25	CPS	Bexar
67992C	CPSE_345KV_Howard_Switching_Station,CPSE_Hamilton_to_MedCtr_Upgrade,CPSE_Medina_to_36th_Street_Upgrade	Tier 3	Jun-25	CPS	Bexar
67992A	CPSE_345KV_Howard_Switching_Station,CPSE_Hamilton_to_MedCtr_Upgrade,CPSE_Medina_to_36th_Street_Upgrade	Tier 3	Jun-25	CPS	Bexar
15TPIT0031	Chavaneaux_Chavaneaux Tap Rebuild (Brooks to Chavaneaux ckt)	Tier 4	Jun-26	CPS	Bexar
4320	CPSE_Brooks to Chavaneaux MLSE	Tier 4	Dec-26	CPS	Bexar
4323	CPSE_Braunig to Brooks_MLSE	Tier 4	Jun-27	CPS	Bexar

Study Assumptions – Generation

- New generation that met Planning Guide Section 6.9(1) condition with Commercial Operation Date (COD) before June 2027 in the study area at the time of the study, but not already modeled in the RTP cases, was added to the case based on the December 2022 Generator Interconnection Status (GIS) report posted in MIS in January 2023
  - GIS Link: https://www.ercot.com/gridinfo/resource

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
22INR0368	Padua Grid BESS	OTH	Mar-24	202.6	Bexar

- All new generation added was dispatched consistent with the 2022 RTP methodology
- All recent retired/indefinitely mothballed units were reviewed and turned off, if not already reflected in the 2022 RTP Final case

Study Assumptions – Load & Reserve

- Load in study area
  - Load level will be consistent with the 2022 RTP
- Reserve
  - Load outside of study weather zone(s) may be adjusted to maintain the reserve consistent with the 2022 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 (EHV only)
    - P3 (G-1+N-1: G-1 represents generator outage)
    - P6 (X-1+N-1: X-1 represents 345/138-kV transformer outage)
- Criteria
  - Monitor all 60 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 the projected San Antonio South 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
    - Dynamic stability impact
- Generation 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

Deliverables

- Tentative Timelines
  - Status updates at future RPG meetings
  - Final recommendation – Q2 2023

Thank you!

Stakeholder comments also welcomed through:

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ERCOT Independent Review of the CPS Energy (CPS) San Antonio South Reliability Project

Document Revisions

Date	Version	Description	Author(s)
06/23/2023	1.0	Final Draft	Caleb Holland, Tanzila Ahmed
		Reviewed by	Robert Golen, Prabhu Gnanam, Davida Dwyer

Executive Summary

CPS Energy (CPS) submitted the San Antonio South Reliability Project to the Regional Planning Group (RPG) in December 2022. CPS proposed this project to address NERC Category P1 thermal overloads of the J.K. Spruce to Pawnee 345-kV transmission line. The project will be needed by 2027 Summer Peak.

The proposed project was estimated to cost approximately $281 million and was classified as a Tier 1 project per ERCOT Nodal Protocol Section 3.11.4.3. The proposed project cost exceeds the $100 million threshold and would require a Certificate of Convenience and Necessity (CCN) application.

ERCOT performed an Independent Review, identified thermal overloads in the San Antonio area, and evaluated five different transmission project options.

Among the five different transmission project options evaluated in the Independent Review, ERCOT recommends Option 5 to address the thermal overload based on the study results described in Sections 5 and 6 of this report. Option 5 consists of the following:

- Construct a new 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require new Rights of Way (ROW);
- Rebuild the existing 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

The cost estimate for this Tier 1 project is approximately $329.1 million. One or more CCN applications will be required for 1) the construction of the new 345-kV double-circuit transmission line from Howard Road 345-kV substation to San Miguel 345-kV substation due to approximately 50.0 miles of new ROW and 2) the rebuild of the existing 138-kV transmission line from Howard Road 138-kV Substation to Leon Creek 138-kV Substation due to approximately 1.7 miles of new ROW. The expected In-Service Date (ISD) of this project is June 2027.

CPS requests this project be designated as critical to reliability of the ERCOT system based on historic line loading reflected in the recent high congestion costs, new renewable generation development, and local CPS generation reaching technical and potential end of life.

Table of Contents

1 Introduction

In December 2022, CPS submitted the San Antonio South Reliability Project to the RPG to address NERC Category P1 thermal overloads of the 345-kV J.K. Spruce to Pawnee transmission line. As shown in Figure 1.1, there are currently only two 345-kV transmission paths from Southern Texas into the San Antonio area. One of these paths approaches San Antonio from the South and is a single circuit with a total normal capacity of 1,051 MVA. The other is a double circuit with a combined total normal capacity of 2,372 MVA, which loops around San Antonio to the East and enters the San Antonio area from the North. As of 2027, there will be three 345-kV corridors from Southern Texas to the two substations shown at the bottom of Figure 1.1 (San Miguel and Pawnee). These stations are approximately 50 miles south of San Antonio. With the contingent loss of either of the two paths from those substations into San Antonio, only one path that would be left to serve San Antonio and modeling shows this path would be subjected to a significant increase in loading.

The CPS-proposed project was classified as a Tier 1 project pursuant to ERCOT Nodal Protocol Section 3.11.4.3, with an estimated cost of approximately $281 million. ERCOT conducted an Independent Review for this RPG project to identify any reliability needs in the area including the project need (138-kV transmission line thermal overloads in the South and Northeast San Antonio areas) and evaluated various transmission upgrade options. This report describes the study assumptions, methodology, and the results of the ERCOT Independent Review of the project.

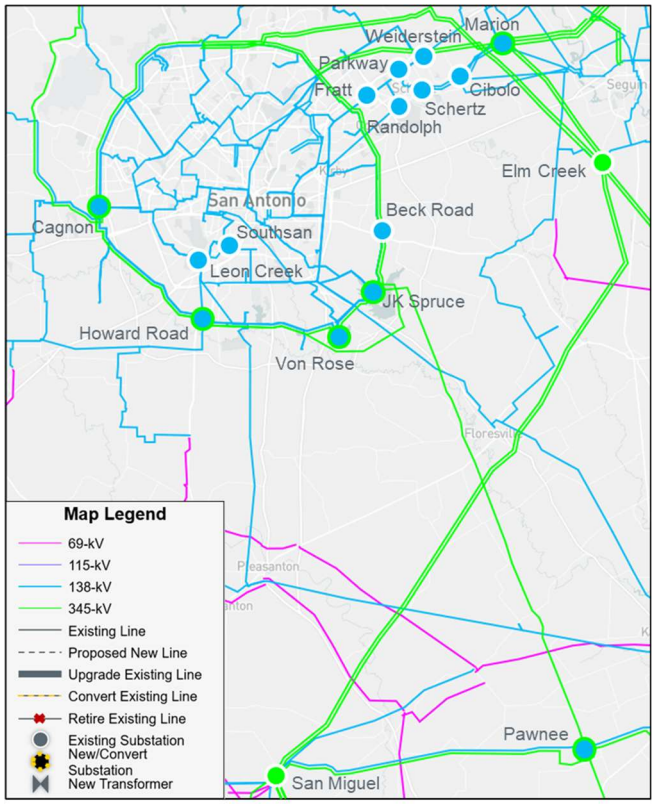

Figure 1.1: Map of Transmission System in The San Antonio Area

2 Study Assumptions and Methodology

ERCOT performed studies under various system conditions to identify any reliability issues and to determine transmission upgrades to support the proposed San Antonio South Reliability Project, if an upgrade is deemed necessary. This section describes the study assumptions and criteria used to conduct the Independent Review.

2.1 Study Assumptions for Reliability Analysis

This project is in the South and South-Central weather zones in Bexar and Atascosa Counties. Nearby counties that were also studied because they are electrically close via the 345-kV transmission system include Karnes, Wilson, and Guadalupe Counties.

2.1.1 Steady-State Study Base Case

The Final 2022 RTP cases, published on the Market Information System (MIS) on December 22, 2022, were used as reference cases in this study. The 2027 Summer peak case was selected for the long-term outlook. The steady-state study base case was constructed by updating transmission, generation, and loads of the following 2022 RTP Summer Peak Load case for the South and South-Central (SSC) weather zones.

- Case: 2022RTP_2027_SUM_SSC_12222022[1]

2.1.2 Transmission Topology

Transmission projects within the study area with In-Service Dates (ISDs) through June 2027 were added to the study base case. The ERCOT Transmission Project Information and Tracking (TPIT)[2] report for October 2022 was used as reference. The added TPIT projects are listed in Table 2.1. These projects are all classified as Tier 3 and Tier 4 projects. No new Tier 1 or Tier 2 projects were added to the study base case because these were already modeled in the final RTP cases.

[1] 2022 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG3-2787-M.
[2] TPIT Report: https://www.ercot.com/gridinfo/sysplan/index.html.

Table 2.1: List of Transmission Projects Added from the Study Base Case

TPIT No	Project Name	Tier	Project ISD	TSP	County
45084B	Braunig to Highland Rebuild	Tier 4	Jul-23	CPS	Bexar
70536	New 138 kV Verde Circle Substation	Tier 4	Oct-24	CPS	Bexar
45029	Grandview Highland Hills Rebuild	Tier 4	Jun-25	CPS	Bexar
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4320	CPSE_Brooks to Chavaneaux MLSE	Tier 4	Dec-26	CPS	Bexar
4323	CPSE_Braunig to Brooks_MLSE	Tier 4	Jun-27	CPS	Bexar

The RTP project shown in Table 2.2 was used as a placeholder for the San Antonio South Reliability project and was removed from study base case.

Table 1.2: List of Transmission Projects Removed from the Study Base Case

RTP Project ID	Project Name	TSP	County
2022-SC6	Howard - San Miguel 345-kV Double Circuit Line Addition and Beck Road 345/138-kV Substation Expansion	CPS, STEC	Bexar, Atascosa

2.1.3 Generation

Based on the December 2022 Generator Interconnection Status (GIS)[3] report posted on the ERCOT website on January 3, 2023, generators in the study area that met ERCOT Planning Guide Section 6.9(1) conditions with Commercial Operations Date (COD) prior to June 2027 were added to the study base case if not already present in the case. These generation additions are listed in Table 2.3. All new generation dispatches were consistent with the 2022 RTP methodology.

Table 2.3: List of Generation Added to the Study Base Case Based on December 2022 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
22INR0368	Padua Grid BESS	OTH	Mar-24	202.6	Bexar

The status of each unit that was projected to be either indefinitely mothballed or retired at the time of the study was reviewed. The units listed in Table 2.4 were opened in the study base case to reflect their mothballed/retired status.

[3] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER.

Table 2.4: List of Generation Opened to Reflect Mothballed/Retired Status

Bus No	Unit Name	Capacity (MW)	Weather Zone
170121	CALAVERS_JTD1	420.0	South-Central
170122	CALAVERS_JTD2	420.0	South-Central
110273	AMOCOOIL_AMOCO_5	32.0	Coast
110020	PNPI_GT2	71.0	Coast
150081	OLINGR_OLING_1	78.0	North Central
170381	OCI_ALM1_ASTRO	1.0	South-Central
170131	BRAUNIG_VHB1	217.0	South-Central
170132	BRAUNIG_VHB2	230.0	South-Central
170133	BRAUNIG_VHB3	412.0	South-Central

2.1.4 Loads

Loads in the study weather zones were consistent with the 2022 RTP.

Loads outside the study weather zones were adjusted to maintain the minimum reserve requirements consistent with the 2022 RTP.

2.1.5 Maintenance Outage Scenario

ERCOT developed an off-peak maintenance season scenario to further evaluate the short-listed options.

The load levels in the South and South-Central weather zones were reduced to 91.2%[4] and 83.7%[4] of their summer peak load levels, respectively. This scaling is meant to reflect assumed off-peak season loads based on historical real-time load data of the South and South-Central weather zones.

2.2 Study Assumption for Sensitivity Scenario

2.2.1 Operation Summer Peak Sensitivity Analysis

The 2022 Operations Peak Sensitivity case was created based on the July 20, 2022, Summer Peak Operations case. The CPS Howard Switching Station (TPIT Project 67992) was added to this case, which was necessary for connecting Options 3 and 5 for testing. Critical contingencies and circuits seen in the N-1 reliability study, maintenance outage scenario analysis, and long-term load serving capability assessment were monitored under N-0 and N-1 conditions. Then, scenarios for Options 3, 4, and 5 (the short-listed options) were created based on this case, and the contingencies were tested to determine the potential impact of each option.

2.3 Study Assumptions for Congestion Analysis

Congestion analysis was conducted to identify any new congestion in the study area with the addition of the preferred transmission upgrade option.

[4] This percentage was determined based on the review of top ten historical loads in Spring, Fall, and Winter for the last three years associated with the South and South-Central Weather Zones.

The 2022 RTP 2027 economic final case was updated based on the December 2022 GIS report for generation updates and the October 2022 TPIT report for transmission updates to conduct congestion analysis. The 2027 study year was selected based on the proposed ISD of the project.

All TPIT projects listed in Table 2.1 were added and the RTP project shown in Table 2.2 that was used as a placeholder for the San Antonio South Reliability project was removed from the economic base case.

New generation additions listed in Table 2.5 were added to the economic base case and all generation listed in Table 2.4 were opened in the study base case to reflect their mothballed/retired status.

Table 2.5: List of Generation Added to the Economic Base Case Based on December 2022 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
21INR0203	Eastbell Milam Solar	SOL	Oct-23	244.9	Milam
21INR0223	Tulsita Solar	SOL	Dec-24	261.0	Goliad
21INR0351	7V Solar	SOL	Nov-23	244.6	Fayette
22INR0368	Padua Grid BESS	OTH	Mar-24	202.6	Bexar
22INR0397	Buckeye Corpus Fuels Solar	SOL	Dec-23	57.6	Nueces
22INR0398	Sabal Storage	OTH	May-23	18.0	Cameron
22INR0551	Wolf Tank Storage	OTH	Mar-23	155.5	Webb
23INR0007	Outpost Solar	SOL	Apr-24	513.7	Webb
23INR0047	Charger Solar	SOL	May-24	406.8	Refugio
23INR0162	Redonda Solar	SOL	Dec-24	253.2	Zapata
23INR0166	Great Kiskadee Storage	OTH	Aug-24	103.1	Hidalgo
23INR0343	Guajillo Energy Storage	OTH	Sep-24	201.1	Webb
23INR0369	Anemoi Energy Storage	OTH	Dec-23	205.0	Hidalgo
23INR0472	Frontera Energy Center	GAS	Jun-23	524.0	Hidalgo

2.4 Methodology

This section lists the Contingencies and Criteria used for project review along with tools used to perform the various analyses.

2.4.1 Contingencies and Criteria

The reliability assessments were performed based on NERC Reliability Standard TPL-001-5.1, ERCOT Nodal Protocols, and Planning Criteria[5].

Contingencies[6] were updated based on the changes made to the topology as described in Section 2.1 of this document. The following steady state contingencies were simulated for the study region:

- P0 (System Intact);
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (Extra High Voltage (EHV) only);

[5] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current.
[6] Details of each event and contingency category are defined in the NERC reliability standard TPL-001-5.1.

- P3-1: G-1 + N-1 (G-1: generation outages) {OW Sommers Unit 2, San Miguel Unit 1, JK Spruce Unit 2, and Leon Creek Peaker Units 1-4}; and
- P6-2: X-1 + N-1 (X-1: 345/138-kV transformers only) {Howard Road, San Miguel, and Pawnee Switch}.

All 69-kV and above buses, transmission lines, and transformers in the study region were monitored (excluding generator step-up transformers) and the following thermal and voltage limits were enforced:

- Thermal
  - Rate A (normal rating) for pre-contingency conditions;
  - Rate B (emergency rating) for post-contingency conditions;
- Voltages
  - Voltages exceeding pre-contingency and post-contingency limits; and
  - Voltage deviations exceeding 8% on non-radial load buses.

2.4.2 Study Tool

ERCOT utilized the following software tools to perform this independent study:

- PowerWorld Simulator version 22 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis and
- UPLAN version 11.4.0.27191 for congestion analysis.

3 Project Need

Steady-state reliability analysis was performed in accordance with NERC TPL-001-5.1 and ERCOT Planning Criteria described in Section 2.3 of this document. This analysis indicated a thermal overload issue under G-1+N-1 contingency in the study area. Under the G-1 scenario with Sommers Unit 2 taken out-of-service, six N-1 violations were observed. Per CPS, Sommers Unit 2 has a planned retirement in March 2029, which further validates its study as a G-1 scenario.

Various 345-kV and 138-kV transmission line outages caused overloads in the 138-kV system. These issues are summarized in Table 3.1. Figure 3.1 visually illustrates the project need.

