PUBLIC

Item 7.1: CNP Baytown Area Load Addition Project

Kristi Hobbs
Vice President, System Planning and Weatherization

Board of Directors Meeting

September 22-23, 2025

- **Purpose**
  Provide an overview of the $545.3 million CNP Baytown Area Load Addition Tier 1 Reliability Project. Per ERCOT Protocol Section 3.11.4.7 Tier 1 projects require Board endorsement

- **Voting Item**
  ERCOT staff requests and recommends that the Board endorse the CNP Baytown Area Load Addition RPG Project (Option 2A) based on North American Electric Reliability Corporation (NERC) and 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 endorsed by the Technical Advisory Committee (TAC)
- ERCOT studied several options and recommends Option 2A as it addresses the reliability violations, meets ERCOT and NERC Reliability Criteria, improves long-term load-serving capability, improves operational flexibility and is feasible

PUBLIC

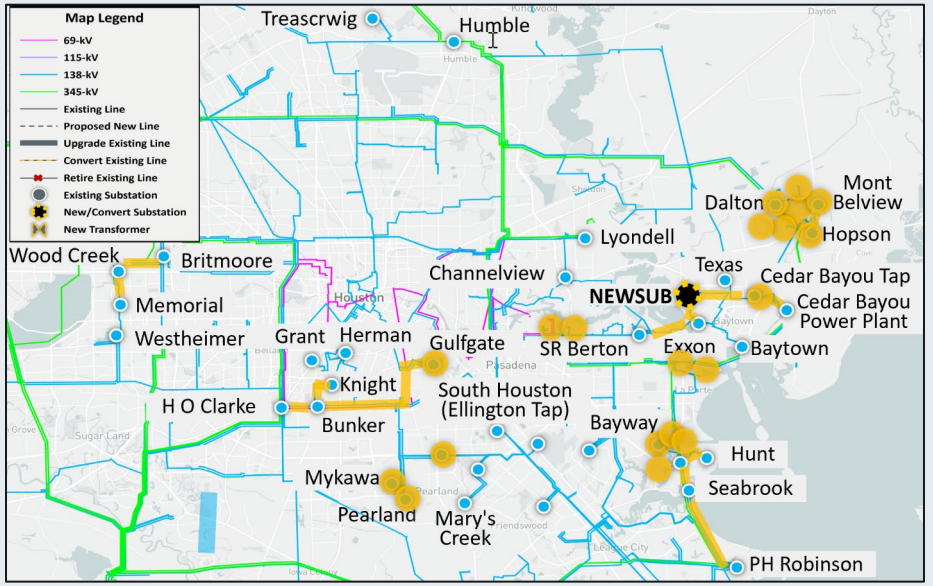
Item 7.1

CNP Baytown Area Load Addition RPG Project

- CenterPoint Energy Houston Electric, LLC submitted the Baytown Area Load Addition Project for Regional Planning Group (RPG) review in September 2024
- The purpose of the project is to address the reliability needs due to a proposed load addition in Harris County in the Coast Weather Zone
- ERCOT performed an independent review of the project and identified thermal overloads and voltage violations in Harris and Chambers counties
- ERCOT's endorsement of the project is based on the reliability need to relieve thermal overloads on 43.7 miles of 138-kV transmission lines and 23 voltage violations in Harris and Chambers counties to meet NERC and ERCOT reliability planning criteria
- ERCOT presented the project and TAC voted to endorse (with 3 No votes and 1 Abstention) the project on August 27, 2025

Key Takeaway: The CNP Baytown Area Load Addition Project has completed RPG review and received endorsement by TAC.

Thermal Overloads and Voltage Violations Seen by ERCOT



PUBLIC

Basis for ERCOT Board Endorsement

ERCOT's independent review identified a reliability need for the CNP Baytown Area Load Addition Project to satisfy:

- NERC TPL-001-5.1 Table 1 Reliability Criteria for category:
  - P3, P6-2 and P7 contingencies
- ERCOT Planning Guide Section Reliability Performance Criteria contingency:
  - 4.1.1.2(1)(c): The contingency is a loss of a single generating unit followed by a single transmission element or common tower outage
  - 4.1.1.2(1)(d): The contingency is a loss of a single transformer followed by a single transmission element or common tower outage
  - 4.1.1.8 Maintenance Contingency Analysis: The contingency is the loss of a single transmission element or common tower followed by a single transmission element or common tower outage

Key Takeaway: The CNP Baytown Area Load Addition Project is needed to meet reliability under NERC and ERCOT Planning Guide criteria.

PUBLIC

Additional Information based on Comment from TAC

- ERCOT studied four different transmission project options, Option 1, Option 2 and Option 2A addressed the summer peak load thermal violations but only Option 2A addressed all the Maintenance Outage violations.
- The Cost Estimate for the CNP Proposed Option 1 increased from the originally submitted $141.6 million to $163.1 million due to increase in current cost estimates. Option 1 rebuilds approximately 11 miles of 138-kV transmission lines
- ERCOT identified additional Maintenance Outage violations compared to the CNP project submission
- Option 2A has a cost estimate of $545.3 million and rebuilds approximately 51 miles of 138-kV transmission lines.
- Approximately 45% of the estimated capital cost is associated with temporary work required for all structure replacements and full temp by-pass

Key Takeaway: The CNP Baytown Area Load Addition Project Option 2A Cost Estimate includes approximately 5 times more 138-kV transmission line rebuilds.

