PUBLIC

Item 5.6: 26RPG001 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Planning Group (RPG) Project

Kristi Hobbs
Vice President, System Planning and Weatherization

Board of Directors Meeting

June 1-2, 2026

Purpose

Provide an overview of the $1.831 billion LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Tier 1 Reliability Project. Per ERCOT Protocol Section 3.11.4.7 Tier 1 projects require endorsement by the Board of Directors.

Voting Items

ERCOT staff requests and recommends that the Board endorse the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition RPG Project based on North American Electric Reliability Corporation (NERC) and Electric Reliability Council of Texas, Inc (ERCOT) reliability planning criteria.

Key Takeaways

- Ensuring ERCOT's leadership for grid reliability and resilience, the Project has completed RPG review and received an independent assessment from ERCOT staff and unanimous endorsement by the Technical Advisory Committee (TAC).
- The 2025 RTP developed the Euclid 765-kV Substation and Transmission Line Addition Project to address the 2030 base case reliability needs.

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LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition RPG Project

LCRA TSC and CEHE submitted the Euclid 765-kV Substation and Transmission Line Addition Project (26RPG001) for Reginal Planning Group (RPG) review in January 2026.

The 2025 RTP developed the Euclid 765-kV Substation and Transmission Line Addition Project to address the 2030 base case reliability needs.

Addition of 765-kV equipment beyond what is already included in the 765-kV Strategic Transmission Expansion Plan (STEP) to address new load growth

The expansion of the existing 345-kV Euclid station in Central Texas to include 765-kV helps support bus voltages and provides a new source into the Central Texas area.

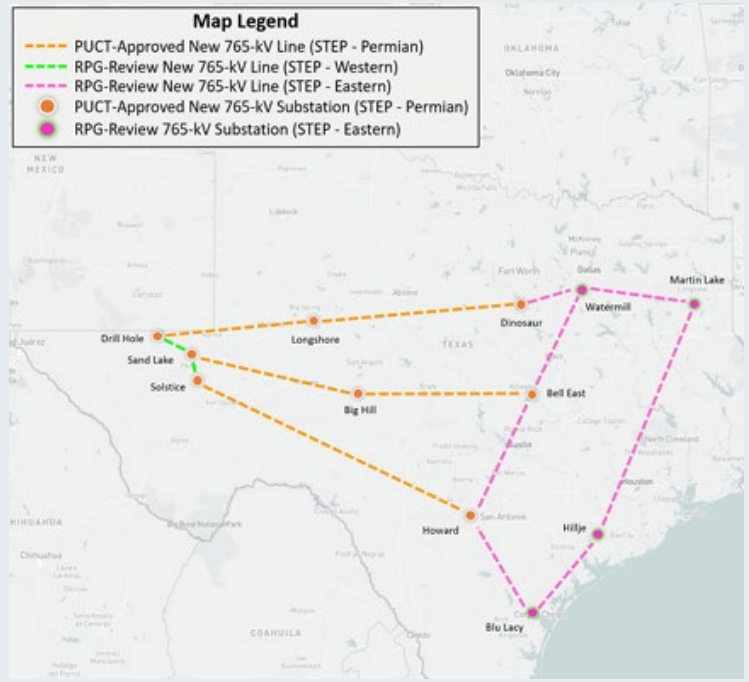
Adding the Euclid 765-kV Substation and Transmission Line Addition Project in Central Texas brings additional transfer capacity needed for the Central Texas area.

ERCOT Presented the project and TAC voted unanimously to endorse the project on May 19, 2026.

Key Takeaway: The Euclid 765-kV Substation and Transmission Line Addition Project has been under evaluation by ERCOT and stakeholders since the 2025 RTP review cycle.

765-kV Strategic Transmission Expansion Plan (STEP)

- November 19: TAC endorsement.
- December 8-9: Presentation to ERCOT Board.



Overall Project Summary

Approximately 131.4 miles of new 765-kV single-circuit transmission line;

One (1) new 765-kV substation;

Two (2) new 765/345-kV transformers;

765-kV Switch Shunt Reactors;

Upgrade existing 345-kV circuit breakers to 80 kA interrupting capability; and

Two (2) new, approximately 2.0 miles, 345-kV transmission lines.

A Certificate of Convenience and Necessity (CCN) is needed for the construction of the new Euclid to Hillje 765-kV transmission, for approximately 131.4 miles of new right of way (ROW).

Key Takeaway: The Euclid 765-kV Substation and Transmission Line Addition Project will require a CCN due to approximately 131.4 miles of new ROW.

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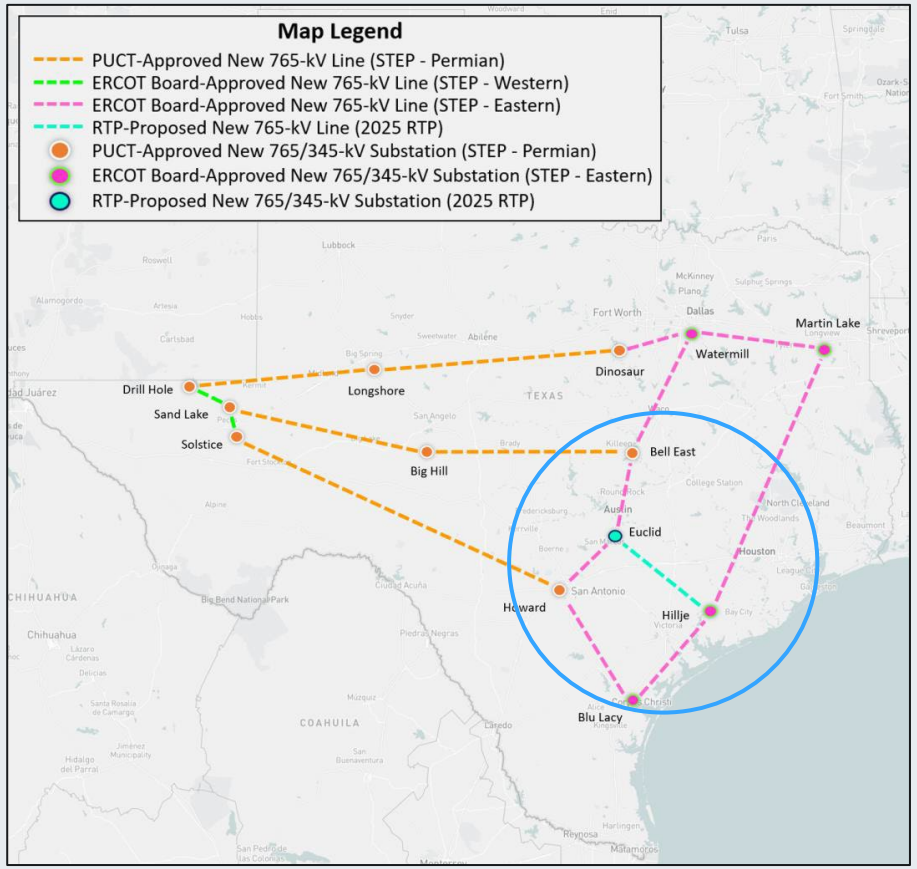
Request for Board Vote