Table 3.1: Thermal Overloads Observed in the Study Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Length (miles)	Loading %
P7: N-1	HOWARD (5230) -> LEON_CRK (5260) CKT 1	138	4.88	101.39
P1: N-1	L_MARION8_1Y (7178) -> L_CIBOLO8_1Y (7608) CKT 1	138	4.81	102.91
P1: N-1	L_MARION8_1Y (7178) -> L_CIBOLO8_1Y (7608) CKT 2	138	4.81	103.24
P7: N-1	L_PARKWA8_1Y (7611) -> FRATT (5165) CKT 1	138	4.09	103.52
P7: N-1	L_SCHERT8_1Y (7610) -> L_PARKWA8_1Y (7611) CKT 1	138	2.83	105.01
P7: N-1	L_WEIDER8_1Y (7461) -> RANDOLPH (5360) CKT 1	138	5.47	102.74

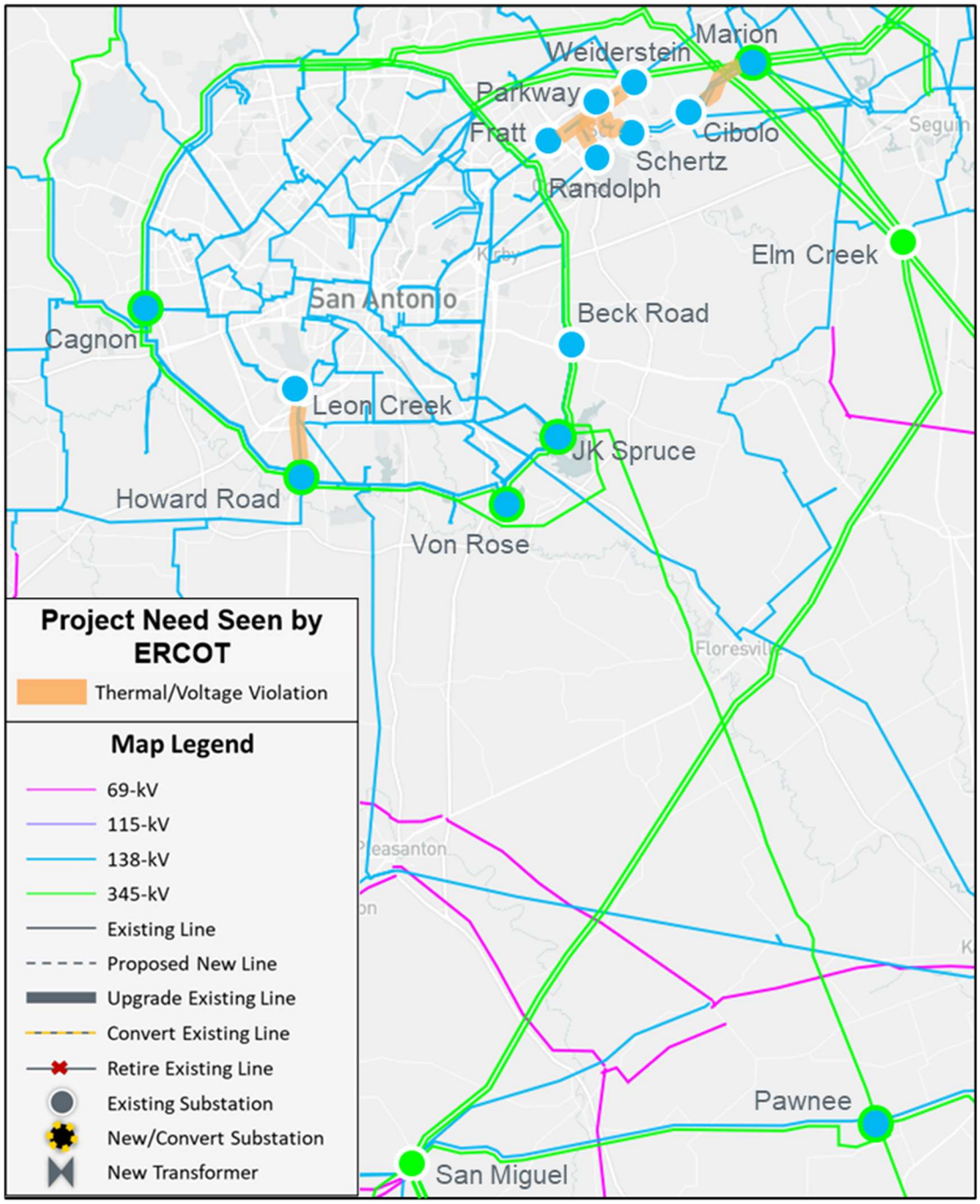

Figure 3.1: Study Area Map Showing Project Needs

4 Description of Project Options

ERCOT initially evaluated five system-improvement options to address the thermal overloads that were observed in the study base case in the San Antonio area. All five options resolved the N-1 thermal overloads in the study area. Detailed maps of each option are provided in Appendix A.

Option 1 (CPS Proposed Solution) consists of the following:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require new ROW;
- Rebuild the existing 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 478 MVA, will require 1.7 miles of new ROW; and
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation.

Option 2 consists of the following:

- Construct a new, 345-kV substation (New Station) between Spruce to Pawnee and San Miguel to Elm Creek 345-kV circuits;
- Construct a new, 38-mile, Howard Rd to (New Station) double-circuit 345-kV transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require new ROW;
- Rebuild and convert the existing, 26-mile (New Station) to Pawnee 345-kV transmission line to a double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit;
- Rebuild the existing, 13.9-mile Elm Creek to Marion 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 478 MVA; this will require 1.7 miles of new ROW; and
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation.

Option 3 consists of the following:

- Rebuild and convert the existing, 45.8-mile Spruce to Pawnee 345-kV line to a double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit;
- Rebuild the existing, 35-mile Howard Rd to Spruce and Howard Rd to Von Rose 345-kV transmission lines with normal and emergency ratings of at least 1,746 MVA per circuit;
- Rebuild the existing, 13.9-mile Elm Creek to Marion 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 5.2-mile Beck to Spruce 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,792 MVA per circuit; and
- Build Beck Road 345/138-kV switchyard and install two 600-MVA autotransformers.

Option 4 consists of the following:

- Rebuild the existing, 4.9-mile Howard Rd to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 478 MVA; this will require 1.7 miles of new ROW;
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA;

- Rebuild the existing, 4.1-mile Fratt to Parkway 138-kV transmission line with a normal and emergency rating of at least 478 MVA;
- Rebuild the existing, 5.5-mile Randolph to Weiderstein 138-kV transmission line with a normal and emergency rating of at least 478 MVA;
- Rebuild the existing, 4.8-mile Marion to Cibolo Double Circuit 138-kV transmission line with a normal and emergency rating of at least 478 MVA per circuit; and
- Rebuild the existing, 2.8-mile Schertz to Parkway 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

Option 5 consists of the following:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1;982 MVA per circuit; this transmission line will require new ROW;
- Rebuild the existing, 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

5 Option Evaluations

ERCOT performed reliability analysis to evaluate all initial options and to identify any reliability impacts of the options in the study area. Based on the results of these analyses, short-listed options were selected for further evaluations. This section details these studies and their results and compares the short-listed options.

5.1 Results of Reliability Analysis

All initial options were evaluated based on the contingencies described in the methodology section of the report, and no reliability criteria violations were identified for Options 3, 4, and 5 as shown in Table 5.1.

Table 5.1: Results of Initial Reliability Assessment of All Five Options

		N-1		X-1 + N-1		G-1 + N-1	
Option	Unsolved Power Flow	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation
1	None	None	None	1	None	None	None
2	None	None	None	1	None	None	None
3	None	None	None	None	None	None	None
4	None	None	None	None	None	None	None
5	None	None	None	None	None	None	None

6 Short-listed Options

As shown in Table 5.1, Options 3, 4, and 5 met all the reliability criteria, and these options were short-listed for further assessment. These three options are illustrated in Figures 6.1, 6.2, and 6.3.

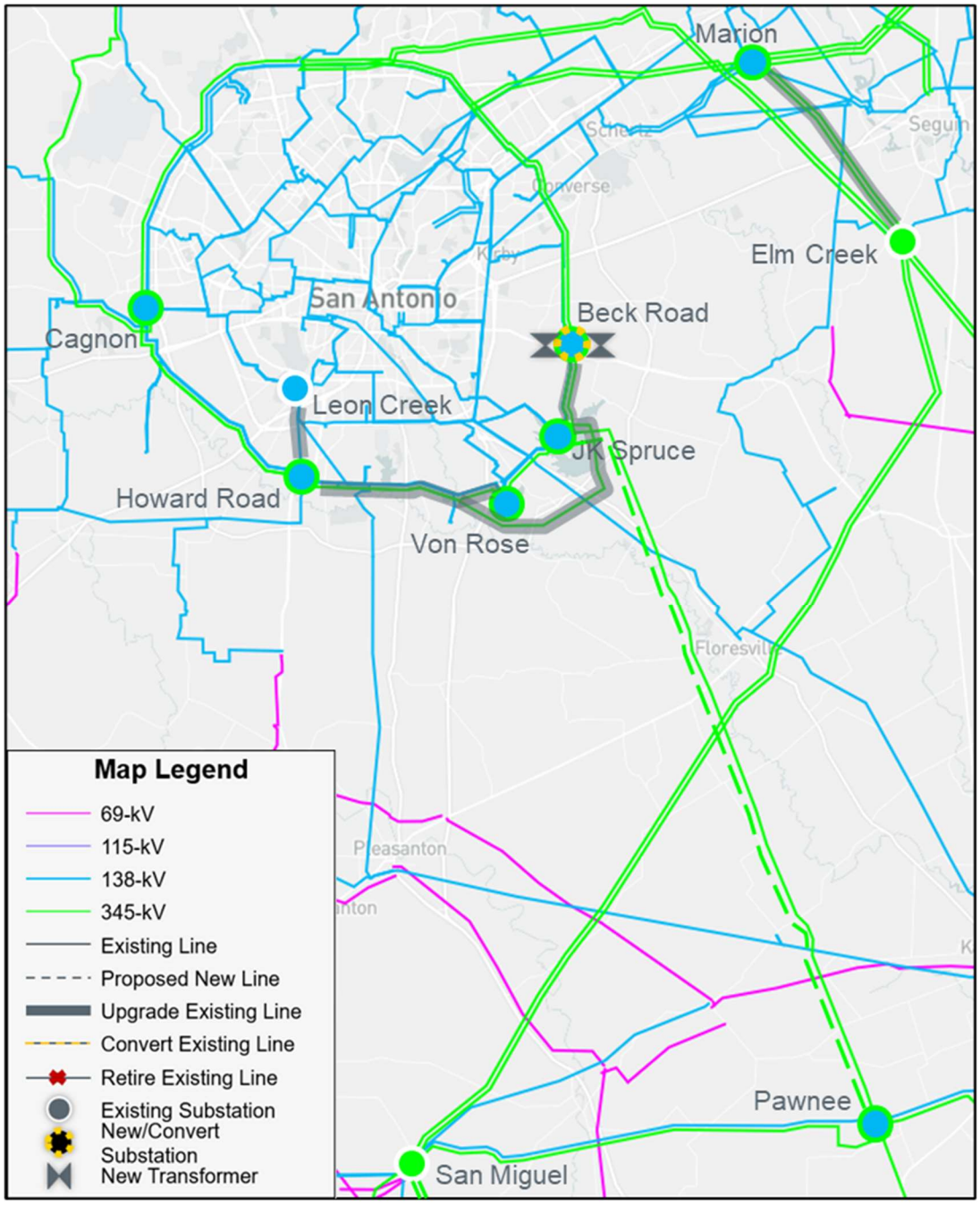

Figure 6.1: Map of Option 3

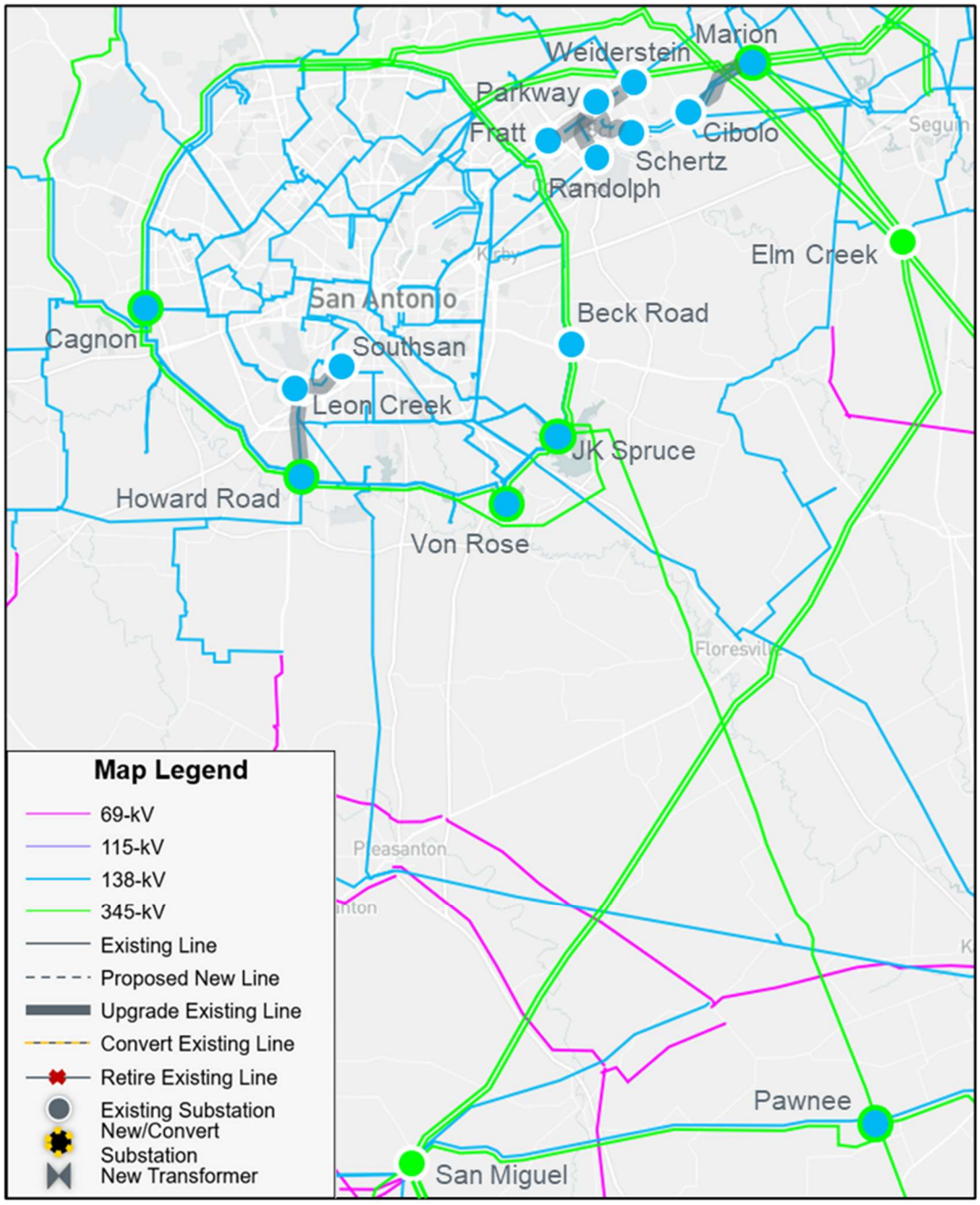

Figure 6.2: Map of Option 4

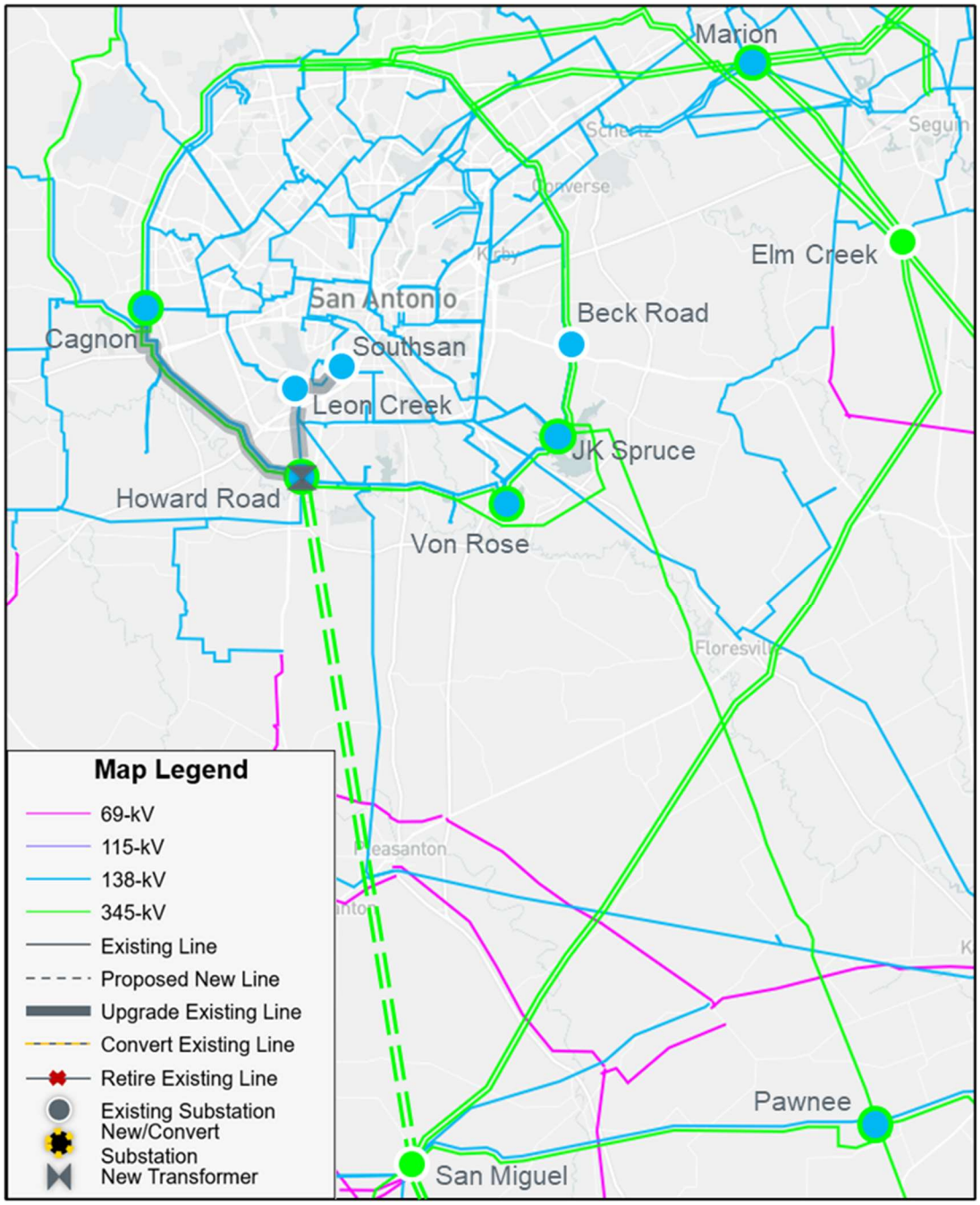

Figure 6.3: Map of Option 5

6.1 Long-Term Load Serving Capability Assessment

ERCOT performed a long-term load serving capability assessment on the short-listed options. Scenario 1 assess the load serving capability of the San Antonio Area, and Scenario 2 assess the same in a high Southern wind export condition. In Scenario 1, ERCOT increased load at substations within the San Antonio area and decreased conforming load outside of the South-Central weather zone to balance power. In Scenario 2, ERCOT increased load at substations within the study area and

increased wind generation within the Southern weather zone to balance power. The results of the long-term load serving capability assessment are shown in Table 6.1 below.