PUBLIC

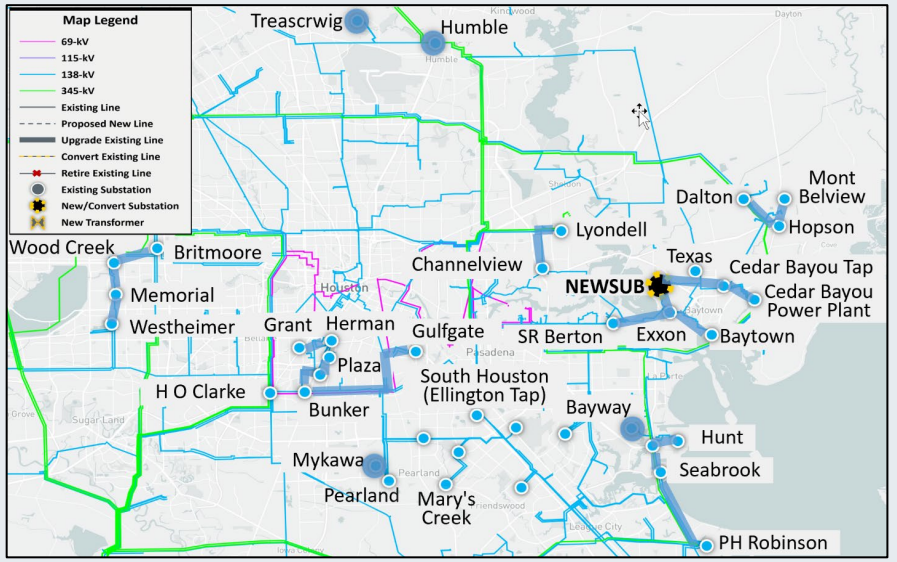
Request for Committee Vote

ERCOT staff requests and recommends that the Board:

- Endorse the need for the CNP Baytown Area Load Addition Project (Option 2A) based on NERC and ERCOT reliability planning criteria
- The ERCOT Independent Review (EIR) is included as *Attachment A* to the Board Decision Template

Key Takeaways: ERCOT studied several options and recommends Option 2A to address the reliability violations, meets ERCOT and NERC Reliability Criteria, improves long-term load-serving capability, improves operational flexibility and is feasible.

ERCOT Recommendation



Joint Comments of the Technical Advisory Committee (TAC) Residential Consumer; Office of Public Utility Counsel (OPUC); and Rhythm Ops

The CNP Baytown Area Load Addition Project started as a $142M project as submitted by CenterPoint and turned into a $545M project after ERCOT independent review. The primary driver for this project is to accommodate a new large load to be located in Harris County. No details regarding the size of the load, or the timing of its interconnection request were provided to TAC.

Our concern with this project was the lack of comprehensive documentation provided to TAC explaining the increased cost. Through discussion, TAC was able to determine that the $545M project cost includes $245M in temporary bypass facilities, inferring the 'new build' portion of the project costs are estimated at $300M. But without any more details, such as additional miles of new build required for Option 2A compared to other options, or the effects of equipment cost increases we could not support approving this project.

Date: September 15, 2025
To: Board of Directors
From: Kristi Hobbs, Vice President, System Planning and Weatherization (ERCOT)
Subject: CNP Baytown Area Load Addition Project

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: September 22-23, 2025

Item No.: 7.1

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 CenterPoint Energy Houston Electric, LLC (CNP) Baytown Area Load Addition Regional Planning Group (RPG) Project in order to meet the reliability requirements for the ERCOT System and address thermal overloads and voltage violations due to a proposed load addition in Harris County in the Coast Weather Zone, which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted to endorse.

Background/History:
CNP proposed the Baytown Area Load Addition Project in September 2024, a $141.65 million, Tier 1 project with the expected in-service date of January 2028, to meet reliability planning criteria due to a proposed load addition in Harris County in the Coast Weather Zone. 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 Baytown Area Load Addition Project and identified thermal overloads and voltage violations in Harris and Chambers counties. The ERCOT project recommendation (Option 2A), a $545.30 million, Tier 1 project with the expected in-service date of January 2028 addresses the need for a project under North American Electric Reliability Corporation (NERC) and ERCOT Planning Criteria to address thermal overloads on 43.7 miles of 138-kV transmission lines and 23 voltage violations Harris and Chambers counties with the following ERCOT System improvements:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and

- The existing SR Bertron to Texas 138-kV Circuit 87.