ERCOT staff requests and recommends that the Board endorse the need for the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition RPG Project based on NERC and ERCOT reliability planning criteria.

The ERCOT Independent Review (EIR) is included as **Attachment A** to the Board Decision Template.

Key Takeaway: ERCOT performed a comprehensive evaluation for determining the Euclid 765-kV Substation and Transmission Line Addition Project to satisfy the need in the 2025 RTP evaluation.

ERCOT Recommendation



Date: May 22, 2026
To: Board of Directors
From: Kristi Hobbs, Vice President, System Planning and Weatherization (ERCOT)
Subject: 26RPG001 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Planning Group (RPG) Project

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: June 1-2, 2026

Item No.: 5.6

Issue:
Whether the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) should accept the recommendation of ERCOT staff to endorse the need for the Tier 1 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Regional Planning Group (RPG) Project in order to meet the reliability requirements for the ERCOT System and address reliability needs in Central Texas, which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted unanimously to endorse.

Background/History:
LCRA TSC and CEHE jointly proposed the Euclid 765-kV Substation and Transmission Line Addition Project in January 2026, a $1.831 billion, Tier 1 project with the expected in-service date (ISD) of June 30, 2031, to meet reliability planning criteria due to load growth in Central Texas. Protocol Section 3.11.4.7, Processing of Tier 1 Projects, requires ERCOT to independently review submitted projects. ERCOT performed an independent review of the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project reviewed the comprehensive evaluation in the 2025 Regional Transmission Plan (RTP) for determining the Euclid 765-kV Substation and Transmission Line Addition Project and performed additional assessments. ERCOT recommends the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project, a $1.831 billion, Tier 1 project with the expected ISD of June 30, 2031 addresses the reliability needs in Central Texas due to the rapidly growing electrical demand with the following ERCOT System improvements:

LCRA TSC will:

- Install a new 765-kV yard adjacent to the Euclid 345-kV station;
- At Euclid, cut-into the planned Bell County East to Howard Road 765-kV transmission line (the line cut-in scope will be coordinated with CPS Energy and Oncor, who own the Bell County East and Howard Road stations, respectively, and will co-own this line);
- Install a new, 765-kV transmission line from Euclid to a point-of-interconnection with CEHE, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require new ROW;
- Install two new single-circuit 345-kV transmission lines from Euclid to Misty, for approximately 2.0 miles, using bundled 1926 ACSS/TW Cumberland conductor (2,988 MVA normal and emergency rating). These lines will require a new ROW and, while they may be in the same ROW, the lines will be installed on separate structures;
- At Euclid, install 765-kV shunt reactors that are sufficient to ensure voltage remains within acceptable operating limits;
- At Euclid, install two 765/345-kV autotransformers with normal and emergency ratings of 2,403 and 2,772 MVA, respectively; and
- At Euclid, cut-in the T511 John Dumas to Hornsby 345-kV transmission circuit; and
- At Euclid and Misty, all 345-kV substation equipment will have a 5,000 A minimum rating and new 345-kV circuit breakers will have a minimum 80 kA interrupting capability.

CEHE will:

- Install a new 765-kV transmission line from Hillje to a point-of-interconnection with LCRA TSC, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require a new ROW;
- At Hillje, install new or modify existing shunt reactors as needed to ensure voltage remains within acceptable operating limits (CEHE is currently planning to install four 300 MVAr shunt reactors); and
- At Hillje, upgrade 345-kV Hillje substation equipment to have a minimum 80 kA interrupting capability.

ERCOT's independent review utilized the comprehensive evaluation in the 2025 RTP study for determining the Euclid 765-kV Substation and Transmission Line Addition

Project, performed additional analysis and assessments to verify the reliability need for the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project.

RPG considered project overviews during meetings in March and April 2026. Between March and April 2026, ERCOT staff presented scope and status updates at RPG meetings in March, April and May 2026. Pursuant to paragraph (2) of Protocol Section 3.11.4.9, Regional Planning Group Acceptance and ERCOT Endorsement, ERCOT presented the Tier 1 project to the Technical Advisory Committee (TAC) for review and comment, and on May 19, 2026, TAC unanimously endorsed the project recommended by ERCOT. Pursuant to paragraph (1)(a) of Protocol Section 3.11.4.3, Categorization of Proposed Transmission Projects, projects with an estimated capital cost of $100 million or greater are Tier 1 projects, for which Protocol Section 3.11.4.7(2) requires endorsement by the Board. Pursuant to Section 3.11.4.9, ERCOT's endorsement of a Tier 1 project is obtained upon affirmative vote of the Board.