Table 6.1: Results of Long-Term Load Serving Capability Assessment of Base Case and Options 3, 4, and 5

Option	Incremental Load Serving Capability (MW)	
	Scenario 1	Scenario 2
Base case	353	359
3	813	845
4	393	403
5	510	534

6.2 Planned Maintenance Outage Evaluation

Using the P1, P2.1, and P7 contingencies based on the review of the system topology of the area, ERCOT conducted an N-2 contingency analysis for each short-listed option to represent system element outages under planned maintenance condition (N-1-1) in the area. Then, each N-2 violation was run as an N-1-1 contingency scenario, with system adjustments in between the contingencies. As shown in Table 6.2, the results of this maintenance assessment indicate that Options 3 and 5 performed similarly and better than Option 4.

Table 6.2: Results of Planned Maintenance Outage Evaluation for the Short-Listed Options

Option	Unsolved Power Flow	Thermal Overloads	Thermal Loading Change from Base case	Voltage Violations
3	None	1	Reduced	None
4	None	1	Increased	None
5	None	1	Reduced	None

6.3 Operations Summer Peak Sensitivity Analysis

ERCOT conducted a sensitivity analysis based on the July 20, 2022, Summer Peak Operations case. Critical contingencies and circuits seen in the N-1 reliability study, maintenance outage scenario analysis, and long-term load serving capability assessment were monitored under N-0 and N-1 conditions. The only circuit with significant loading in this study was the Spruce to Pawnee 345-kV transmission line. Therefore, Table 6.3 focuses on that circuit. Both Options 3 and 5 addressed the project need as seen by CPS, whereas Option 4 did not, as shown in Table 6.3.

Table 6.3: Results of 2022 Operations Summer Peak Case Sensitivity for the Short-Listed Options

Option	N-0 Loading on Spruce to Pawnee 345-kV Line (% MVA Limit)	N-1 Loading on Spruce to Pawnee 345-kV Line (% MVA Limit)
Base case	62	102
Option 3	27	37
Option 4	62	102
Option 5	47	54

6.4 Cost Estimate and Feasibility Assessment

CPS, South Texas Electric Cooperative (STEC), Lower Colorado River Authority (LCRA), Brazos Electric Cooperative (BREC), and Guadalupe Valley Electric Cooperative (GVEC) performed feasibility assessments and provided cost estimates for the three short-listed options. Based on input from CPS, Option 4 was deemed infeasible due to the complete de-energization of an existing substation that would be required during construction. Table 6.4 summarizes the cost estimates, mileage of CCN required, and feasibility of the three short-listed options.

Table 6.4: Cost Estimates and Feasibility of the Short-Listed Options

Option	Cost Estimates ($M)	CCN Required (Miles)	Feasibility
Option 3	505.6*	0.0	Feasible
Option 4	N/A	1.7	Not Feasible
Option 5	329.1	51.7	Feasible

* Updated cost estimate from the original estimate in the RPG submittal and may increase to include additional transmission upgrades

7 Comparison of Short-listed Options

The study results demonstrated that all three short-listed options addressed the project need as seen by ERCOT in the study area. Comparisons of the short-listed options, with corresponding cost estimates provided by CPS, STEC, LCRA, BREC, and GVEC, is summarized in Table 7.

Table 7: Comparison of Short-listed Options with Cost Estimates

	Option 3	Option 4	Option 5
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes
Improves Long-Term Load Serving Capability	Yes (Better)	Marginally	Yes
Improves Performance in Summer Peak Operations Case Sensitivity	Yes	No	Yes
Improves Operational Flexibility	No	No	Yes
Provides an additional transfer path from South	No	No	Yes
Requires CCN (Miles)	No	Yes (1.7)	Yes (51.7)
Construction Feasible (Based on TSP assessment)	Yes	No	Yes
Cost Estimate* ($M)	505.6*	N/A	329.1

* Updated cost estimate from the original estimate in the RPG submittal and may increase to include additional transmission upgrades

ERCOT recommends Option 5 as the preferred option to address the reliability need in the San Antonio area based on the following considerations:

- Options 3 and 5 both improve long-term load serving capability and improve performance in the summer peak operations case sensitivity. However, Option 5 improves operational flexibility and provides an additional transfer path from Southern Texas into the San Antonio area;
- Further, Option 5 is significantly less expensive than Option 3.

8 Additional Analyses and Assessment

The preferred option (Option 5, approximately $329.1 million) is categorized as a Tier 1 project, pursuant to ERCOT Protocol 3.11.4.3. ERCOT performed generation and load sensitivity studies to identify the preferred option performance, as required under Planning Guide Section 3.1.3 (4). Additionally, a Sub-synchronous Resonance (SSR) Assessment was performed.

8.1 Generation Addition Sensitivity Analysis

ERCOT performed a generation addition sensitivity analysis based on Planning Guide Section 3.1.3(4)(a).

Based on a review of the March 2023 GIS[7] reports, 11 units were found within the South and South-Central weather zones load pocket which could have an impact on the identified reliability issues. These units are listed in Table 8.1. After the addition of the units to the Option 5 case, no new thermal or voltage violations were identified.

Table 8.1: List of Units that Could Have Impact on the Identified Reliability Issues

GINR	Unit Name	Fuel Type	Capacity (MW)	County
19INR0022	Monte Alto I	WIN	189.00	Willacy
19INR0023	Monte Alto 2 Wind	WIN	272.76	Willacy
20INR0086	Arroyo Solar	SOL	180.00	Cameron
21INR0226	Equinox Solar 1	SOL	200.00	Starr
21INR0391	Grandslam Solar	SOL	121.89	Atascosa
22INR0251	Shaula I Solar	SOL	205.20	DeWitt
22INR0257	Corazon Solar Phase II	SOL	203.90	Webb
22INR0267	Shaula II Solar	SOL	205.20	DeWitt
23INR0061	Noria Solar DCC	SOL	145.00	Nueces
23INR0093	Alila Solar	SOL	256.50	San Patricio
25INR0223	Uhland Maxwell	GAS	184.00	Caldwell

8.2 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 ERCOT independent review. As stated in Section 2.1, ERCOT used the 2027 SSC summer peak case from the 2022 RTP and adjusted the load to create the 2027 SSC summer peak case to study the San Antonio area. This study base case, which was created in accordance with the 2022 RTP Study Scope and Process document and Section 2.1 of this document, included load scaled down from the respective non-coincident peaks in the North, North Central, West, Far West, East, and Coast weather zones.

The Outage Transfer Distribution Factors (OTDFs) of overloaded elements with respect to the load transfer for each weather zone (excluding South and South-Central weather zones) were calculated

[7] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER.

using PowerWorld Simulator. The OTDFs were less than 1% for each of the overloaded elements, *i.e.*, they were not significant enough to have an impact on the overloaded elements. ERCOT concluded that the load scaling used to develop the base case in this study did not have a material impact on the project need, which was primarily driven by thermal overloads in the San Antonio area.

8.3 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Nodal Protocol Section 3.22.1.3(2), ERCOT conducted a sub-synchronous-resonance (SSR) screening for the preferred option (Option 5) and found no adverse SSR impacts to the existing and planned generation resources in the study area.

9 Congestion Analysis

ERCOT conducted a congestion analysis to identify any potential impact on system congestion related to the addition of the recommend project, Option 5, using the 2022 RTP 2027 final economic case.

The results of congestion analysis indicated Option 5 relieved three existing congestions and caused one new congestion as shown in Table 9.1.

Table 9.1: List of New and Existing Congestion Due to Transmission Upgrade of Option 5

Monitored Line	% Time of Congestion	New / Existing
Howard Road to Leon Creek 138-kV Line	24.02	Existing
Leon Creek to Southsan 138-kV Line	0.83	Existing
Spruce to Pawnee 345-kV Line	0.74	Existing
Cagnon to Vlsi 138-kV Line	0.73	New

An additional test was conducted by upgrading Cagnon to Vlsi 138-kV line to see if this alleviated the new congestion. Based on the results summarized in Table 9.2, the additional upgrade did not yield any economic benefit. Therefore, no upgrades will be recommended to solve this new congestion as part of Option 5.

Table 9.2: Test Results with Cagnon to Vlsi 138-kV Line Upgrade

Upgrade Tested	Mileage (mi)	Passed Production Cost Savings Test	Passed Generation Revenue Reduction Test
Cagnon to Vlsi 138-kV Line Upgrade	8.7	No	No

10 Conclusion

ERCOT evaluated the five transmission-upgrade options to resolve the thermal violations observed in the San Antonio area. Based on the results of the independent review, ERCOT recommends Option 5 as the preferred solution because it addresses the thermal violations while introducing no new reliability issues, improves the long-term load serving capability of the San Antonio Area, improves performance in the summer peak operations case sensitivity, improves operational flexibility, and

provides a new transmission path from Southern Texas to the San Antonio area while also being the least cost of the two feasible short-listed options.

Option 5 consists of the following upgrades and is estimated to cost approximately $329.1 million:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require 50 miles of new ROW;
- Rebuild the existing, 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

This project will require one or more CCN applications for 1) the construction of the new, 345-kV double-circuit transmission line from Howard Road 345-kV Substation to San Miguel 345-kV Substation due to approximately 50.0 miles of new ROW and 2) to rebuild the existing, 138-kV transmission line from Howard Road 138-kV Substation to Leon Creek 138-kV Substation due to approximately 1.7 miles of new ROW. The expected ISD of this project is June 2027.

11 Appendix

Index	Description	Document
A	Maps of all options	Appendix A.pdf

APPROVED
Minutes of the Technical Advisory Committee (TAC) Meeting – Webex Only
Tuesday, July 25, 2023 – 9:30 a.m.

Members:

Barnes, Bill	Reliant Energy Retail Services (Reliant)	
Bonskowski, Ned	Luminant Generation (Luminant)	
Campo, Curtis	Garland Power and Light (GP&L)	Alt. Rep. for Russell Franklin
Carpenter, Jeremy	Tenaska Power Services (Tenaska)	
Cochran, Seth	DC Energy	
Dreyfus, Mark	City of Eastland	
Fehrenbach, Nick	City of Dallas	
Gaytan, Jose	Denton Municipal Electric (DME)	
Goff, Eric	Residential Consumer	
Gross, Blake	AEP Service Corporation	Alt Rep. Richard Ross
Hanson, Kevin	National Grid Renewables (NG Renewables)	
Harpole, Jay	AP Gas & Electric (APG&E)	
Helton, Bob	ENGIE	
Hendrix, Chris	Demand Control 2	
Holt, Blake	Lower Colorado River Authority (LCRA)	Alt. Rep. for Emily Jolly
Jolly, Emily	LCRA	
Kee, David	CPS Energy	
Kent, Garret	CMC Steel Texas (CMC Steel)	
Lange, Clif	South Texas Electric Cooperative (STEC)	
Loving, Alicia	Austin Energy	
Martin, Collin	Oncor Electric Delivery (Oncor)	
Mercado, David	CenterPoint Energy (CNP)	
Nix, Keith	Texas-New Mexico Power Company (TNMP)	
Pokharel, Nabaraj	Office of Public Utility Counsel (OPUC)	
Powell, Christian	Pedernales Electric Cooperative (PEC)	
Ross, Richard	AEP Service Corporation	
Sams, Bryan	Calpine Corporation (Calpine)	
Schmitt, Jennifer	Rhythm Ops	
Smith, Bill	Air Liquide	
Surendran, Resmi	Shell Energy North America (SENA)	

The following proxy was assigned:

- Caitlin Smith to Bob Helton

Guests:

Ainspan, Malcolm	NRG
Aldridge, Ryan	AB Power Advisors
Ashley, Kristy	CES
Barati, Camron	Potomac Economics
Barber, Kathy	
Barr, Bill	LCRA

Basaran, Harika	PUCT
Bell, Brad	Solar Proponent
Benson, Mariah	PUCT
Berry, Danny	LCRA
Bertin, Suzanne	
Bezwada, Neelima	Potomac Economics
Bivens, Carrie	Potomac Economics
Blackburn, Don	Hunt Energy Network
Block, Laurie	LBlock Consulting, LLC
Brown, Chris	PUCT
Camet, Brooke	PUCT
Clifford, Brigid	PG Renewables
Conant, Portia	Yes Energy
Cook, Kristin	Southern Power
Cooksey, Matthew	OPUC
Daigneault, Ralph	Potomac Economics
Donohoo, Ken	OwlERC, LLC
Duensing, Allison	Sarac Energy
Fowler, Lynne	
Ghoshal, Orijit	esVolta
Gietl, Tim	
Glotfelty, Jimmy	PUCT
Godly, Kevin	Rev Renewables
George, Ian	BOFA
Grey, Bruce	Samsung
Hankins, Laura	LCRA
Harvey, Julia	Texas Electric Cooperatives
Henderson, Norris	FERC
Hennings, Peter	Roscommon
Henson, Martha	Oncor
Horstmyer, Reid	Dynasty Power
Hubbard, John Russ	TIEC
Hudis, Gabriella	Gabel Associates
Lindsey Hughes	Broad Reach Power
Huynh, Thuy	Potomac Economics
Ingraham, Deborah	Acciona
Jewell, Michael	Jewell and Associates
Jones, Randy	Mountaineer Market Advisors
Keller, Jenna	PUCT
Korde, Kshitij	NG Renewables
Koz, Brian	
Kremling, Barry	GVEC
Kroskey, Tony	Brazos
Lacek, Mollie	Talen Energy
Lasher, Warren	Lasher Energy
Lee, Jim	CNP

Lewis, William	Payless Power
Lotter, Eric	GridMonitor
Lu, Bo	Broad Reach Power
Macaraeg, Tad	Stem
Macias, Jesse	AEP Texas
Mayers, Sharon	Worley
Maynez, Andrew	Orsted
McClellan, Suzi	Good Company Associates
McKeever, Debbie	Oncor
Morris, Sandy	WETT
Nicholson, Tyler	PUCT
Noyes, Theresa	LCRA
Nguyen, Andy	Constellation Energy Generation
Ok, Brendan	PUCT
Okenfuss, James	Savion
O'Niell, Nic	Austin Energy
Orr, Rob	Lone Star Transmission
Ortiz, Antonio	
Oxedine, Helen	CPS Energy
Pallarez, Eddie	AEP
Pfefferle, Ryan	Oxy
Pietrucha, Doug	Texas Advanced Energy
Proffer, Erica	KVUE News
Pyka, Greg	Schneider Engineering
Ramaswamy, Ramya	PUCT
Reedy, Steve	CIM View
Reimers, Andrew	Lancium
Richmond, Michele	Competitive Power
Riojas, Joselle	Targa Resources
Ritch, John	NextEra Energy
Roth, Werner	PUCT
Sager, Brenden	Austin Energy
Scott, Kathy	CNP
Sersen, Juliana	Baker Botts
Shaffer, Jarred	Office of Texas Governor Greg Abbott
Siddiqi, Shams	Crescent Power Consulting
Smith, Chase	Southern Power
Smith, Mark	Mark Smith Law, LLC
Snyder, Bill	AEP
Teng, Shuye	LCRA
True, Roy	ACES
Uy, Manny	Hunt Energy
Walker, Floyd	PUCT
Wan, Josephine	Austin Energy
White, Lauri	AEP
Wittmeyer, Bob	Longhorn Power

Wolf, Craig	RES
Wyman, Constance	
Yang, Chen	Avangrid
Zhang, Wen	Potomac Economics

ERCOT Staff:
Albracht, Brittney
Anderson, Troy
Arth, Matt
Azeredo, Chris
Billo, Jeff
Blevins, Bill
Boren, Ann
Chu, Zhengguo
Clifton, Suzy
Dashnyam, Sanchir
Day, Betty
Dwyer, Davida
Fohn, Doug
Gnanam, Prabhu
Golen, Robert
Gross, Katherine
Herrera, Shane
Hobbs, Kristi
Holden, Curry
King, Ryan
Li, Ying
Magarinos, Marcelo
Mago, Nitika
McGuire, Joshua
Meier, Kennedy
Mereness, Matt
Michelsen, Dave
Moorty, Sai
Moreno, Alfredo
Ögelman, Kenan
Parakkuth, Jayapal
Patterson, Mark
Pedigo, Jake
Phillips, Cory
Rainwater, Kim
Rickerson, Woody
Roberts, Randy
Rosel, Austin
Schmidt, Matthew
Shaw, Pamela

Solis, Stephen
Thomas, Shane
Troublefield, Jordan
Wasik-Gutierrez, Erin
You, Haibo
Zhou, Emily

Unless otherwise indicated, all Market Segments participated in the votes.