ERCOT's assessment of the Subsynchronous Oscillations (SSO) of existing facilities, conducted pursuant to Protocol Section 3.22.1.3, Transmission Project Assessment, yielded no adverse SSO 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, Project Evaluation, indicated a significant new congestion in the area with the addition of the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project. The new congestion will be evaluated in forthcoming studies. A decrease in the total system wide congestion was observed in the study

The report describing the ERCOT Independent Review of the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project, including ERCOT staff's recommendation, is included as Attachment A.

Key Factors Influencing Issue:

1. ERCOT System improvements are needed to addresses the reliability needs in Central Texas due to the rapidly growing electrical demand.
2. ERCOT staff found the recommended set of improvements to be the most efficient solution for meeting the planning reliability criteria and facilitating future transmission expansion for future load in the area.
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 Protocol Section 3.11.4.3(1)(a).
4. TAC voted unanimously to endorse the Tier 1 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project Regional Planning Group (RPG) Project, as recommended by ERCOT, on May 19, 2026.

Conclusion/Recommendation:

ERCOT staff recommends that the Board endorse the need for the Tier 1 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project RPG Project, which ERCOT staff has independently reviewed, and which TAC has voted unanimously to endorse based on North American Electric Reliability Corporation (NERC) and ERCOT reliability planning criteria.

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 endorse the need for the Tier 1 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project Regional Planning Group Project, 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;

THEREFORE, BE IT RESOLVED, that ERCOT is hereby authorized and approved to endorse the need for the Tier 1 LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project Regional Planning Group Project, which ERCOT staff has independently reviewed, and which TAC has voted unanimously to endorse based on NERC and ERCOT reliability planning criteria.

CORPORATE SECRETARY'S CERTIFICATE

I, Brandon Gleason, Assistant Corporate Secretary of ERCOT, do hereby certify that, at its June 1-2, 2026 meeting, the Board passed a motion approving the above Resolution by _____.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of _____, 2026.

_____

Brandon Gleason

Assistant Corporate Secretary

ERCOT Independent Review (EIR) of the LCRA Transmission Services Corporation (LCRA TSC) and CenterPoint Energy Houston Electric, LLC (CEHE) Euclid 765-kV Substation and Transmission Line Addition Project (26RPG001)

May 22, 2026

Document Revisions

Date	Version	Description	Authors
05/22/2026	1	Final	Ben Richardson, Ehsan Rehman
		Reviewed by	Robert Golen, Sun Wook Kang, Pengwei Du, Prabhu Gnanam

Executive Summary

LCRA Transmission Services Corporation (LCRA TSC) and CenterPoint Energy Houston Electric, LLC (CEHE) submitted the Euclid 765-kV Substation and Transmission Line Addition Project to the Electric Reliability Counsil of Texas' (ERCOT) Regional Planning Group (RPG) in January 2026. LCRA TSC and CEHE proposed this project to address thermal and voltage planning criteria violations, increase transfer capability, and improve operational flexibility in the Central Texas area. The project is in Caldwell, Gonzalez, Lavaca, and Wharton counties in the South Central and Coast Weather Zones.

The recent unprecedented load growth first sparked discussions in the 2024 Regional Transmission Plan (RTP) about introducing an Extra High Voltage (EHV) 765-kV backbone infrastructure to the ERCOT Region. This EHV backbone would function as a superhighway, enabling electrons to flow more efficiently through long-distance transmission from resource-rich regions to load centers.

In December 2025, ERCOT's Board of Directors approved the 765-kV Eastern Backbone and Western Loop projects, thereby approving the full 765-kV Strategic Transmission Expansion Plan (STEP)[1]. The 765-kV STEP was included in the 2025 RTP and showed continued reliability benefits as seen in the 2024 RTP. The 2025 RTP evaluated the potential addition of 765-kV equipment beyond what is already included in the 765-kV STEP to address new load growth, this included upgrading existing 345-kV pathways; however, those upgrades were determined to be complementary components of the overall Central Texas import strategy while the foundational piece was identified as the Euclid 765-kV Substation and Transmission Line Addition Project. Accordingly, the Euclid 765-kV Station and Euclid to Hillje 765-kV Line Addition project was included in the 2025 RTP published by ERCOT in December 2025[2].

The need for, and benefit from, this new 765-kV import path is seen as early as the 2025 RTP's 2027 study case. However, the total system load in the 2025 RTP's 2027 study case, which includes Transmission Service Provider (TSP)-submitted Large Loads

[1] Link to 2024 Regional Transmission Plan (RTP) 345-kV Plan and Texas 765-kV Strategic Transmission Expansion Plan Comparison.
[2] Link to Public ERCOT 2025 Regional Transmission Plan

adjusted through the ERCOT Transmission Planning Adjusted Load Forecast (ETPALF) process, is approximately 120,000 MW. That total system load is approximately 35,000 MW higher than the current summer peak demand record of 85,508 MW. The 2028 study case, with TSP-submitted Large Loads, is approximately 140,000 MW, or 55,000 MW higher than the current summer peak demand record.

However, it is understood that the in-service date (ISD) for a new 765-kV line would not be feasible by 2027. Nevertheless, based on those TSP-submitted load levels, an additional 765-kV import path was the best solution to address the system needs identified at those load levels, independent of the in-service timeline, and would experience similar ISD challenges. Therefore, the planning approach used in the 2025 RTP was to present the preferred solution option. Should these system load levels materialize before the preferred transmission solution is completed, the TSPs and ERCOT will work collaboratively to determine an appropriate Constraint Management Plan (CMP) for the operational situation at that time. Should those load levels materialize before the new import path is in place, approximately 3,000 MW of future load would need to have its energization delayed based on the 2025 RTP's 2027 study case load levels, and 6,000 MW of future load would need to have its energization delayed based on 2028 study case load levels.

ERCOT performed an independent review that utilized study results from the 2025 RTP and assessed the need for further analysis. Based on the results of this ERCOT Independent Review (EIR), ERCOT recommends the following project as submitted by LCRA TSC and CEHE:

LCRA TSC will:

- Install a new 765-kV yard adjacent to the Euclid 345-kV station;
- At Euclid, cut-into the planned Bell County East to Howard Road 765-kV transmission line (the line cut-in scope will be coordinated with CPS Energy and Oncor, who own the Bell County East and Howard Road stations, respectively, and will co-own this line);
- Install a new, 765-kV transmission line from Euclid to a point-of-interconnection with CEHE, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require new right of way (ROW);

- Install two new single-circuit 345-kV transmission lines from Euclid to Misty, for approximately 2.0 miles, using bundled 1926 ACSS/TW Cumberland conductor (2,988 MVA normal and emergency rating). These lines will require a new ROW and, while they may be in the same ROW, the lines will be installed on separate structures;
- At Euclid, install 765-kV shunt reactors that are sufficient to ensure voltage remains within acceptable operating limits;
- At Euclid, install two 765/345-kV autotransformers with normal and emergency ratings of 2,403 and 2,772 MVA, respectively; and
- At Euclid, cut-in the T511 John Dumas to Hornsby 345-kV transmission circuit; and
- At Euclid and Misty, all 345-kV substation equipment will have a 5,000 A minimum rating and new 345-kV circuit breakers will have a minimum 80 kA interrupting capability.

CEHE will:

- Install a new 765-kV transmission line from Hillje to a point-of-interconnection with LCRA TSC, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require a new ROW;
- At Hillje, install new or modify existing shunt reactors as needed to ensure voltage remains within acceptable operating limits (CEHE is currently planning to install four 300 MVAr shunt reactors); and
- At Hillje, upgrade 345-kV Hillje substation equipment to have a minimum 80 kA interrupting capability.

The cost estimate for this project is approximately $1.831 billion and is classified as a Tier 1 project under ERCOT Protocol Section 3.11.4.3(1)(a). One or more Certificate of Convenience and Necessity (CCN) applications will be required for the construction of the new 765-kV single-circuit transmission line from Euclid to Hillje due to approximately 131.4 miles of new ROW. The expected ISD of this project is June 30, 2031. However, the projected ISD may change based on several factors, including environmental assessments, licensing requests, regulatory approvals, ROW acquisitions, and/or construction processes. Also, the specifications may be modified following additional studies or during detailed design. TSP(s) shall notify ERCOT of the details of any modifications to the endorsed project.

Table of Contents

1. Introduction

LCRA Transmission Services Corporation (LCRA TSC) and CenterPoint Energy Houston Electric, LLC (CEHE) submitted the Euclid 765-kV Substation and Transmission Line Addition Project to the Electric Reliability Council of Texas' (ERCOT) Regional Planning Group (RPG) in January 2026. LCRA TSC and CEHE proposed this project to address thermal and voltage planning criteria violations, increase transfer capability and improve operational flexibility in the Central Texas area. The project is in Caldwell, Gonzalez, Lavaca, and Wharton Counties in the South Central and Coast Weather Zones.

The recent unprecedented load growth first sparked discussions in the 2024 Regional Transmission Plan (RTP) about introducing an Extra High Voltage (EHV) 765-kV backbone infrastructure to the ERCOT Region. This EHV backbone would function as a superhighway, enabling electrons to flow more efficiently through long-distance transmission from resource-rich regions to load centers. The benefits of higher voltage transmission include:

- Increased transfer capability to load centers;
- Flexibility in Generation Resource siting;
- Increased outage coordination capacity;
- Reduced impact to Texas consumers due to less overall right of way (ROW) requirements[3];
- Reduced line losses;
- Potential retirement of series compensation devices; and
- Potential exit strategy for some current Generic Transmission Constraints.

The PUCT approved the Permian Basin Reliability Plan in October 2024, and on May 1, 2025, it approved a 765-kV import option, introducing a higher transmission voltage level in ERCOT for the first time since the 1960s. In December 2025, ERCOT's Board of Directors approved the 765-kV Eastern Backbone and Western Loop projects, thereby approving the full 765-kV Strategic Transmission Expansion Plan (STEP)[4]. The 765-kV

[3] A single 765-kV circuit requires approximately 200 feet of ROW but carries up to three times the power of a 345-kV double circuit. A single 345-kV double circuit requires approximately 150 feet of ROW. When comparing overall ROW needs, the 765-kV option requires less than half (200 feet) what the equivalent 345-kV option requires (150 feet x 3 double circuits = 450 total feet for equivalent 345-kV transmission capacity).
[4] Link to 2024 Regional Transmission Plan (RTP) 345-kV Plan and Texas 765-kV Strategic Transmission Expansion Plan Comparison.

STEP was included in the 2025 RTP and showed continued reliability benefits as seen in the 2024 RTP. The 2025 RTP evaluated the potential addition of 765-kV equipment beyond what is already included in the 765-kV STEP to address new load growth, this included upgrading existing 345-kV pathways; however, those upgrades were determined to be complementary components of the overall Central Texas import strategy while the foundational piece was identified as the Euclid 765-kV Substation and Transmission Line Addition Project. Accordingly, the Euclid 765-kV Station and Euclid to Hillje 765-kV Line Addition Project was included in the 2025 RTP published by ERCOT in December 2025[5].