Clif Lange called the July 25, 2023 meeting to order at 9:30 a.m.

Antitrust Admonition
Mr. Lange directed attention to the displayed Antitrust Admonition and noted that the Antitrust Guidelines are available for review on the ERCOT website.

Approval of TAC Meeting Minutes (see Key Documents)[1]
June 25, 2023
Mr. Lange noted this item could be considered in the Combined Ballot.

Meetings Update
June 29, 2023 Public Utility Commission of Texas (PUCT) Open Meeting
July 20, 2023 PUCT Open Meeting
Mr. Lange reviewed the disposition of Revision Request items considered at the June 29, 2023 and July 20, 2023 PUCT Open Meetings.

Review of ERCOT Market Impact Statements/Opinions and Independent Market Monitor (IMM) Opinion (see Key Documents)
Ann Boren presented the ERCOT Market Impact Statements and ERCOT opinions for Revision Requests to be considered by TAC, and Carrie Bivens presented the IMM opinions.

Protocol Revision Subcommittee (PRS) Report (see Key Documents)
Martha Henson reviewed PRS activities and presented Revision Requests for TAC consideration.

Nodal Protocol Revision Request (NPRR) 1165, Revisions to Requirements of Providing Audited Financial Statements and Providing Independent Amount
Eric Goff moved to recommend approval of NPRR1165 as recommended by PRS in the 7/13/23 PRS Report. Bill Barnes seconded the motion. The motion carried with one objection from the Municipal (CPS Energy) Market Segment. *(Please see ballot posted with Key Documents.)*

[1] Key Documents referenced in these minutes may be accessed on the ERCOT website at: https://www.ercot.com/calendar/07252023-TAC-Meeting-_-Webex

NPRR1182, Inclusion of Controllable Load Resources and Energy Storage Resources in the Constraint Competitiveness Test Process
Mr. Lange noted this item could be considered in the Combined Ballot.

NPRR1183, ECEII Definition Clarification and Updates to Posting Rules for Certain Documents without ECEII
Mr. Lange noted this item could be considered in the Combined Ballot.

Other Binding Documents List
Ms. Henson summarized recent ERCOT efforts to streamline the change control process for items on the Other Binding Document List to align with NPRR1157, Incorporation of PUCT Approval into Revision Request Process, encouraged Market Participants to attend future PRS meetings to participate in the ongoing effort, and presented the PRS recommendations for TAC consideration. Mr. Lange noted this item could be considered in the Combined Ballot.

Revision Requests Tabled at TAC (See Key Documents)
NPRR1173, Changes Consistent With the Options Available to an MOU and EC Entering Retail Competition in the ERCOT Market
TAC took no action on this item.

NPRR1176, Update to EEA Trigger Levels
Ms. Boren reviewed the 7/25/23 Revised Impact Analysis for NPRR1176. Mr. Lange noted that NPRR1176 and Nodal Operating Guide Revision Request (NOGRR) 252, Related to NPRR1176, Update to EEA Trigger Levels, could be considered in the Combined Ballot.

Other Binding Documents (See Key Documents)
Other Binding Document Revision Request (OBDRR) 046, Related to NPRR1188, Implement Nodal Dispatch and Energy Settlement for Controllable Load Resources
Mr. Lange noted this item could be considered in the Combined Ballot.

OBDRR047, Revision to ERS Procurement Methodology regarding Unused Funds from Previous Terms
Mark Patterson provided an overview of OBDRR047. Market Participants discussed allocations to Loads versus rolling funds to another contract period. Mr. Lange noted this item could be considered in the Combined Ballot.

Retail Market Subcommittee (RMS) Report (See Key Documents)
Suspension of 2024 Business and Residential Annual Validation
Debbie McKeever reviewed RMS activities, including RMS action to recommend suspending the 2024 Business and Residential Annual Profile Validation, summarized the benefits of taking this action, presented estimated cost savings for ERCOT and Transmission and/or Distribution Service Providers (TDSPs), and requested TAC consideration of the issue. Market Participants expressed support for the RMS recommended action for 2024, and requested a cost/benefit analysis on the validation process and consideration for potentially eliminating it at a later date. Mr. Lange noted this item could be considered in the Combined Ballot and requested RMS review the issues.

Reliability and Operations Subcommittee (ROS) Report (see Key Documents)
Chase Smith reviewed ROS activities and presented Revision Requests for TAC consideration.

NOGRR247, Change UFLS Stages and Load Relief Amounts
Mr. Lange noted this item could be considered in the Combined Ballot.

NOGRR252, Related to NPRR1176, Update to EEA Trigger Levels
Mr. Lange noted this item could be considered in the Combined Ballot.

Planning Guide Revision Request (PGRR) 108, Related to NPRR1183, ECEII Definition Clarification and Updates to Posting Rules for Certain Documents without ECEII
Mr. Lange noted this item could be considered in the Combined Ballot.

ROS Procedures
Mr. Smith noted that the ROS Procedures were updated to include the Inverter-Based Resource Working Group (IBRWG) and administrative edits. Mr. Lange noted this item could be considered in the Combined Ballot.

Wholesale Market Subcommittee (WMS) Report (see Key Documents)
Jim Lee reviewed WMS activities and presented a Revision Request for TAC consideration.

Verifiable Cost Manual Revision Request (VCMRR) 034, Excluding RUC Approved Fuel Costs from Fuel Adders
Mr. Lee summarized the 6/12/23 WMS Report for VCMRR034. Some Market Participants expressed concern that VCMRR034 creates difficulty with reconciling which costs are submitted and approved via the process versus fuel adders.

Mr. Goff moved to recommend approval of VCMRR034 as recommended by WMS in the 7/12/23 WMS Report. Chris Hendrix seconded the motion. The motion carried with one objection from the Independent Generator (Luminant) Market Segment, and three abstentions from the Independent Generator (Calpine, ENGIE, Jupiter Power) Market Segment. *(Please see ballot posted with Key Documents.)*

Credit Finance Sub Group (CFSG) Report (see Key Documents)
Approval of CFSG Membership
Brenden Sager reviewed CFSG activities and presented the following designated CFSG Member for TAC approval:

- Anthony Lerch, Constellation Energy Generation, Independent Generator

Mr. Lange noted this item could be considered in the Combined Ballot.

Large Flexible Load Task Force (LFLTF) Report (See Key Documents)
Bill Blevins noted that the July 24, 2023 LFLTF meeting was cancelled; stated that Revision Requests addressing large Load issues, including registration, interconnection, and operation of customers with large Loads are anticipated to be filed soon; and encouraged Market Participants to attend the August 28, 2023 LFLTF Meeting for discussion on older interconnection approvals that have yet to interconnect and potential time frames for interconnection approvals to be valid.

ERCOT Reports (see Key Documents)
Real-Time Cooptimization (RTC) Update
Matt Mereness provided an update on the RTC project, stated that ERCOT proposes drafting an RTC+B Working Group Charter for consideration at the August 22, 2023 TAC meeting, and encouraged Market

Participants to consider the Vice-Chair leadership opportunity. This working group is to provide on-going collaboration and risk mitigation between ERCOT and Market Participants for the implementation of the RTC+B program,

ERCOT Contingency Reserve Service (ECRS) Go-Live Update
Mr. Mereness noted that ERCOT Staff is working with ROS and WMS leadership on the TAC assignments related to ECRS.

CPS San Antonio South Reliability Regional Planning Group Project
Prabhu Gnanam presented the ERCOT independent review of the CPS San Antonio South Reliability Regional Planning Group Project, a comparison of options, and the ERCOT recommendation for Option 5 to address the reliability need in the San Antonio area. Mr. Lange noted this item could be considered in the Combined Ballot.

Other Business (see Key Documents)
2024 Stakeholder Meeting Calendar
Market Participants reviewed the 2024 Stakeholder Meeting Calendar options for TAC and expressed support for a Wednesday meeting schedule.

Combined Ballot
David Kee moved to approve the Combined Ballot as follows:

- **To approve the June 27, 2023, TAC Meeting Minutes as presented**
- **To recommend approval of NPRR1182 as recommended by PRS in the 7/13/23 PRS Report**
- **To recommend approval of NPRR1183 as recommended by PRS in the 7/13/23 PRS Report**
- **To approve the OBD List as recommended by PRS**
- **To recommend approval of NPRR1176 as recommended by PRS in the 6/14/23 PRS Report; and the 7/25/23 Revised Impact Analysis**
- **To table OBDRR046**
- **To recommend approval of OBDRR047 as submitted; and the 6/30/23 Impact Analysis**
- **To approve suspension of the 2024 Business and Residential Annual Validation; as recommended by RMS**
- **To recommend approval of NOGRR247 as recommended by ROS in the 7/6/23 ROS Report**
- **To recommend approval of NOGRR252 as recommended by ROS in the 7/6/23 ROS Report**
- **To recommend approval of PGRR108 as recommended by ROS in the 7/6/23 ROS Report**
- **To approve the ROS Procedures as presented**
- **To approve CFSG Membership as presented**
- **To endorse Option 5 for the CPS San Antonio South Reliability RPG Project, as recommended by ERCOT**

Jose Gaytan seconded the motion. The motion carried unanimously. *(Please see ballot posted with Key Documents.)*

Mr. Lange adjourned the July 25, 2023 TAC meeting at 11:29 a.m.

Version 2.0

TAC Motion: To approve the Combined Ballot as presented (detailed on the "Ballot Details" tab)

Tally Votes

Clear | Record Vote

Date: July 25, 2023

Prepared by: Cory Phillips

TALLY TOTAL

Voting Structure	Motion Passes		
TAC	2/3 of non-abst TAC Votes = 20		Total Abstentions
TAC Vote:	30	0	0
	100%	0%	

Sector / Entity		Representative	Present	Yes	No	Abstain
Consumers	Divide Subsegments? n	**Consumer Vote Total**	1			
City of Eastland	Comm	Mark Dreyfus	y	1		
City of Dallas	Comm	Nick Fehrenbach	y	1		
CMC Steel Texas (CMC Steel)	Indu	Garret Kent	y	1		
Air Liquide	Indu	Bill Smith	y	1		
Residential Consumer	Resi	Eric Goff	y	1		
Office of Public Utility Counsel (OPUC)	Resi	Nabaraj Pokharel	y	1		
		Segment Vote:	6	6	0	0
Cooperatives						
Golden Spread Electric Cooperative (GSEC)		Mike Wise (Katie Rich)	y	1		
Lower Colorado River Authority (LCRA)		Emily Jolly (Blake Holt)	y	1		
Pedernales Electric Cooperative (PEC)		Christian Powell	y	1		
South Texas Electric Cooperative (STEC)		Clif Lange	y	1		
		Segment Vote:	4	4	0	0
Independent Generators						
Calpine Corporation (Calpine)		Bryan Sams	y	1		
ENGIE		Bob Helton	y	1		
Jupiter Power		Caitlin Smith (Bob Helton)	y	1		
Luminant Generation (Luminant)		Ned Bonskowski	y	1		
		Segment Vote:	4	4	0	0
Independent Power Marketers						
Tenaska Power Services (Tenaska)		Jeremy Carpenter	y	1		
Shell Energy North America (SENA)		Resmi Surendran	y	1		
National Grid Renewables (NG Reneweables)		Kevin Hanson	y	1		
DC Energy		Seth Cochran	y	1		
		Segment Vote:	4	4	0	0
Independent Retail Electric Providers						
Reliant Energy Retail Services (Reliant)		Bill Barnes	y	1		
Demand Control 2		Chris Hendrix	y	1		
Rhythm Ops		Jennifer Schmitt	y	1		
AP Gas & Electric (APG&E)		Jay Harpole	y	1		
		Segment Vote:	4	4	0	0
Investor Owned Utilities						
Texas-New Mexico Power Company (TNMP)		Keith Nix	y	1		
Oncor Electric Delivery (Oncor)		Collin Martin	y	1		
CenterPoint Energy (CNP)		David Mercado	y	1		
AEP Service Corporation (AEPSC)		Richard Ross (Blake Gross)	y	1		
		Segment Vote:	4	4	0	0
Municipals						
Denton Municipal Electric (DME)		Jose Gaytan	y	1		
CPS Energy		David Kee	y	1		
Austin Energy		Alicia Loving	y	1		
Garland Power & Light (GP&L)		Russell Franklin (Curtis Campo)	y	1		
		Segment Vote:	4	4	0	0
All Sectors Voting Totals						
						Total
		Segment Vote:	**30**	30	0	0

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Date: August 24, 2023
To: Board of Directors
From: Bob Flexon, Reliability and Markets (R&M) Committee Chair
Subject: CPS Energy – San Antonio South Reliability Regional Planning Group Project

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: August 31, 2023
Item No.: 11.2

Issue:
Whether the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) should accept the recommendation of ERCOT staff to: (1) endorse the need for the Tier 1 CPS Energy – San Antonio South Reliability Regional Planning Group (RPG) Project in order to meet the reliability requirements for the ERCOT System and address thermal overloads in the San Antonio Area, which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted unanimously to endorse; and (2) designate the CPS Energy – San Antonio South Reliability RPG Project as critical to the reliability of the ERCOT System pursuant to Public Utility Commission of Texas (PUCT) Substantive Rule 25.101(b)(3)(D).

Background/History:
CPS Energy (CPS) has proposed the San Antonio South Reliability Project, a $329.1 million, Tier 1 project with an expected in-service date of June 2027, to meet reliability planning criteria and address thermal overloads in the San Antonio area with the following ERCOT System improvements to 26.9 miles of 138-kV transmission lines:

- Construct new 50-mile Howard Road to San Miguel double circuit 345-kV transmission line with a minimum rating of 1982 MVA,
- Rebuild 14.9-mile Cagnon to Howard Road 345-kV double circuit transmission line with a minimum rating of 1746 MVA,
- Rebuild 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a minimum of 698 MVA,
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation, and
- Rebuild 2.9-mile Leon Creek to Southsan 138-kV transmission line with a minimum rating of 478 MVA.

For construction to meet the June 2027 in-service date, the San Antonio South Reliability Project requires Public Utility Commission of Texas (PUCT, Commission) approval of a Certificate of Convenience and Necessity, following Board designation of the project as critical to the reliability of the ERCOT System, which per PUCT Substantive Rule 25.101(b)(3)(D) authorizes Commission consideration on an expedited basis of 180-days from the date of filing for projects deemed critical to

reliability. The reliability need for project completion as soon as possible and the need to limit the duration of any necessary Constraint Management Plans (CMPs) render the project critical to reliability.

CPS proposed the San Antonio South Reliability Project with an initial cost estimate of $281 million for RPG review in December 2022. RPG considered project overviews during meetings in January and June 2023. Between January and June 2023, ERCOT staff presented scope and status updates at RPG meetings in February, March, April, and May. Pursuant to Protocol Section 3.11.4.9(2), ERCOT presented the Tier 1 project to the Technical Advisory Committee (TAC) for review and comment, and on July 25, 2023 TAC endorsed the project as recommended by ERCOT.