Hence, ERCOT performed an independent review that utilized study results from the 2025 RTP and assessed the need for further analysis. Based on the results of this EIR, ERCOT recommends the following project as submitted by LCRA TSC and CEHE:

LCRA TSC will:

- Install a new 765-kV yard adjacent to the Euclid 345-kV station;
- At Euclid, cut-into the planned Bell County East to Howard Road 765-kV transmission line (the line cut-in scope will be coordinated with CPS Energy and Oncor, who own the Bell County East and Howard Road stations, respectively, and will co-own this line);
- Install a new, 765-kV transmission line from Euclid to a point-of-interconnection with CEHE, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require new ROW;
- Install two new single-circuit 345-kV transmission lines from Euclid to Misty, for approximately 2.0 miles, using bundled 1926 ACSS/TW Cumberland conductor (2,988 MVA normal and emergency rating). These lines will require a new ROW and, while they may be in the same ROW, the lines will be installed on separate structures;
- At Euclid, install 765-kV shunt reactors that are sufficient to ensure voltage remains within acceptable operating limits;
- At Euclid, install two 765/345-kV autotransformers with normal and emergency ratings of 2,403 and 2,772 MVA, respectively; and
- At Euclid, cut-in the T511 John Dumas to Hornsby 345-kV transmission circuit; and
- At Euclid and Misty, all 345-kV substation equipment will have a 5,000 A minimum rating and new 345-kV circuit breakers will have a minimum 80 kA interrupting capability.

[5] Link to Public ERCOT 2025 Regional Transmission Plan

CEHE will:

- Install a new 765-kV transmission line from Hillje to a point-of-interconnection with LCRA TSC, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require a new ROW;
- At Hillje, install new or modify existing shunt reactors as needed to ensure voltage remains within acceptable operating limits (CEHE is currently planning to install four 300 MVAr shunt reactors); and
- At Hillje, upgrade 345-kV Hillje substation equipment to have a minimum 80 kA interrupting capability.

The cost estimate for this project is approximately $1.831 billion, and the project is classified as a Tier 1 project under ERCOT Protocol Section 3.11.4.3(1)(a). One or more Certificate of Convenience and Necessity (CCN) applications will be required for the construction of the new 765-kV single-circuit transmission line from Euclid to Hillje due to approximately 131.4 miles of new ROW. The expected in-service date (ISD) of this project is June 30, 2031. However, the projected ISD may change based on several factors, including environmental assessments, licensing requests, regulatory approvals, ROW acquisitions, and/or construction processes. Also, the specifications may be modified following additional studies or during detailed design. Transmission Service Provider (TSP)(s) shall notify ERCOT of the details of any modifications to the endorsed project.

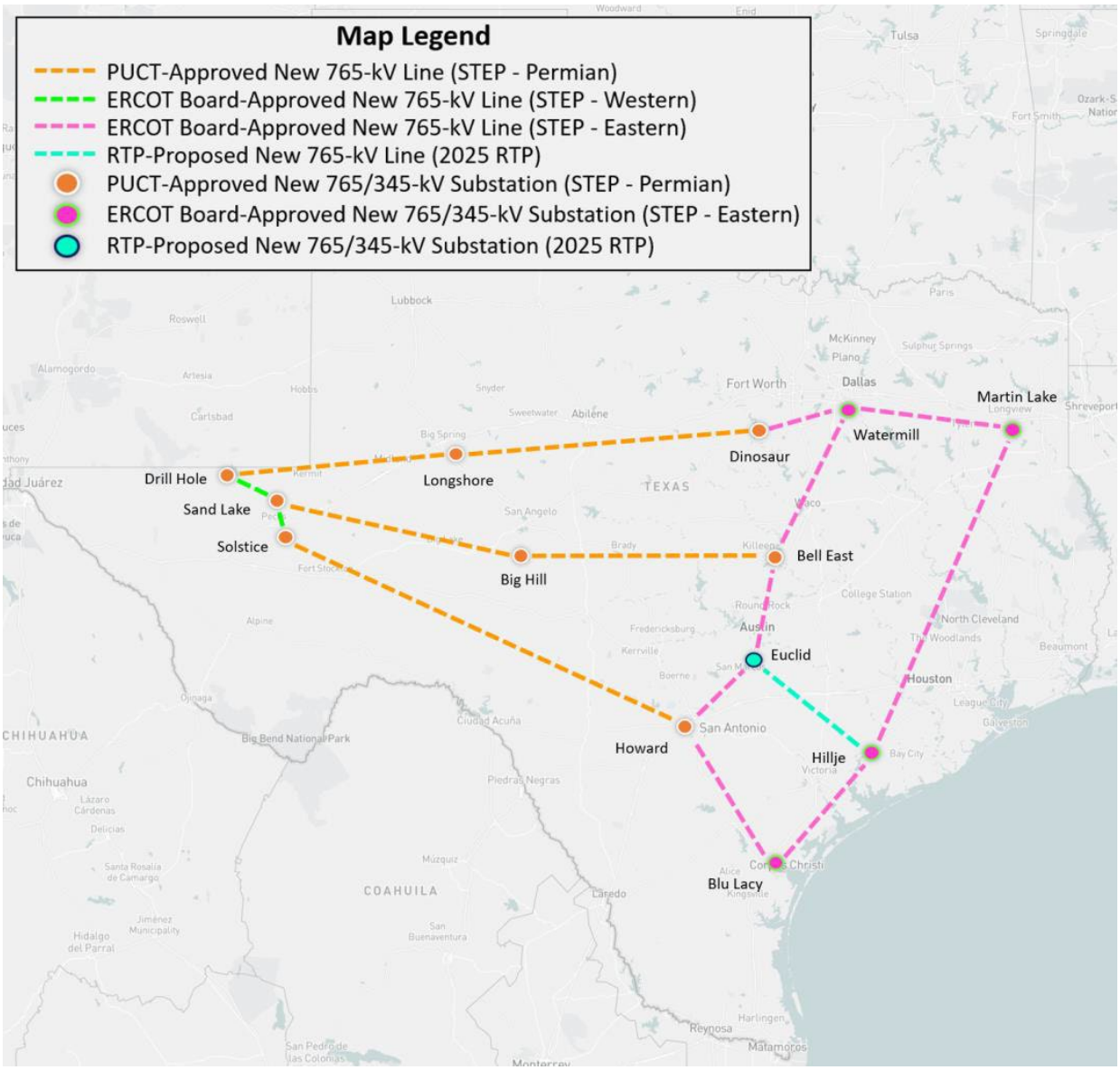


Figure 1.1: Map of Transmission System in The Euclid 765-kV Substation and Transmission Line Addition Project Area

2. Study Assumptions and Methodology

To address the rapid changes experienced in the ERCOT system, which include trends of substantial growth in demand and increasing penetration of Inverter-Based Resources (IBRs), ERCOT's 2025 RTP evaluated 765-kV transmission network in addition to the traditional 345-kV infrastructure. ERCOT conducted extensive engineering analysis of the 765-kV plan and obtained substantial review and input from Transmission and Distribution Service Providers (TDSPs) and other stakeholders in the ERCOT region through RPG meetings. As a culmination of these efforts, ERCOT proposed the Euclid 765-kV Station and Euclid to Hillje 765-kV Line Addition.

The start case for the Euclid 765-kV Station and Euclid to Hillje 765-kV Line Addition Project incorporated all local transmission projects needed by 2027 in the study area.

The 765-kV contingency analyses were performed in accordance with North American Electric Reliability Corporation (NERC) Reliability Standard TPL-001-5.1 and ERCOT Planning Guide criteria, specifically the N-1 contingency conditions, prior outage of a generator or 345/138-kV transformer followed by N-1 contingency conditions, maintenance outages at the 300-kV and above voltage levels, and extreme events.

As such, ERCOT has decided to utilize the 2025 RTP study for this EIR and perform additional analyses required by the Tier 1 project. The following sections highlight the studies and cost effectiveness of the Euclid 765-kV Station and Euclid to Hillje 765-kV Line Addition Project performed in the 2025 RTP evaluation.

2.1. Steady State Reliability Studies

ERCOT performed comprehensive steady state studies to identify needs in the 2025 RTP evaluation. The 2025 RTP evaluated the potential addition of 765-kV equipment beyond what is already included in the 765-kV STEP to address new load growth, this included upgrading existing 345-kV pathways; however, those upgrades were determined to be complementary components of the overall Central Texas import strategy while the foundational piece was identified as the Euclid 765-kV Substation and Transmission Line Addition Project.

The 2025 RTP steady state studies determined that the expansion of the existing 345-kV Euclid station in Central Texas to include 765-kV helps stabilize bus voltages and provides a new source into the Central Texas area, while the Euclid to Hillje 765-kV line, approximately 131.4 miles, addresses various violations along the Coast-to-Central paths. Adding a new 765-kV Central Texas import pathway from the Hillje substation in the Coast Weather Zone to the Euclid station in Central Texas brings approximately 2,000 MW across the line into Central Texas under base case summer peak conditions. The increased import capability was observed under both normal and post-contingency conditions across various system topology configurations, including both the 2025 RTP Report with the planned 765-kV STEP Eastern Backbone project and exclusively on the new line's own merits without the planned backbone.

The need for, and benefit from, this new 765-kV import path was seen as early as the 2025 RTP's 2027 study case. However, the total system load in the 2025 RTP's 2027 study case, which includes TSP-submitted Large Loads adjusted through the ERCOT Transmission Planning Adjusted Load Forecast (ETPALF) process, is approximately 120,000 MW. That total system load is approximately 35,000 MW higher than the current summer peak demand record of 85,508 MW. The 2028 study case, with TSP-submitted Large Loads, is approximately 140,000 MW, or 55,000 MW higher than the current summer peak demand record.

However, it is understood that the ISD for a new 765-kV line would not be feasible by 2027. Nevertheless, based on those TSP-submitted load levels, an additional 765-kV import path was determined to be the best solution to address the system needs identified at those load levels, independent of the in-service timeline. Alternative solutions, including extensive 345-kV upgrades, were evaluated but would require significantly greater right-of-way expansion, provide lower transfer capability relative to the proposed 765-kV solution and would experience similar ISD challenges. Therefore, the planning approach used in the 2025 RTP was to present the preferred solution option. Should these system load levels materialize before the preferred transmission solution is completed, the TSPs and ERCOT will work collaboratively to determine an appropriate Constraint Management Plan (CMP) for the operational situation at that time. Should those load levels materialize

before the new import path is in place, approximately 3,000 MW of future load would need to have its energization delayed based on the 2025 RTP's 2027 study case load levels, and 6,000 MW of future load would need to have its energization delayed based on 2028 study case load levels.

2.2. Dynamic Stability Studies

ERCOT conducted a dynamic stability analysis to evaluate the impact of the Euclid to Hillje area upgrades proposed by LCRA TSC and CEHE. The dynamic stability analysis assessed potential impacts on the West Texas Export stability constraint by examining contingencies previously studied for the 765-kV STEP.

ERCOT used the same approved Dynamics Working Group (DWG) 2027 High Renewable Minimum Load (HRML) case, which was previously used for the 765-kV STEP analysis, as a baseline, and updated it to include proposed Euclid to Hillje area 765-kV and 345-kV upgrades. To stress the West Texas Export interface, the generation in the ERCOT North, West, and Far West Weather Zones was increased relative to the generation in the ERCOT South, East, Coast and South Central Weather Zones.

2.3. Study Assumptions for Congestion Analysis

Congestion impact of the project was analyzed to study potential new congestion introduced by the project. To do so, the 2025 RTP sensitivity case for the study year 2030 was used. The 2030 case was selected based on the project timeline.

2.4. Contingencies and Criteria

The reliability assessments were performed based on NERC Reliability Standard TPL-001-5.1, ERCOT Protocols[6], and the ERCOT Planning Guide.[7]

The following steady-state contingencies were simulated for the study region:

- P0 (System Intact);
- P1, P2-1, P7 (N-1 conditions);

[6] ERCOT Protocols: https://www.ercot.com/mktrules/nprotocols/current
[7] ERCOT Planning Guide: http://www.ercot.com/mktrules/guides/planning/current

- P2-2, P2-3, P4, and P5 (345-kV and above);
- P3: (G-1+N-1) (G-1: generation outage); and
- P6-2: (X-1+N-1) (X-1: 345/138-kV transformer and 765/345-kV transformer).