Pursuant to Protocol Section 3.11.4.3(1)(a), projects with an estimated capital cost of $100 million or greater are Tier 1 projects, for which Section 3.11.4.7 requires endorsement by the Board. Section IV(B)(2)(a) requires the R&M Committee to review and make a recommendation to the Board regarding any Tier 1 project. Protocol Section 3.11.4.7 also requires ERCOT to independently review submitted projects. Of five options ERCOT analyzed during independent review of the San Antonio South Reliability Project, ERCOT preferred Option 5 as the least cost option to address reliability; improve ability to serve long-term Load growth; and improve operational flexibility, including providing an additional transfer path from Southern Texas to San Antonio.

ERCOT's assessment of the Sub-Synchronous Resonance (SSR) of CPS's of existing facilities in the San Antonio area, conducted pursuant to Protocol Section 3.22.1.3, yielded no adverse SSR impacts to the existing and planned generation resources at the time of the study. Results of the congestion analysis ERCOT conducted pursuant to Planning Guide Section 3.1.3 indicate the project would relieve three existing congestions and result in one new congestion (for the one new congestion, upgrades would yield no economic benefits according to test results for revenue reduction and cost savings):

- Howard Road to Leon Creek 138-kV Line (24.02 percent existing congestion)
- Leon Creek to Southsan 138-kV Line (0.83 percent existing congestion)
- Spruce to Pawnee 345-kV Line (0.74 percent existing congestion)
- Cagnon to Vlsi 138-kV Line (0.73 percent new congestion)

The project completion date may change depending on material acquisition, outage coordination, and construction. The cost estimate accounts for the expectation that some construction activities will occur in an energized transmission line corridor. CPS cooperation with ERCOT could be necessary to develop and implement CMPs based on summer 2027 operational conditions.

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The report describing the ERCOT Independent Review of the San Antonio South Reliability Project, including ERCOT staff's recommendation for Option 5, is attached as ***Attachment A***.

Key Factors Influencing Issue:

1. ERCOT System improvements are needed to meet reliability planning criteria and address thermal overloads in the San Antonio area.
2. ERCOT staff found the recommended set of improvements to be the most efficient solution for meeting the planning criteria and addressing thermal overloads.
3. Protocol Section 3.11.4.7 requires Board endorsement of a Tier 1 project, which is a project with an estimated capital cost of $100 million or greater pursuant to Section 3.11.4.3(1)(a).
4. TAC voted unanimously to endorse the Tier 1 CPS Energy – San Antonio South Reliability Regional Planning Group Project (Option 5), as recommended by ERCOT, on July 25, 2023.
5. Since there is reliability need to have the project in place as soon as possible, ERCOT staff has deemed this project critical to reliability.
6. If the CPS Energy – San Antonio South Reliability RPG Project (Option 5) is designated as critical to the reliability of the ERCOT System, the review process at the PUCT will be expedited pursuant to Substantive Rule 25.101(b)(3)(D).

Conclusion/Recommendation:

ERCOT staff recommends, and the R&M Committee is expected to recommend, that the Board: (1) endorse the need for the Tier 1 CPS Energy – San Antonio South Reliability RPG Project (Option 5), which ERCOT staff has independently reviewed and which TAC has voted unanimously to endorse, based on NERC and ERCOT reliability planning criteria; and (2) designate the CPS Energy – San Antonio South Reliability RPG Project (Option 5) as critical to the reliability of the ERCOT System pursuant to PUCT Substantive Rule 25.101(b)(3)(D).

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ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.
BOARD OF DIRECTORS RESOLUTION

WHEREAS, pursuant to Section 3.11.4.3(1)(a) of the Electric Reliability Council of Texas, Inc. (ERCOT) Protocols, projects with an estimated capital cost of $100 million or greater are Tier 1 projects, for which Section 3.11.4.7 requires endorsement by the ERCOT Board of Directors (Board); and

WHEREAS, after due consideration of the alternatives, the Board deems it desirable and in the best interest of ERCOT to accept ERCOT staff's recommendation to (1) endorse the need for the Tier 1 CPS Energy – San Antonio South Reliability Regional Planning Group Project (Option 5), which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted unanimously to endorse, based on North American Electric Reliability Corporation (NERC) and ERCOT reliability planning criteria; and (2) designate the CPS Energy – San Antonio South Reliability Regional Planning Group Project (Option 5) as critical to the reliability of the ERCOT System pursuant to Public Utility Commission of Texas (PUCT) Substantive Rule 25.101(b)(3)(D); each as recommended by the Reliability and Markets (R&M) Committee;

THEREFORE, BE IT RESOLVED, that the Board hereby (1) endorses the need for the Tier 1 CPS Energy – San Antonio South Reliability Regional Planning Group Project (Option 5), which ERCOT staff has independently reviewed and which TAC has voted unanimously to endorse, based on NERC and ERCOT reliability planning criteria; and (2) designates the CPS Energy – San Antonio South Reliability Regional Planning Group Project (Option 5) as critical to the reliability of the ERCOT System pursuant to PUCT Substantive Rule 25.101(b)(3)(D).

CORPORATE SECRETARY'S CERTIFICATE

I, Jonathan M. Levine, Assistant Corporate Secretary of ERCOT, do hereby certify that, at its August 31, 2023 meeting, the Board passed a motion approving the above Resolution by _____.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of August, 2023.

_____
Jonathan M. Levine
Assistant Corporate Secretary

ERCOT Independent Review of the CPS Energy (CPS) San Antonio South Reliability Project

Document Revisions

Date	Version	Description	Author(s)
06/23/2023	1.0	Final Draft	Caleb Holland, Tanzila Ahmed
		Reviewed by	Robert Golen, Prabhu Gnanam, Davida Dwyer

Executive Summary

CPS Energy (CPS) submitted the San Antonio South Reliability Project to the Regional Planning Group (RPG) in December 2022. CPS proposed this project to address NERC Category P1 thermal overloads of the J.K. Spruce to Pawnee 345-kV transmission line. The project will be needed by 2027 Summer Peak.

The proposed project was estimated to cost approximately $281 million and was classified as a Tier 1 project per ERCOT Nodal Protocol Section 3.11.4.3. The proposed project cost exceeds the $100 million threshold and would require a Certificate of Convenience and Necessity (CCN) application.

ERCOT performed an Independent Review, identified thermal overloads in the San Antonio area, and evaluated five different transmission project options.

Among the five different transmission project options evaluated in the Independent Review, ERCOT recommends Option 5 to address the thermal overload based on the study results described in Sections 5 and 6 of this report. Option 5 consists of the following:

- Construct a new 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require new Rights of Way (ROW);
- Rebuild the existing 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

The cost estimate for this Tier 1 project is approximately $329.1 million. One or more CCN applications will be required for 1) the construction of the new 345-kV double-circuit transmission line from Howard Road 345-kV substation to San Miguel 345-kV substation due to approximately 50.0 miles of new ROW and 2) the rebuild of the existing 138-kV transmission line from Howard Road 138-kV Substation to Leon Creek 138-kV Substation due to approximately 1.7 miles of new ROW. The expected In-Service Date (ISD) of this project is June 2027.

CPS requests this project be designated as critical to reliability of the ERCOT system based on historic line loading reflected in the recent high congestion costs, new renewable generation development, and local CPS generation reaching technical and potential end of life.

Table of Contents

1 Introduction

In December 2022, CPS submitted the San Antonio South Reliability Project to the RPG to address NERC Category P1 thermal overloads of the 345-kV J.K. Spruce to Pawnee transmission line. As shown in Figure 1.1, there are currently only two 345-kV transmission paths from Southern Texas into the San Antonio area. One of these paths approaches San Antonio from the South and is a single circuit with a total normal capacity of 1,051 MVA. The other is a double circuit with a combined total normal capacity of 2,372 MVA, which loops around San Antonio to the East and enters the San Antonio area from the North. As of 2027, there will be three 345-kV corridors from Southern Texas to the two substations shown at the bottom of Figure 1.1 (San Miguel and Pawnee). These stations are approximately 50 miles south of San Antonio. With the contingent loss of either of the two paths from those substations into San Antonio, only one path that would be left to serve San Antonio and modeling shows this path would be subjected to a significant increase in loading.

The CPS-proposed project was classified as a Tier 1 project pursuant to ERCOT Nodal Protocol Section 3.11.4.3, with an estimated cost of approximately $281 million. ERCOT conducted an Independent Review for this RPG project to identify any reliability needs in the area including the project need (138-kV transmission line thermal overloads in the South and Northeast San Antonio areas) and evaluated various transmission upgrade options. This report describes the study assumptions, methodology, and the results of the ERCOT Independent Review of the project.

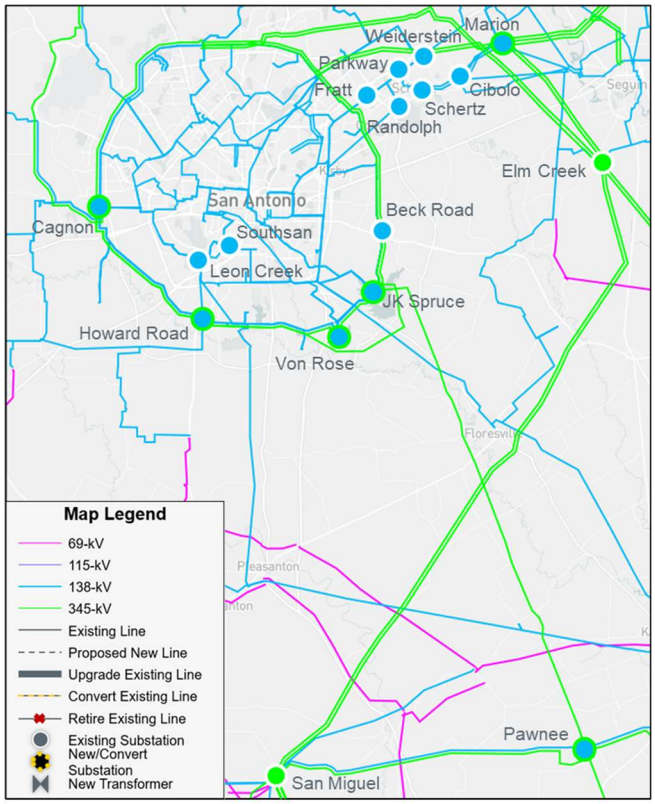

Figure 1.1: Map of Transmission System in The San Antonio Area

2 Study Assumptions and Methodology

ERCOT performed studies under various system conditions to identify any reliability issues and to determine transmission upgrades to support the proposed San Antonio South Reliability Project, if an upgrade is deemed necessary. This section describes the study assumptions and criteria used to conduct the Independent Review.

2.1 Study Assumptions for Reliability Analysis

This project is in the South and South-Central weather zones in Bexar and Atascosa Counties. Nearby counties that were also studied because they are electrically close via the 345-kV transmission system include Karnes, Wilson, and Guadalupe Counties.

2.1.1 Steady-State Study Base Case

The Final 2022 RTP cases, published on the Market Information System (MIS) on December 22, 2022, were used as reference cases in this study. The 2027 Summer peak case was selected for the long-term outlook. The steady-state study base case was constructed by updating transmission, generation, and loads of the following 2022 RTP Summer Peak Load case for the South and South-Central (SSC) weather zones.

- Case: 2022RTP_2027_SUM_SSC_12222022[1]

2.1.2 Transmission Topology

Transmission projects within the study area with In-Service Dates (ISDs) through June 2027 were added to the study base case. The ERCOT Transmission Project Information and Tracking (TPIT)[2] report for October 2022 was used as reference. The added TPIT projects are listed in Table 2.1. These projects are all classified as Tier 3 and Tier 4 projects. No new Tier 1 or Tier 2 projects were added to the study base case because these were already modeled in the final RTP cases.

[1] 2022 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG3-2787-M.
[2] TPIT Report: https://www.ercot.com/gridinfo/sysplan/index.html.

Table 2.1: List of Transmission Projects Added from the Study Base Case

TPIT No	Project Name	Tier	Project ISD	TSP	County
45084B	Braunig to Highland Rebuild	Tier 4	Jul-23	CPS	Bexar
70536	New 138 kV Verde Circle Substation	Tier 4	Oct-24	CPS	Bexar
45029	Grandview Highland Hills Rebuild	Tier 4	Jun-25	CPS	Bexar
45084A	Braunig to Highland Rebuild	Tier 4	Jun-25	CPS	Bexar
67992B	CPSE_345KV_Howard_Switching_Station, CPSE_Hamilton_to_MedCtr_Upgrade, CPSE_Medina_to_36th_Street_Upgrade	Tier 3	Jun-25	CPS	Bexar
67992C	CPSE_345KV_Howard_Switching_Station, CPSE_Hamilton_to_MedCtr_Upgrade, CPSE_Medina_to_36th_Street_Upgrade	Tier 3	Jun-25	CPS	Bexar
67992A	CPSE_345KV_Howard_Switching_Station, CPSE_Hamilton_to_MedCtr_Upgrade, CPSE_Medina_to_36th_Street_Upgrade	Tier 3	Jun-25	CPS	Bexar
15TPIT0031	Chavaneaux_Chavaneaux Tap Rebuild (Brooks to Chavaneaux ckt)	Tier 4	Jun-26	CPS	Bexar
4320	CPSE_Brooks to Chavaneaux MLSE	Tier 4	Dec-26	CPS	Bexar
4323	CPSE_Braunig to Brooks_MLSE	Tier 4	Jun-27	CPS	Bexar

The RTP project shown in Table 2.2 was used as a placeholder for the San Antonio South Reliability project and was removed from study base case.

Table 1.2: List of Transmission Projects Removed from the Study Base Case

RTP Project ID	Project Name	TSP	County
2022-SC6	Howard - San Miguel 345-kV Double Circuit Line Addition and Beck Road 345/138-kV Substation Expansion	CPS, STEC	Bexar, Atascosa

2.1.3 Generation

Based on the December 2022 Generator Interconnection Status (GIS)[3] report posted on the ERCOT website on January 3, 2023, generators in the study area that met ERCOT Planning Guide Section 6.9(1) conditions with Commercial Operations Date (COD) prior to June 2027 were added to the study base case if not already present in the case. These generation additions are listed in Table 2.3. All new generation dispatches were consistent with the 2022 RTP methodology.

Table 2.3: List of Generation Added to the Study Base Case Based on December 2022 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
22INR0368	Padua Grid BESS	OTH	Mar-24	202.6	Bexar

The status of each unit that was projected to be either indefinitely mothballed or retired at the time of the study was reviewed. The units listed in Table 2.4 were opened in the study base case to reflect their mothballed/retired status.

[3] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER.

Table 2.4: List of Generation Opened to Reflect Mothballed/Retired Status

Bus No	Unit Name	Capacity (MW)	Weather Zone
170121	CALAVERS_JTD1	420.0	South-Central
170122	CALAVERS_JTD2	420.0	South-Central
110273	AMOCOOIL_AMOCO_5	32.0	Coast
110020	PNPI_GT2	71.0	Coast
150081	OLINGR_OLING_1	78.0	North Central
170381	OCI_ALM1_ASTRO	1.0	South-Central
170131	BRAUNIG_VHB1	217.0	South-Central
170132	BRAUNIG_VHB2	230.0	South-Central
170133	BRAUNIG_VHB3	412.0	South-Central

2.1.4 Loads

Loads in the study weather zones were consistent with the 2022 RTP.

Loads outside the study weather zones were adjusted to maintain the minimum reserve requirements consistent with the 2022 RTP.

2.1.5 Maintenance Outage Scenario

ERCOT developed an off-peak maintenance season scenario to further evaluate the short-listed options.

The load levels in the South and South-Central weather zones were reduced to 91.2%[4] and 83.7%[4] of their summer peak load levels, respectively. This scaling is meant to reflect assumed off-peak season loads based on historical real-time load data of the South and South-Central weather zones.

2.2 Study Assumption for Sensitivity Scenario

2.2.1 Operation Summer Peak Sensitivity Analysis

The 2022 Operations Peak Sensitivity case was created based on the July 20, 2022, Summer Peak Operations case. The CPS Howard Switching Station (TPIT Project 67992) was added to this case, which was necessary for connecting Options 3 and 5 for testing. Critical contingencies and circuits seen in the N-1 reliability study, maintenance outage scenario analysis, and long-term load serving capability assessment were monitored under N-0 and N-1 conditions. Then, scenarios for Options 3, 4, and 5 (the short-listed options) were created based on this case, and the contingencies were tested to determine the potential impact of each option.

2.3 Study Assumptions for Congestion Analysis

Congestion analysis was conducted to identify any new congestion in the study area with the addition of the preferred transmission upgrade option.

[4] This percentage was determined based on the review of top ten historical loads in Spring, Fall, and Winter for the last three years associated with the South and South-Central Weather Zones.

The 2022 RTP 2027 economic final case was updated based on the December 2022 GIS report for generation updates and the October 2022 TPIT report for transmission updates to conduct congestion analysis. The 2027 study year was selected based on the proposed ISD of the project.

All TPIT projects listed in Table 2.1 were added and the RTP project shown in Table 2.2 that was used as a placeholder for the San Antonio South Reliability project was removed from the economic base case.

New generation additions listed in Table 2.5 were added to the economic base case and all generation listed in Table 2.4 were opened in the study base case to reflect their mothballed/retired status.