All 115-kV and above buses, 60-kV and above 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 limits
  - Rate A (normal rating) for pre-contingency conditions; and
  - Rate B (emergency rating) for post-contingency conditions.
- Voltage limits
  - Voltages exceeding pre-contingency and post-contingency limits; and
  - Voltage deviations exceeding 8% on non-radial load buses.

2.5. Contingencies and Criteria for Dynamics Stability Analysis

ERCOT performed a dynamic stability analysis by testing critical NERC Category P1 and P7 contingencies associated with the West Texas Export interfaces, as well as the new EHV transmission paths running from the West Texas region toward the major load centers. For dynamic stability analysis, the following criteria were enforced for the tested P1 and P7 contingencies:

- For planning event P1: No generating unit shall pull out of synchronism. A generator being disconnected from the system by fault clearing action or by a Remedial Action Scheme (RAS) is not considered pulling out of synchronism;
- For planning events P7: When a generator pulls out of synchronism in the simulations, the resulting apparent impedance swings shall not result in the tripping of any transmission system elements other than the generating unit and its directly connected facilities;
- For any operating condition in category P1 of the NERC Reliability Standard addressing Transmission System Planning Performance Requirements, voltage shall recover to 0.90 p.u. within five seconds after clearing the fault;
- For any operating condition in category P7 of the NERC Reliability Standard addressing Transmission System Planning Performance Requirements, voltage shall recover to 0.90 p.u. within ten seconds after clearing the fault; and
- For any operating condition in categories P1 and P7 of the NERC Reliability Standard addressing Transmission System Planning Performance Requirements,

power oscillation within the range of 0.2 Hz to 2 Hz decays with a minimum 3% damping ratio.

2.6. Study Tools

ERCOT utilized the following software tools to perform the studies:

- PowerWorld Simulator version 24 for Security Constrained Optimal Power Flow and steady-state contingency analysis;
- TARA version 2302_2 for steady-state transfer analysis;
- UPLAN version 12.3.0.30786 to perform congestion analysis; and
- PSS/E Ver. 35.6.3 for Subsynchronous Oscillation (SSO) and dynamic stability analyses.

3. Additional Analyses and Assessment

The LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project, with a cost estimate of approximately $1.831 billion, is categorized as a Tier 1 project, under ERCOT Protocol 3.11.4.3(1)(a). ERCOT performed generation and load sensitivity studies to identify the project performance, as required under Planning Guide Section 3.1.3(4). Additionally, an SSO Assessment was performed.

3.1. Congestion Analysis

ERCOT performed a congestion analysis to identify any potential impact on system congestion related to the addition of the project using the 2025 RTP sensitivity case for study year 2030.

Although the project decreased the system wide congestion cost, it resulted in a new congestion on one of the reconfigured lines shown in the Table 3.1.

Table 3.1: List of New and Existing Congestion Due to Transmission Upgrade

Monitored Line	% Times Congested[8]	New/Existing
Misty to Lytton Springs 345-kV line	4.52	New

3.2. Generation Addition Sensitivity Analysis

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

Based on a review of the February 2026 GIS[9] report, forty-six (46) units were found within the study area that could have an impact on the identified reliability issues. These units, listed in Table 3.2, were added to the 2025 RTP 2031 Summer Peak case following the 2025 RTP Methodology. ERCOT determined that the addition of these generators does not impact the Euclid project.

[8] Under the most binding contingency
[9] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER

Table 3.2: List of Units that Could Have an Impact on the Identified Reliability Issues

GINR	Unit Name	Fuel Type	Max Capacity (~MW)	County
19INR0055	Monte Cristo II Wind	WIN	233.9	Hidalgo
22INR0387	Val Vista Grid BESS 1	OTH	209.3	Hidalgo
22INR0466	Pajarita BESS	OTH	205.5	Cameron
23INR0090	Iguala Solar	SOL	250.0	Victoria
23INR0467	Lavender Storage Project	OTH	231.9	Bexar
24INR0102	Val Vista Grid BESS 2	OTH	210.6	Hidalgo
24INR0160	Huisache Solar	SOL	125.6	Wilson
24INR0376	Huisache BESS	OTH	100.7	Wilson
24INR0505	Corralitos Wind 1	WIN	196.1	Zapata
24INR0506	Corralitos Wind 2	WIN	195.4	Zapata
25INR0353	Marshall Spring Solar	SOL	150.0	Gillespie
25INR0354	Marshall Spring Storage	OTH	150.0	Gillespie
25INR0402	Driet BESS	OTH	150.5	Colorado
25INR0512	Monument Hill Solar	SOL	200.0	Fayette
26INR0088	La Salle Solar	SOL	512.6	La Salle
26INR0116	Falcon Zapata Storage 138	OTH	200.8	Zapata
26INR0143	Santa Garcias Solar	SOL	265.0	Kleberg
26INR0311	Senator Aggreko Solar	SOL	251.0	Maverick
26INR0312	Senator Aggreko Storage	OTH	153.1	Maverick
26INR0330	Alamo City BESS	OTH	128.2	Bexar
26INR0341	Megamouth Energy Storage	OTH	101.3	Harris
27INR0109	Two Barbaras BESS	OTH	217.2	Montgomery
27INR0111	Malachite Solar	SOL	184.6	Wharton
27INR0112	Malachite BESS	OTH	191.1	Wharton
27INR0124	RedSun Solar	SOL	82.6	Burnet
27INR0132	Palo Verde Wind	WIN	297.5	San Patricio
27INR0372	Abeja Solar Farm	SOL	200.8	Bee
27INR0389	Sugaree Solar	SOL	251.4	Maverick
27INR0392	Cernan BESS	OTH	10.0	Wharton
27INR0465	Althea Storage	OTH	251.3	Maverick
28INR0037	Bullring Wind 1	WIN	303.5	Starr
28INR0038	Bullring Wind 2	WIN	303.8	Starr
28INR0039	Bullring Wind 3	WIN	190.4	Starr
28INR0072	Mirando Valley Wind	WIN	478.7	Jim Hogg
28INR0089	EmberYork	GAS	900.0	Austin
28INR0154	Pamela Heights I	OTH	101.7	Harris
28INR0295	Margay Energy Storage	OTH	101.3	Brazoria
28INR0434	Viento Bravo Wind	WIN	366.5	Jim Hogg