Table 2.5: List of Generation Added to the Economic Base Case Based on December 2022 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (MW)	County
21INR0203	Eastbell Milam Solar	SOL	Oct-23	244.9	Milam
21INR0223	Tulsita Solar	SOL	Dec-24	261.0	Goliad
21INR0351	7V Solar	SOL	Nov-23	244.6	Fayette
22INR0368	Padua Grid BESS	OTH	Mar-24	202.6	Bexar
22INR0397	Buckeye Corpus Fuels Solar	SOL	Dec-23	57.6	Nueces
22INR0398	Sabal Storage	OTH	May-23	18.0	Cameron
22INR0551	Wolf Tank Storage	OTH	Mar-23	155.5	Webb
23INR0007	Outpost Solar	SOL	Apr-24	513.7	Webb
23INR0047	Charger Solar	SOL	May-24	406.8	Refugio
23INR0162	Redonda Solar	SOL	Dec-24	253.2	Zapata
23INR0166	Great Kiskadee Storage	OTH	Aug-24	103.1	Hidalgo
23INR0343	Guajillo Energy Storage	OTH	Sep-24	201.1	Webb
23INR0369	Anemoi Energy Storage	OTH	Dec-23	205.0	Hidalgo
23INR0472	Frontera Energy Center	GAS	Jun-23	524.0	Hidalgo

2.4 Methodology

This section lists the Contingencies and Criteria used for project review along with tools used to perform the various analyses.

2.4.1 Contingencies and Criteria

The reliability assessments were performed based on NERC Reliability Standard TPL-001-5.1, ERCOT Nodal Protocols, and Planning Criteria[5].

Contingencies[6] were updated based on the changes made to the topology as described in Section 2.1 of this document. The following steady state contingencies were simulated for the study region:

- P0 (System Intact);
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (Extra High Voltage (EHV) only);

[5] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current.
[6] Details of each event and contingency category are defined in the NERC reliability standard TPL-001-5.1.

- P3-1: G-1 + N-1 (G-1: generation outages) {OW Sommers Unit 2, San Miguel Unit 1, JK Spruce Unit 2, and Leon Creek Peaker Units 1-4}; and
- P6-2: X-1 + N-1 (X-1: 345/138-kV transformers only) {Howard Road, San Miguel, and Pawnee Switch}.

All 69-kV and above buses, transmission lines, and transformers in the study region were monitored (excluding generator step-up transformers) and the following thermal and voltage limits were enforced:

- Thermal
  - Rate A (normal rating) for pre-contingency conditions;
  - Rate B (emergency rating) for post-contingency conditions;
- Voltages
  - Voltages exceeding pre-contingency and post-contingency limits; and
  - Voltage deviations exceeding 8% on non-radial load buses.

2.4.2 Study Tool

ERCOT utilized the following software tools to perform this independent study:

- PowerWorld Simulator version 22 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis and
- UPLAN version 11.4.0.27191 for congestion analysis.

3 Project Need

Steady-state reliability analysis was performed in accordance with NERC TPL-001-5.1 and ERCOT Planning Criteria described in Section 2.3 of this document. This analysis indicated a thermal overload issue under G-1+N-1 contingency in the study area. Under the G-1 scenario with Sommers Unit 2 taken out-of-service, six N-1 violations were observed. Per CPS, Sommers Unit 2 has a planned retirement in March 2029, which further validates its study as a G-1 scenario.

Various 345-kV and 138-kV transmission line outages caused overloads in the 138-kV system. These issues are summarized in Table 3.1. Figure 3.1 visually illustrates the project need.

Table 3.1: Thermal Overloads Observed in the Study Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Length (miles)	Loading %
P7: N-1	HOWARD (5230) -> LEON_CRK (5260) CKT 1	138	4.88	101.39
P1: N-1	L_MARION8_1Y (7178) -> L_CIBOLO8_1Y (7608) CKT 1	138	4.81	102.91
P1: N-1	L_MARION8_1Y (7178) -> L_CIBOLO8_1Y (7608) CKT 2	138	4.81	103.24
P7: N-1	L_PARKWA8_1Y (7611) -> FRATT (5165) CKT 1	138	4.09	103.52
P7: N-1	L_SCHERT8_1Y (7610) -> L_PARKWA8_1Y (7611) CKT 1	138	2.83	105.01
P7: N-1	L_WEIDER8_1Y (7461) -> RANDOLPH (5360) CKT 1	138	5.47	102.74

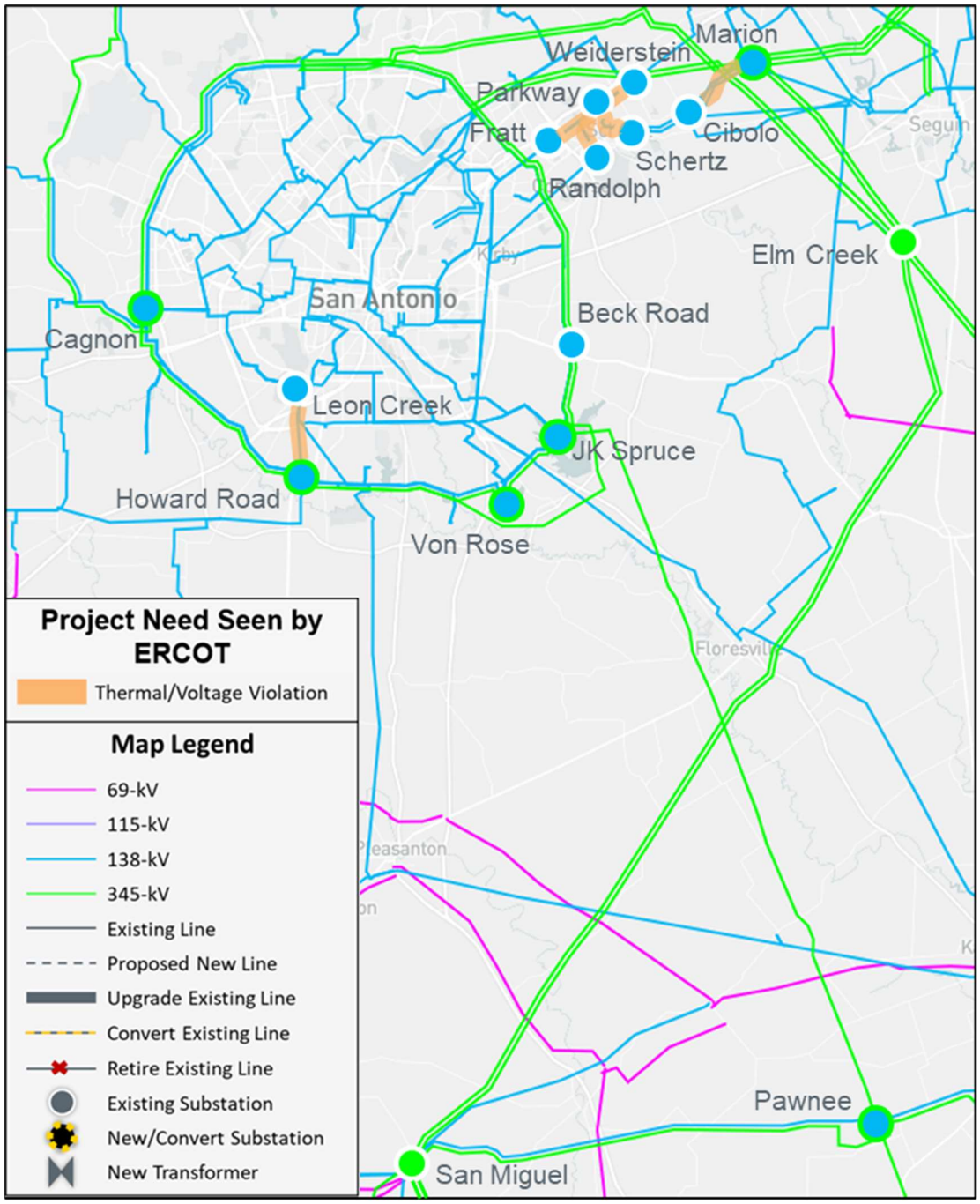

Figure 3.1: Study Area Map Showing Project Needs

4 Description of Project Options

ERCOT initially evaluated five system-improvement options to address the thermal overloads that were observed in the study base case in the San Antonio area. All five options resolved the N-1 thermal overloads in the study area. Detailed maps of each option are provided in Appendix A.

Option 1 (CPS Proposed Solution) consists of the following:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require new ROW;
- Rebuild the existing 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 478 MVA, will require 1.7 miles of new ROW; and
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation.

Option 2 consists of the following:

- Construct a new, 345-kV substation (New Station) between Spruce to Pawnee and San Miguel to Elm Creek 345-kV circuits;
- Construct a new, 38-mile, Howard Rd to (New Station) double-circuit 345-kV transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require new ROW;
- Rebuild and convert the existing, 26-mile (New Station) to Pawnee 345-kV transmission line to a double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit;
- Rebuild the existing, 13.9-mile Elm Creek to Marion 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 478 MVA; this will require 1.7 miles of new ROW; and
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation.

Option 3 consists of the following:

- Rebuild and convert the existing, 45.8-mile Spruce to Pawnee 345-kV line to a double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit;
- Rebuild the existing, 35-mile Howard Rd to Spruce and Howard Rd to Von Rose 345-kV transmission lines with normal and emergency ratings of at least 1,746 MVA per circuit;
- Rebuild the existing, 13.9-mile Elm Creek to Marion 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 5.2-mile Beck to Spruce 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,792 MVA per circuit; and
- Build Beck Road 345/138-kV switchyard and install two 600-MVA autotransformers.

Option 4 consists of the following:

- Rebuild the existing, 4.9-mile Howard Rd to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 478 MVA; this will require 1.7 miles of new ROW;
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA;

- Rebuild the existing, 4.1-mile Fratt to Parkway 138-kV transmission line with a normal and emergency rating of at least 478 MVA;
- Rebuild the existing, 5.5-mile Randolph to Weiderstein 138-kV transmission line with a normal and emergency rating of at least 478 MVA;
- Rebuild the existing, 4.8-mile Marion to Cibolo Double Circuit 138-kV transmission line with a normal and emergency rating of at least 478 MVA per circuit; and
- Rebuild the existing, 2.8-mile Schertz to Parkway 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

Option 5 consists of the following:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1;982 MVA per circuit; this transmission line will require new ROW;
- Rebuild the existing, 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

5 Option Evaluations

ERCOT performed reliability analysis to evaluate all initial options and to identify any reliability impacts of the options in the study area. Based on the results of these analyses, short-listed options were selected for further evaluations. This section details these studies and their results and compares the short-listed options.

5.1 Results of Reliability Analysis

All initial options were evaluated based on the contingencies described in the methodology section of the report, and no reliability criteria violations were identified for Options 3, 4, and 5 as shown in Table 5.1.

Table 5.1: Results of Initial Reliability Assessment of All Five Options

		N-1		X-1 + N-1		G-1 + N-1	
Option	Unsolved Power Flow	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation
1	None	None	None	1	None	None	None
2	None	None	None	1	None	None	None
3	None	None	None	None	None	None	None
4	None	None	None	None	None	None	None
5	None	None	None	None	None	None	None

6 Short-listed Options

As shown in Table 5.1, Options 3, 4, and 5 met all the reliability criteria, and these options were short-listed for further assessment. These three options are illustrated in Figures 6.1, 6.2, and 6.3.

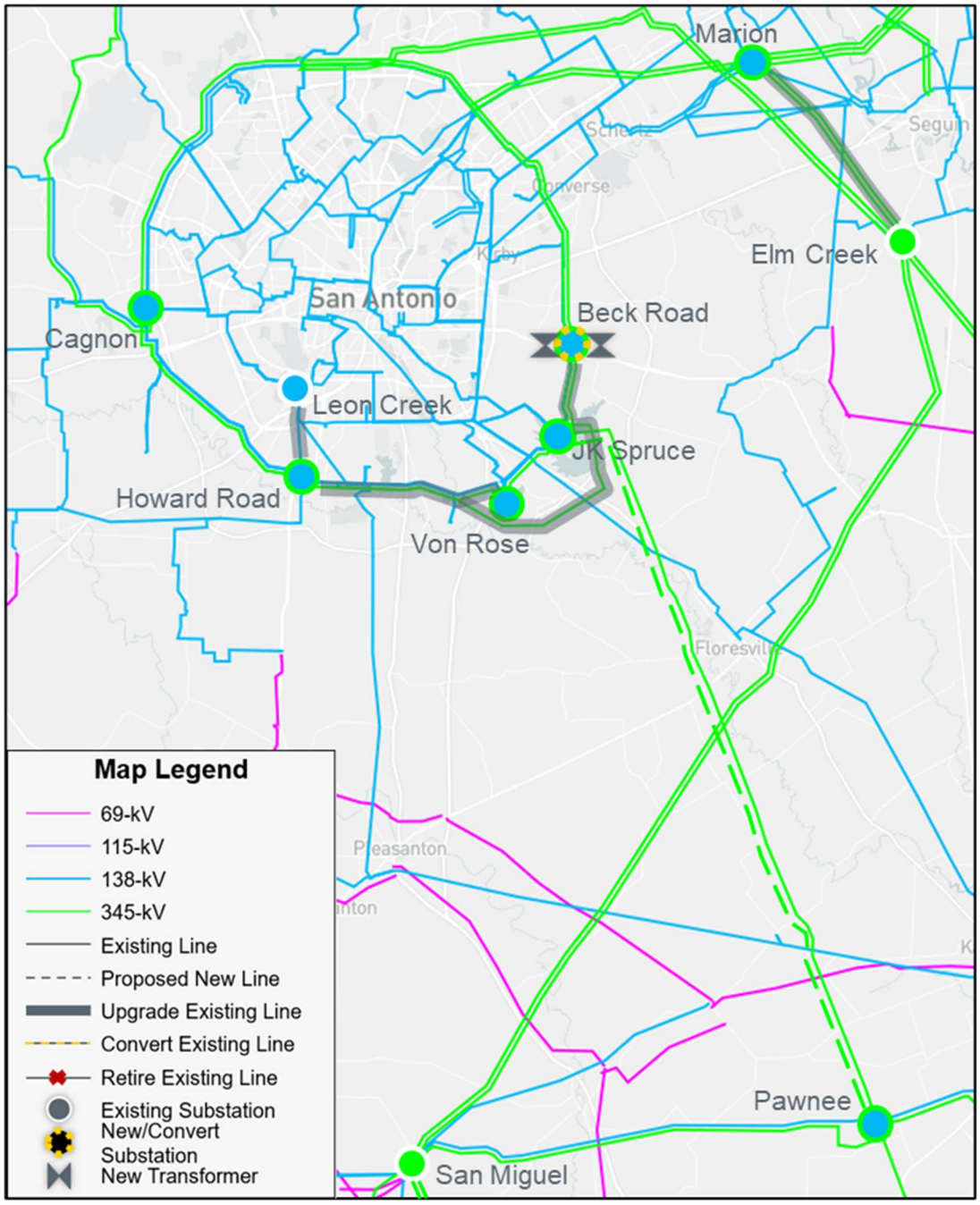

Figure 6.1: Map of Option 3

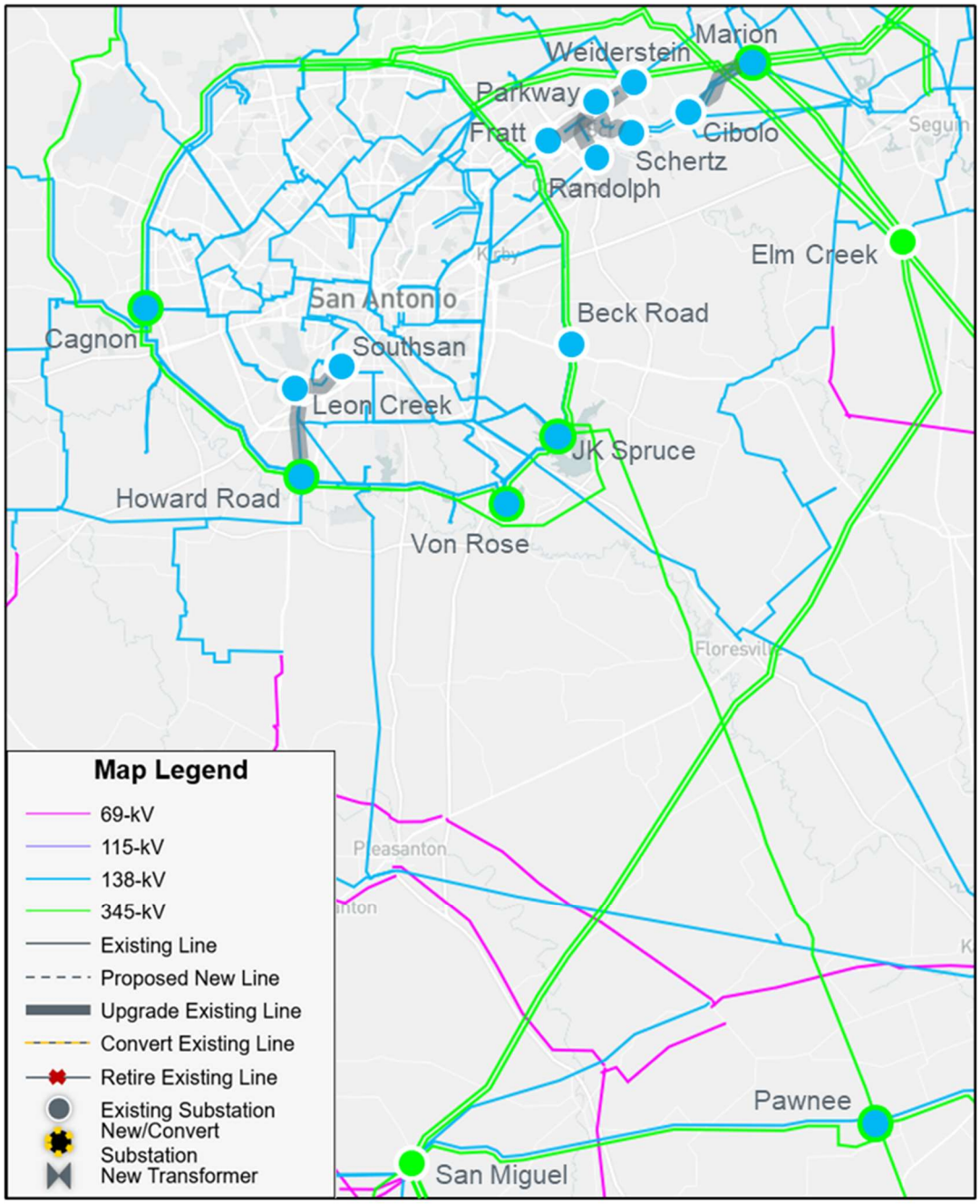

Figure 6.2: Map of Option 4

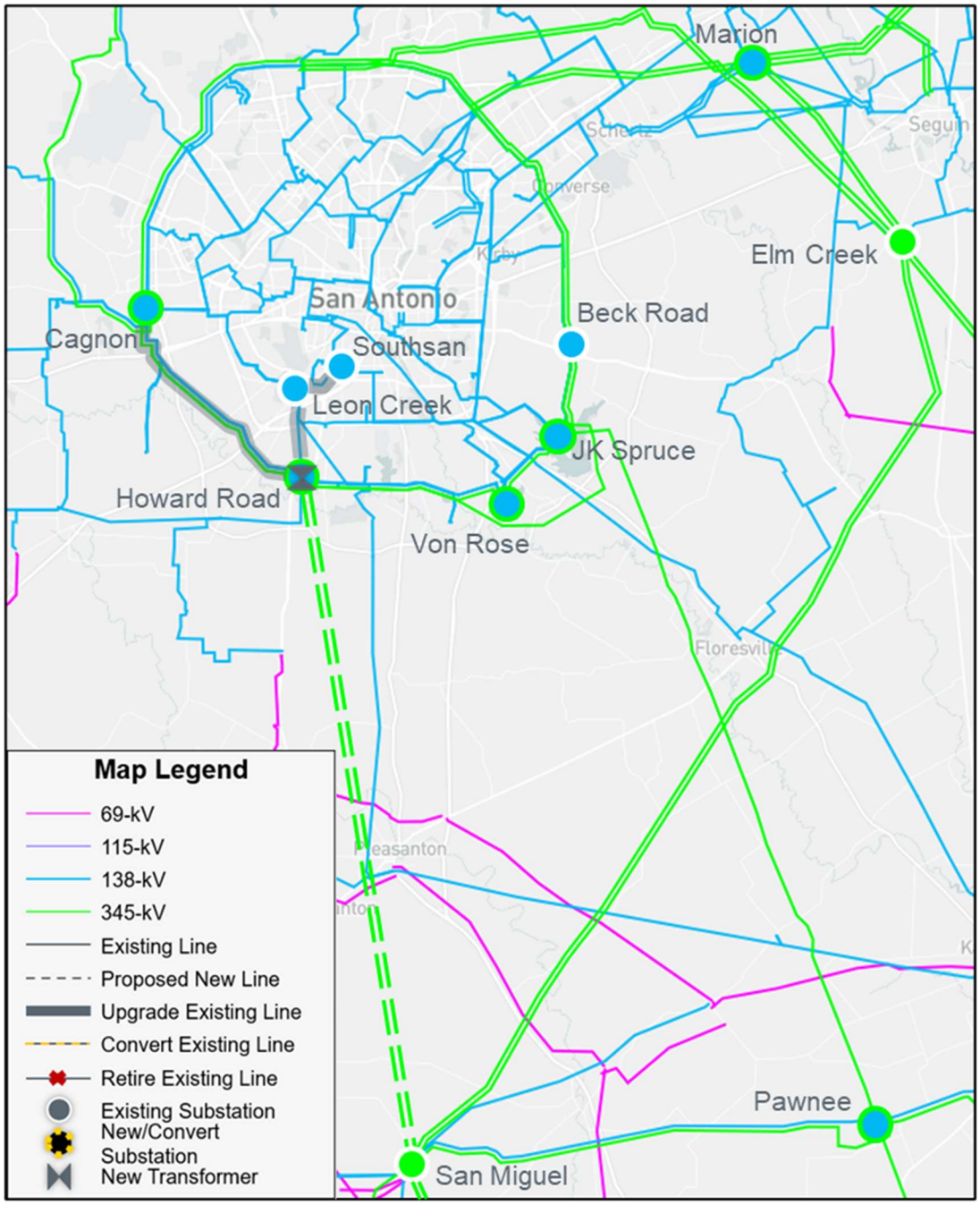

Figure 6.3: Map of Option 5

6.1 Long-Term Load Serving Capability Assessment

ERCOT performed a long-term load serving capability assessment on the short-listed options. Scenario 1 assess the load serving capability of the San Antonio Area, and Scenario 2 assess the same in a high Southern wind export condition. In Scenario 1, ERCOT increased load at substations within the San Antonio area and decreased conforming load outside of the South-Central weather zone to balance power. In Scenario 2, ERCOT increased load at substations within the study area and

increased wind generation within the Southern weather zone to balance power. The results of the long-term load serving capability assessment are shown in Table 6.1 below.

Table 6.1: Results of Long-Term Load Serving Capability Assessment of Base Case and Options 3, 4, and 5

Option	Incremental Load Serving Capability (MW)	
	Scenario 1	Scenario 2
Base case	353	359
3	813	845
4	393	403
5	510	534

6.2 Planned Maintenance Outage Evaluation

Using the P1, P2.1, and P7 contingencies based on the review of the system topology of the area, ERCOT conducted an N-2 contingency analysis for each short-listed option to represent system element outages under planned maintenance condition (N-1-1) in the area. Then, each N-2 violation was run as an N-1-1 contingency scenario, with system adjustments in between the contingencies. As shown in Table 6.2, the results of this maintenance assessment indicate that Options 3 and 5 performed similarly and better than Option 4.

Table 6.2: Results of Planned Maintenance Outage Evaluation for the Short-Listed Options

Option	Unsolved Power Flow	Thermal Overloads	Thermal Loading Change from Base case	Voltage Violations
3	None	1	Reduced	None
4	None	1	Increased	None
5	None	1	Reduced	None

6.3 Operations Summer Peak Sensitivity Analysis

ERCOT conducted a sensitivity analysis based on the July 20, 2022, Summer Peak Operations case. Critical contingencies and circuits seen in the N-1 reliability study, maintenance outage scenario analysis, and long-term load serving capability assessment were monitored under N-0 and N-1 conditions. The only circuit with significant loading in this study was the Spruce to Pawnee 345-kV transmission line. Therefore, Table 6.3 focuses on that circuit. Both Options 3 and 5 addressed the project need as seen by CPS, whereas Option 4 did not, as shown in Table 6.3.

Table 6.3: Results of 2022 Operations Summer Peak Case Sensitivity for the Short-Listed Options

Option	N-0 Loading on Spruce to Pawnee 345-kV Line (% MVA Limit)	N-1 Loading on Spruce to Pawnee 345-kV Line (% MVA Limit)
Base case	62	102
Option 3	27	37
Option 4	62	102
Option 5	47	54

6.4 Cost Estimate and Feasibility Assessment

CPS, South Texas Electric Cooperative (STEC), Lower Colorado River Authority (LCRA), Brazos Electric Cooperative (BREC), and Guadalupe Valley Electric Cooperative (GVEC) performed feasibility assessments and provided cost estimates for the three short-listed options. Based on input from CPS, Option 4 was deemed infeasible due to the complete de-energization of an existing substation that would be required during construction. Table 6.4 summarizes the cost estimates, mileage of CCN required, and feasibility of the three short-listed options.

Table 6.4: Cost Estimates and Feasibility of the Short-Listed Options

Option	Cost Estimates ($M)	CCN Required (Miles)	Feasibility
Option 3	505.6*	0.0	Feasible
Option 4	N/A	1.7	Not Feasible
Option 5	329.1	51.7	Feasible

* Updated cost estimate from the original estimate in the RPG submittal and may increase to include additional transmission upgrades

7 Comparison of Short-listed Options

The study results demonstrated that all three short-listed options addressed the project need as seen by ERCOT in the study area. Comparisons of the short-listed options, with corresponding cost estimates provided by CPS, STEC, LCRA, BREC, and GVEC, is summarized in Table 7.

Table 7: Comparison of Short-listed Options with Cost Estimates

	Option 3	Option 4	Option 5
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes
Improves Long-Term Load Serving Capability	Yes (Better)	Marginally	Yes
Improves Performance in Summer Peak Operations Case Sensitivity	Yes	No	Yes
Improves Operational Flexibility	No	No	Yes
Provides an additional transfer path from South	No	No	Yes
Requires CCN (Miles)	No	Yes (1.7)	Yes (51.7)
Construction Feasible (Based on TSP assessment)	Yes	No	Yes
Cost Estimate* ($M)	505.6*	N/A	329.1

* Updated cost estimate from the original estimate in the RPG submittal and may increase to include additional transmission upgrades

ERCOT recommends Option 5 as the preferred option to address the reliability need in the San Antonio area based on the following considerations:

- Options 3 and 5 both improve long-term load serving capability and improve performance in the summer peak operations case sensitivity. However, Option 5 improves operational flexibility and provides an additional transfer path from Southern Texas into the San Antonio area;
- Further, Option 5 is significantly less expensive than Option 3.

8 Additional Analyses and Assessment

The preferred option (Option 5, approximately $329.1 million) is categorized as a Tier 1 project, pursuant to ERCOT Protocol 3.11.4.3. ERCOT performed generation and load sensitivity studies to identify the preferred option performance, as required under Planning Guide Section 3.1.3 (4). Additionally, a Sub-synchronous Resonance (SSR) Assessment was performed.

8.1 Generation Addition Sensitivity Analysis

ERCOT performed a generation addition sensitivity analysis based on Planning Guide Section 3.1.3(4)(a).

Based on a review of the March 2023 GIS[7] reports, 11 units were found within the South and South-Central weather zones load pocket which could have an impact on the identified reliability issues. These units are listed in Table 8.1. After the addition of the units to the Option 5 case, no new thermal or voltage violations were identified.

Table 8.1: List of Units that Could Have Impact on the Identified Reliability Issues

GINR	Unit Name	Fuel Type	Capacity (MW)	County
19INR0022	Monte Alto I	WIN	189.00	Willacy
19INR0023	Monte Alto 2 Wind	WIN	272.76	Willacy
20INR0086	Arroyo Solar	SOL	180.00	Cameron
21INR0226	Equinox Solar 1	SOL	200.00	Starr
21INR0391	Grandslam Solar	SOL	121.89	Atascosa
22INR0251	Shaula I Solar	SOL	205.20	DeWitt
22INR0257	Corazon Solar Phase II	SOL	203.90	Webb
22INR0267	Shaula II Solar	SOL	205.20	DeWitt
23INR0061	Noria Solar DCC	SOL	145.00	Nueces
23INR0093	Alila Solar	SOL	256.50	San Patricio
25INR0223	Uhland Maxwell	GAS	184.00	Caldwell

8.2 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 ERCOT independent review. As stated in Section 2.1, ERCOT used the 2027 SSC summer peak case from the 2022 RTP and adjusted the load to create the 2027 SSC summer peak case to study the San Antonio area. This study base case, which was created in accordance with the 2022 RTP Study Scope and Process document and Section 2.1 of this document, included load scaled down from the respective non-coincident peaks in the North, North Central, West, Far West, East, and Coast weather zones.

The Outage Transfer Distribution Factors (OTDFs) of overloaded elements with respect to the load transfer for each weather zone (excluding South and South-Central weather zones) were calculated

[7] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER.

using PowerWorld Simulator. The OTDFs were less than 1% for each of the overloaded elements, *i.e.*, they were not significant enough to have an impact on the overloaded elements. ERCOT concluded that the load scaling used to develop the base case in this study did not have a material impact on the project need, which was primarily driven by thermal overloads in the San Antonio area.

8.3 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Nodal Protocol Section 3.22.1.3(2), ERCOT conducted a sub-synchronous-resonance (SSR) screening for the preferred option (Option 5) and found no adverse SSR impacts to the existing and planned generation resources in the study area.

9 Congestion Analysis

ERCOT conducted a congestion analysis to identify any potential impact on system congestion related to the addition of the recommend project, Option 5, using the 2022 RTP 2027 final economic case.

The results of congestion analysis indicated Option 5 relieved three existing congestions and caused one new congestion as shown in Table 9.1.

Table 9.1: List of New and Existing Congestion Due to Transmission Upgrade of Option 5

Monitored Line	% Time of Congestion	New / Existing
Howard Road to Leon Creek 138-kV Line	24.02	Existing
Leon Creek to Southsan 138-kV Line	0.83	Existing
Spruce to Pawnee 345-kV Line	0.74	Existing
Cagnon to Vlsi 138-kV Line	0.73	New

An additional test was conducted by upgrading Cagnon to Vlsi 138-kV line to see if this alleviated the new congestion. Based on the results summarized in Table 9.2, the additional upgrade did not yield any economic benefit. Therefore, no upgrades will be recommended to solve this new congestion as part of Option 5.

Table 9.2: Test Results with Cagnon to Vlsi 138-kV Line Upgrade

Upgrade Tested	Mileage (mi)	Passed Production Cost Savings Test	Passed Generation Revenue Reduction Test
Cagnon to Vlsi 138-kV Line Upgrade	8.7	No	No

10 Conclusion

ERCOT evaluated the five transmission-upgrade options to resolve the thermal violations observed in the San Antonio area. Based on the results of the independent review, ERCOT recommends Option 5 as the preferred solution because it addresses the thermal violations while introducing no new reliability issues, improves the long-term load serving capability of the San Antonio Area, improves performance in the summer peak operations case sensitivity, improves operational flexibility, and

provides a new transmission path from Southern Texas to the San Antonio area while also being the least cost of the two feasible short-listed options.

Option 5 consists of the following upgrades and is estimated to cost approximately $329.1 million:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require 50 miles of new ROW;
- Rebuild the existing, 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

This project will require one or more CCN applications for 1) the construction of the new, 345-kV double-circuit transmission line from Howard Road 345-kV Substation to San Miguel 345-kV Substation due to approximately 50.0 miles of new ROW and 2) to rebuild the existing, 138-kV transmission line from Howard Road 138-kV Substation to Leon Creek 138-kV Substation due to approximately 1.7 miles of new ROW. The expected ISD of this project is June 2027.

11 Appendix

Index	Description	Document
A	Maps of all options	Appendix A.pdf

ercot

GENERAL SESSION MINUTES OF THE BOARD OF DIRECTORS MEETING OF ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.

8000 Metropolis Drive (Building E), Suite 100, Boardroom B
Austin, Texas 78744
August 31, 2023

Pursuant to notice duly given, the meeting of the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) convened on the above-referenced date.