GINR	Unit Name	Fuel Type	Max Capacity (~MW)	County
29INR0166	LOST PINES GAS RECIP	GAS	113.0	Bastrop
29INR0176	SCHNEIDER GAS RICE	GAS	113.0	Caldwell
30INR0051	Sim Gideon Combined Cycle	GAS	880.0	Bastrop
30INR0052	Lost Pines Power Park	GAS	880.0	Bastrop
30INR0054	SCHNEIDER COMBINED CYCLE	GAS	880.0	Caldwell
31INR0010	LOST PINES GAS RECIP PHASE 2	GAS	113.0	Bastrop
31INR0013	SCHNEIDER GAS RICE PHASE 2	GAS	113.0	Caldwell

3.3. Load Scaling Sensitivity Analysis

ERCOT Planning Guide Section 3.1.3(4)(b) requires an evaluation of the potential impact of load scaling on the criteria violations seen in the 2024 RTP study. Before 2024, ERCOT RTP adopted the methodology of developing four sets of summer peak cases with each case representing one study region for each study year. For each summer peak case, the loads outside of the study region may be scaled down from the respective non-coincident summer peak levels to maintain a certain reserve requirement. This methodology may cause potential impact of load scaling on the criteria violations. Starting 2024, ERCOT RTP adopted a new methodology of having one summer peak case for each study year with non-coincident peaks for each of the Weather Zones, which would eliminate the load scaling impact. As such, load scaling sensitivity analysis is no longer needed.

3.4. Subsynchronous Oscillation (SSO) Assessment

Pursuant to Protocol Section 3.22.1.3(2), ERCOT conducted an SSO screening for the LCRA TSC and CEHE submitted the Euclid 765-kV Substation and Transmission Line Addition Project and found no adverse SSO impacts to the existing and planned generation resources in the study area.

3.5. Impact on West Texas Export Stability Constraint

Using the study case described in Section 2.2, ERCOT conducted a stability study focusing on the existing West Texas Export by analyzing critical P1 and P7 contingencies associated with the West Texas interface as well as the new EHV transmission paths running from the West Texas region toward the major load centers.

The results of the analysis indicate that the addition of the recommended Euclid to Hillje area 765-kV and 345-kV upgrades does not impact the West Texas Export stability limit of 16.2 GW identified under the approved full 765-kV STEP.

The existing West Texas Export stability constraint will undergo regular review and updates in future Quarterly Stability Assessment (QSA) to ensure its accuracy and relevance.

4. Conclusion

ERCOT reviewed the studies in the 2025 RTP Euclid 765-kV Station and Euclid to Hillje 765-kV Line Addition Project and performed additional assessments. Based on the results of this EIR, ERCOT recommends the LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project because it addresses all project needs with no reliability violations and further enhances system reliability.

ERCOT recommended project consists of the following upgrades:

LCRA TSC will:

- Install a new 765-kV yard adjacent to the Euclid 345-kV station;
- At Euclid, cut-into the planned Bell County East to Howard Road 765-kV transmission line (the line cut-in scope will be coordinated with CPS Energy and Oncor, who own the Bell County East and Howard Road stations, respectively, and will co-own this line);
- Install a new, 765-kV transmission line from Euclid to a point-of-interconnection with CEHE, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require new ROW;
- Install two new single-circuit 345-kV transmission lines from Euclid to Misty, for approximately 2.0 miles, using bundled 1926 ACSS/TW Cumberland conductor (2,988 MVA normal and emergency rating). These lines will require a new ROW and, while they may be in the same ROW, the lines will be installed on separate structures;
- At Euclid, install 765-kV shunt reactors that are sufficient to ensure voltage remains within acceptable operating limits;
- At Euclid, install two 765/345-kV autotransformers with normal and emergency ratings of 2,403 and 2,772 MVA, respectively; and
- At Euclid, cut-in the T511 John Dumas to Hornsby 345-kV transmission circuit; and
- At Euclid and Misty, all 345-kV substation equipment will have a 5,000 A minimum rating and new 345-kV circuit breakers will have a minimum 80 kA interrupting capability.

CEHE will:

- Install a new 765-kV transmission line from Hillje to a point-of-interconnection with LCRA TSC, for approximately 65.7 miles, using conductor with a minimum normal and emergency rating of 7,602 MVA. This line will require a new ROW;

- At Hillje, install new or modify existing shunt reactors as needed to ensure voltage remains within acceptable operating limits (CEHE is currently planning to install four 300 MVAr shunt reactors); and
- At Hillje, upgrade 345-kV Hillje substation equipment to have a minimum 80 kA interrupting capability.

The cost estimate for this project is approximately $1.831 billion and it is classified as a Tier 1 project under ERCOT Protocol Section 3.11.4.3(1)(a). One or more CCN applications will be required for the construction of the new 765-kV single-circuit transmission line from Euclid to Hillje due to approximately 131.4 miles of new ROW. The expected ISD of this project is June 30, 2031. However, the projected ISD may change based on several factors, including environmental assessments, licensing requests, regulatory approvals, ROW acquisitions, and/or construction processes. Also, the specifications may be modified following additional studies or during detailed design. TSP(s) shall notify ERCOT of the details of any modifications to the endorsed project.

Appendix A

Table A.1: Project Related Document

No	Document Name	Attachment
1	LCRA TSC and CEHE Euclid 765-kV Substation and Transmission Line Addition Project	LCRA TSC and CEHE Euclid 765-kV Substa