Meeting Attendance:

Board Members:

Director	Affiliation/Role (if any)	Voting Category
Aguilar, Carlos	N/A	Voting
Capuano, Linda	N/A	Voting
England, Julie	N/A	Voting
Flexon, Bob	N/A	Voting
Flores, Bill (Vice Chair)	N/A	Voting
Foster, Paul (Chair)	N/A	Voting
Heeg, Peggy	N/A	Voting
Hjaltman, Courtney	Office of Public Utility Counsel (OPUC), Public Counsel	Voting
Jackson, Kathleen	Public Utility Commission of Texas (PUCT, Commission), Interim Chair	Non-Voting
Swainson, John	N/A	Voting
Vegas, Pablo	ERCOT President and Chief Executive Officer (CEO)	Non-Voting

Officers and Guests:

Officer/Guest	Role
Barnes, Bill	Reliant Energy Retail Services
Berlin, Anna	ERCOT Associate Corporate Counsel
Bigbee, Nathan	ERCOT Deputy General Counsel
Bivens, Carrie	Potomac Economics, ERCOT Independent Market Monitor (IMM), Director
Black, Robert	ERCOT Vice President of Public Affairs
Cobos, Lori	PUCT Commissioner *(Not Present for Agenda Items 1 – 4)*

Day, Betty	ERCOT Vice President of Security and Compliance and Chief Compliance Officer
Hobbs, Kristi	ERCOT Vice President of Corporate Strategy and PUC Relations
Levine, Jonathan	ERCOT Assistant General Counsel and Assistant Corporate Secretary
McAdams, Will	PUCT Commissioner
Parakkuth, Jayapal	ERCOT Vice President and Chief Information Officer
Rainwater, Kim	ERCOT Corporate Counsel
Rickerson, Woody	ERCOT Vice President of System Planning and Weatherization
Rychetsky, Penny	ERCOT Director of Internal Audit
Schue, Jamie	ERCOT Senior Corporate Counsel
Seely, Chad V.	ERCOT Senior Vice President, General Counsel and Corporate Secretary
Smith, Caitlin	Jupiter Power LLC, Technical Advisory Committee (TAC) Vice Chair *(Via Teleconference)*
Smith, Stephanie	Eolian, LP
Spak, Mara	ERCOT Vice President of Human Resources
Tamby, Jeyant	ERCOT Senior Vice President, Chief Administrative Officer and Chief of Staff *(Via Teleconference)*
Taylor, Sean	ERCOT Vice President and Chief Financial Officer
Woodfin, Dan	ERCOT Vice President of System Operations

Call General Session to Order (Agenda Item 1)

Paul Foster, Board Chair, determined that a quorum was present and called the Board meeting to order at approximately 9:05 a.m. Chair Foster highlighted the Antitrust Admonition and welcomed new Board member Linda Capuano, who joined the Board on July 1, 2023, to her first Board meeting and thanked the ERCOT Board Selection Committee.

Notice of Public Comment, if Any (Agenda Item 2)

Chair Foster announced that on the agenda for the meeting, which was posted publicly on August 24, 2023, ERCOT had provided instructions for members of the public who were interested in commenting in person and that to date no individuals had expressed interest in commenting, which Chad Seely confirmed.

Consent Agenda; Unopposed Revision Requests Recommended by TAC for Approval (Agenda Items 3 – 3.1.27)

Chair Foster presented the Consent Agenda, including unopposed Revision Requests recommended by TAC for approval. Chair Foster highlighted that for NOGRR215, ERCOT requested a recommended effective date of November 1, 2023 for all sections except grey-boxed paragraph (3) of Section 11.1 and paragraph (1) of Section 11.2, which will be effective upon system implementation; for NOGRR249, ERCOT requested a recommended effective date of April 1, 2024; and for OBDRR047, ERCOT requested a recommended effective date of upon Commission approval. Mr. Seely reviewed the cost impacts of the Revision Requests. Chair Foster entertained a motion to recommend approval of the Consent Agenda as follows:

- NPRR1150, Related to NOGRR230, WAN Participant Security;

- NPRR1163, Related to LPGRR070, Discontinuation of Interval Data Recorder (IDR) Meter Weather Sensitivity Process;
- NPRR1164, Black Start and Isochronous Control Capable Identification;
- NPRR1171, Requirements for DGRs and DESRs on Circuits Subject to Load Shedding;
- NPRR1173, Changes Consistent With the Options Available to an MOU and EC Entering Retail Competition in the ERCOT Market;
- NPRR1174, Market Participant's Return of Settlement Funds to ERCOT Following Receipt of Overpayment;
- NPRR1175, Revisions to Market Entry Financial Qualifications and Continued Participation Requirements;
- NPRR1176, Update to EEA Trigger Levels;
- NPRR1182, Inclusion of Controllable Load Resources and Energy Storage Resources in the Constraint Competitiveness Test Process;
- NPRR1183, ECEII Definition Clarification and Updates to Posting Rules for Certain Documents without ECEII;
- NPRR1185, HDL Override Payment Provisions for Verbal Dispatch Instructions;
- NPRR1189, Updates to Language to Clarify the Allowable Regulation Ancillary Service Trades;
- LPGRR070, Discontinuation of Interval Data Recorder (IDR) Meter Weather Sensitivity Process;
- NOGRR215, Limit Use of Remedial Action Schemes;
- NOGRR230, WAN Participant Security;
- NOGRR247, Change UFLS Stages and Load Relief Amounts;
- NOGRR249, Communication of System Operating Limit Exceedances;
- NOGRR250, Related to NPRR1171, Requirements for DGRs and DESRs on Circuits Subject to Load Shedding;
- NOGRR251, Add Cold Weather Conditions to Template for Emergency Operations Plan;
- NOGRR252, Related to NPRR1176, Update to EEA Trigger Levels;
- OBDRR045, Additional Revisions to Demand Response Data Definitions and Technical Specifications;
- OBDRR047, Revision to ERS Procurement Methodology regarding Unused Funds from Previous Terms;
- PGRR103, Establish Time Limit for Generator Commissioning Following Approval to Synchronize;
- PGRR108, Related to NPRR1183, ECEII Definition Clarification and Updates to Posting Rules for Certain Documents without ECEII;
- RMGRR174, Related to NPRR1173, Changes Consistent With the Options Available to an MOU and EC Entering Retail Competition in the ERCOT Market;
- RRGRR033, Related to NPRR1164, Black Start and Isochronous Control Capable Identification; and
- RRGRR035, Related to NPRR1171, Requirements for DGRs and DESRs on Circuits Subject to Load Shedding.

Board Vice Chair Bill Flores moved to recommend approval of the Consent Agenda as presented, including, for NOGRR215, a recommended effective date of November 1, 2023 for all sections except grey-boxed paragraph (3) of Section 11.1 and paragraph (1) of Section 11.2, which will be effective upon system implementation; for NOGRR249, a recommended effective date of April 1, 2024; and for OBDRR047, a recommended effective date of upon Commission approval. John Swainson seconded the motion. The motion passed by unanimous voice vote with no abstentions.

June 20, 2023 General Session Meeting Minutes (Agenda Item 4)

Chair Foster entertained a motion to approve the June 20, 2023 General Session Meeting Minutes (Minutes).

Peggy Heeg moved to approve the Minutes as presented. Julie England seconded the motion. The motion passed by unanimous voice vote with no abstentions.

CEO Update (Agenda Item 5)

Chair Foster recognized Kathleen Jackson, Interim Chair of the PUCT. Interim Chair Jackson called an Open Meeting of the Commission to order to consider matters that had been duly posted with the Texas Secretary of State for August 31, 2023.

Pablo Vegas presented the CEO Update, noting a full report of summer performance would be planned for the Board's meeting in October and thanking Texans for their response to recent Conservation Appeals. Mr. Vegas invited questions or comments before discussing ERCOT's timeline for market design key initiatives. Board members, Commissioners, Mr. Vegas, and Woody Rickerson discussed whether ERCOT's Cost of New Entry (CONE) study would contemplate comprehensive costs to consumers for long-term transmission planning, as well as plans to work with consultants and the Independent Market Monitor (IMM) during development of the study. Board members, Commissioners, Mr. Vegas, and Mr. Seely discussed ERCOT's filing of comments in response to rules proposed by the Environmental Protection Agency (EPA), particularly regarding the combined impact on the existing fleet of thermal Resources and new resource investment as well as on overall reliability in the ERCOT Region. Discussion also included the Commission's Aggregated Distributed Energy Resource (ADER) pilot project; collaboration with Texas A&M University on analyzing the impact of energy efficiency, demand response and energy storage on the ERCOT System; collaboration with the Commission to prioritize various initiatives and identify metrics, benchmarks, and milestones for each initiative; and the possible formation of a task force following Governor Greg Abbott's recent directive for Commission Interim Chair Jackson, along with Commissioner Jimmy Glotfelty, to develop a working group to formulate recommendations for advancing nuclear energy in Texas.

Independent Market Monitor (IMM) Report (Agenda Item 6)

Carrie Bivens presented the Independent Market Monitor (IMM) Report. Discussion with Board members included price trends related to ERCOT Contingency Reserve Service (ECRS) and the impact of ECRS on the need for Reliability Unit Commitment (RUC); the relationship between CONE and the variety of resources in ERCOT's interconnection queue; and potential impacts on capital costs of rules proposed by the EPA.

TAC Report; Non-Unanimous and Other Selected Revision Requests Recommended by TAC for Approval; NPRR1165, Revisions to Requirements of Providing Audited Financial Statements and Providing Independent Amount; OBDRR048, Implementation of Operating Reserve Demand Curve (ORDC) Multi-Step Price Floor; VCMRR034, Excluding RUC Approved Fuel Costs from Fuel Adders; Reliability and Markets (R&M) Committee Recommendations on Non-Unanimous Revision Requests (Agenda Items 7 – 7.1.1 and 7.1.3 – 7.1.4)

Caitlin Smith, TAC Vice Chair, presented the TAC Report, including the first three of four Revision Requests TAC non-unanimously recommended for approval: NPRR1165, OBDRR048, and VCMRR034. Bob Flexon, R&M Committee Chair, commented on the R&M Committee's recommendations regarding NPRR1165, ODBRR048, and VCMRR034.

Mr. Flexon moved to recommend that the Board approve NPRR1165, ODBRR048, and VCMRR034 as recommended by TAC. Mr. Flores seconded the motion. The motion passed by unanimous voice vote with one abstention on OBDRR048 (Courtney Hjaltman).

NPRR1186, Improvements Prior to the RTC+B Project for Better ESR State of Charge Awareness, Accounting, and Monitoring – URGENT; TAC Recommendation Opposition on NPRR1186 of Eolian, LP; TAC Advocate Presentation of TAC Action on NPRR1186; ERCOT Comments on NPRR1186 (Agenda Items 7.1.2 – 7.1.2.3)

Ms. Smith presented the TAC recommendation on NPRR1186, which TAC also non-unanimously recommended for approval. Bill Barnes of Reliant Energy Retail Services presented the TAC Advocate Presentation of the TAC action. Stephanie Smith of Eolian, LP presented the TAC Recommendation Opposition. Dan Woodfin summarized the ERCOT Comments on NPRR1186 and invited questions. Board members, Mr. Rickerson, Ms. Smith, Mr. Vegas, and Mr. Woodfin discussed NPRR1186 as an interim solution pending RTC+B to identify and account for Resource State of Charge (SOC) sufficiency to meet Ancillary Service obligations for which payment is received and the need to ensure a Resource can deliver energy when committed. Mr. Flexon commented on the R&M Committee's discussions during yesterday's R&M Committee meeting and subsequent recommendation that the Board remand NPRR1186 to TAC to address the limited issue of scarcity deployment discussed by ERCOT staff in its presentation and comments, and that TAC present an updated recommendation to the Board at the October 17, 2023 Board meeting.

Mr. Flexon moved to remand NPRR1186 to TAC to address the limited scarcity deployment issue discussed by ERCOT staff in its presentation, and to direct TAC to present an updated recommendation to the Board at the October 17, 2023 Board meeting, as recommended by the R&M Committee. Carlos Aguilar seconded the motion. The motion passed my unanimous voice vote with no abstentions.

Formation of Technology and Security (T&S) Committee (Agenda Item 8)

Chair Foster presented the Formation of Technology and Security (T&S) Committee and summarized the memorandum included in the meeting materials. He reported that the Board would take up Committee assignments later under the HR&G Report.

Ms. Heeg moved to establish and appoint a committee to be known as the Technology and Security (T&S) Committee, which shall oversee technology and security functions, such as information technology, project delivery, and physical and cyber security, and perform such other functions required by law or otherwise as are necessary or appropriate to further the committee's purposes or as may from time to time be delegated to the committee by the Board, and whose membership shall be decided upon by the Board. Mr. Flexon seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Finance and Audit (F&A) Committee Report; Acceptance of 2022 ERCOT 401(k) Savings Plan Audit (Agenda Items 9 and 9.1)

Vice Chair Flores, F&A Committee Chair, reported that the F&A Committee met the prior day and highlighted items discussed at the F&A Committee meeting. He presented the F&A Committee's recommendation regarding the acceptance of ERCOT's 401(k) Savings Plan Audit Report.

Vice Chair Flores moved to accept the ERCOT 2022 401(k) Savings Plan Audit Report as recommended by the F&A Committee. Ms. Heeg seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Human Resources and Governance (HR&G) Committee Report; Date Change for 2023 Annual Meeting of Members; Ratification of Officers; Board Committee Assignments (Agenda Items 10 – 10.3)

Peggy Heeg, HR&G Committee Chair, reported the HR&G Committee met the prior day and highlighted items discussed at the HR&G Committee meeting, including the HR&G Committee's recommendations regarding the date change for the 2023 Annual Meeting of Corporate Members; ratification of Officer title changes for Woody Rickerson and Kristi Hobbs; and Board Committee assignments.

Ms. Heeg moved (1) that the date for the 2023 Annual Meeting of Members be changed December 19, 2023 to December 18, 2023; (2) to approve the ratification of Woody Rickerson as Senior Vice President and Chief Operating Officer and Kristi Hobbs as Vice President of System Planning and Weatherization, effective September 1, 2023; and (3) to approve the Board Committee assignments; each as recommended by the HR&G Committee. Ms. Hjaltman seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Reliability and Markets (R&M) Committee Report; CPS Energy – San Antonio South Reliability Regional Planning Group Project; Recommendation regarding Modifications to Letter of Credit and Surety Bond Standard Forms and Repeal of Guarantee Agreement Standard Forms (Agenda Items 11 – 11.2)

Mr. Flexon, R&M Committee Chair, reported the R&M Committee met the previous day and highlighted items discussed at the R&M Committee meeting, including the R&M Committee's recommendation regarding modifications to the Letter of Credit standard form and Surety Bond standard form and repeal of Guarantee Agreement forms, as well as the R&M Committee's

recommendation to endorse the CPS Energy – San Antonio South Reliability Regional Planning Group Project.

Mr. Flexon moved that the Board (1) approve the proposed modifications to the Letter of Credit and Surety Bond standard forms and repeal of the Guarantee Agreement standard forms; and (2) endorse the need for the Tier 1 CPS Energy – San Antonio South Reliability RPG Project (Option 5), which ERCOT staff has independently reviewed and which TAC has voted unanimously to endorse, based on NERC and ERCOT reliability planning criteria, and designate the project as critical to the reliability of the ERCOT System pursuant to PUCT Substantive Rule 25.101(b)(3)(D); each as recommended by the R&M Committee. Mr. Swainson seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Other Business (Agenda Item 12)
No other business was discussed at this time.

Executive Session; Vote on Matters from Executive Session (Agenda Item 13)
Chair Foster recessed General Session at approximately 11:45 a.m. and convened Executive Session at approximately 12:15 p.m. Chair Foster reconvened General Session at approximately 2:54 p.m.

Chair Foster entertained motions for two matters discussed during Executive Session.

Mr. Flores moved to select Baker Tilly US, LLP as the 2023 ERCOT 401(k) Savings Plan Auditor, as recommended by the F&A Committee and as discussed during Executive Session. Mr. Flexon seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Mr. Flores moved to approve the contract matter discussed in Executive Session under Agenda Item ES 2.1.2, as recommended by the F&A Committee. Ms. England seconded the motion. The motion passed by unanimous voice vote with no abstentions.

Adjournment (Agenda Item 14)
Chair Foster adjourned the meeting at approximately 2:55 p.m.

Board materials and presentations from the meeting are available on ERCOT's website at https://www.ercot.com/committees/board.

Jonathan M. Levine
Assistant Corporate Secretary

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September 13, 2023

George J. Tamez
Director, Transmission Planning & Operations Engineering
CPS Energy
500 McCullough Avenue
San Antonio, Texas 78215

Clif Lange
General Manager
South Texas Electric Cooperative
PO BOX 119
Nursery, TX 77976

RE: San Antonio South Reliability Project

Dear Mr. Tamez and Mr. Lange:

On August 31, 2023, the Electric Reliability Council of Texas (ERCOT) Board of Directors endorsed the following Tier 1 transmission project in accordance with ERCOT Protocol Section 3.11.4:

San Antonio South Reliability Project:

- Construct a new, 50-mile Howard Road to San Miguel 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,982 MVA per circuit; this transmission line will require approximately 50 miles of new Right of Way (ROW);
- Rebuild the existing, 14.9-mile Cagnon to Howard Road 345-kV double-circuit transmission line with a normal and emergency rating of at least 1,746 MVA per circuit;
- Rebuild the existing, 4.9-mile Howard Road to Leon Creek 138-kV transmission line with a normal and emergency rating of at least 698 MVA; this will require 1.7 miles of new ROW;
- Add a third 600-MVA 345/138-kV autotransformer at Howard Road substation; and
- Rebuild the existing, 2.9-mile Leon Creek to Southsan 138-kV transmission line with a normal and emergency rating of at least 478 MVA.

Should you have any questions please contact me at any time.

Sincerely,

Kristi J Hobbs

Kristi Hobbs
Vice President, System Planning and Weatherization
Electric Reliability Council of Texas

cc:

Pablo Vegas, ERCOT
Woody Rickerson, ERCOT
Prabhu Gnanam, ERCOT
Robert Golen, ERCOT
Brandon Gleason, ERCOT