- Upgrade substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate new substation;
- Rebuild the existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 5.6-mile;
- Rebuild the existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 4.0-mile;
- Upgrade the existing Cedar Bayou Plant to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 2.4-mile;
- Upgrade the existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.6-mile;
- Upgrade the existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27-mile;
- Rebuild the existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.26-mile;
- Rebuild existing Baytown to Exxon 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 1.93-mile;
- Rebuild the existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 3.02-mile;
- Rebuild the existing NEWSUB to Texas 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.06-mile;
- Upgrade the existing Hopson to Warvue 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.3-mile;
- Upgrade the existing Brine to Dalton 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.82-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72-mile;
- Rebuild the existing Herman to Grant 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing Gulfgate to Knight 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 6.78-mile;
- Rebuild the existing Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 2.26-mile;
- Rebuild the existing Westminster to Memorial 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 2.4-mile;
- Rebuild the existing Memorial to Woodcreek 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.7-mile;

- Rebuild the existing Woodcreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing PH Robinson to Seabrook 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 7.97-mile;
- Rebuild the existing Seabrook to Hanna 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.62-mile;
- Rebuild the existing Hanna to Hunter 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.4-mile;
- Install 3 new 7.2 MVAr Switched Capacitor Banks at Bayway Substation;
- Install 1 new 60 MVAr Capacitor Bank at Mykawa Substation;
- Install 1 new 60 MVAr Capacitor Bank at Humble Substation; and
- Install 2 new 14.4 MVAr Switched Capacitor Banks at Treaschwig Substation.

ERCOT's independent review verified the reliability need for the Baytown Area Load Addition Project to satisfy ERCOT Planning Guide Section 4.1.1.2(1)(c), 4.1.1.2(1)(d), Reliability Performance Criteria, and Section 4.1.1.8, Maintenance Outage Reliability Criteria. Contingencies are for the loss of a single generating unit followed by a single transmission element or common tower outage, for the loss of a single transformer followed by a single transmission element or common tower outage, and loss of a single transmission element or common tower followed by a single transmission element or common tower outage, respectively.

RPG considered project overviews during meetings in November 2024 and July 2025. Between November 2024 and July 2025, ERCOT staff presented scope and status updates at RPG meetings in November, February, March, April and May. 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 August 27, 2025, TAC endorsed (with 3 No votes and 1 Abstention) the project as 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 Sub-Synchronous Resonance (SSR) of existing facilities in Brazos and neighboring counties in the Coast Weather Zone, conducted pursuant to Protocol Section 3.22.1.3, Transmission Project Assessment, 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, Project Evaluation, indicated no significant new congestion in the area with the addition of the Baytown Area Load Addition Project (Option 2A).

The project completion date is subject to change based on several factors, including material acquisition, outage coordination, construction, or other project related requirements.

The report describing the ERCOT Independent Review of the Baytown Area Load Addition Project (Option 2A), including ERCOT staff's recommendation, is included as ***Attachment A***.

Key Factors Influencing Issue:

1. ERCOT System improvements are needed to meet reliability planning criteria due to a proposed load addition in Harris County in the Coast Weather Zone.
2. ERCOT staff found the recommended set of improvements to be the most efficient solution for meeting the planning reliability criteria, addressing thermal overloads and voltage violations.
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 to endorse the Tier 1 CNP Baytown Area Load Addition Regional Planning Group (RPG) Project (Option 2A), as recommended by ERCOT, on August 27, 2025.

Conclusion/Recommendation:

ERCOT staff recommends that the Board endorse the need for the Tier 1 CNP Baytown Area Load Addition RPG Project (Option 2A), which ERCOT staff has independently reviewed, and which TAC has voted 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 CNP Baytown Area Load Addition Regional Planning Group Project (Option 2A), which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted 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 CNP Baytown Area Load Addition Regional Planning Group Project (Option 2A), which ERCOT staff has independently reviewed, and which TAC has voted 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 _____ meeting, the Board passed a motion approving the above Resolution by _____.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of _____, 2025.

_____

Brandon Gleason

Assistant Corporate Secretary

ERCOT Independent Review of the CNP Baytown Area Load Addition Project

Document Revisions

Date	Version	Description	Author(s)
9/9/2025	1.0	Final	Ben Richardson
		Reviewed by	Robert Golen, Prabhu Gnanam

Executive Summary

CenterPoint Energy Houston Electric, LLC (CNP) submitted the Baytown Area Load Addition Project to the Regional Planning Group (RPG) in September 2024. CNP proposed this project to address North American Electric Reliability Corporation (NERC) Reliability Standard TPL-001-5.1 and ERCOT Planning Guide criteria thermal overloads and voltage violations due to load addition in Harris County in the Coast Weather Zone.

The CNP proposed project was estimated to cost approximately $141.6 million and was classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3. The proposed project will not require a Certificate of Convenience and Necessity (CCN) application.

ERCOT performed an Independent Review, identified reliability issues (thermal overloads and voltage violations identified in CNP's project submission and additional violations in Chambers and Harris counties) and evaluated four different transmission project options.

The ERCOT Independent Review (EIR) evaluated four different transmission project options. Based on the study results described in Sections 5 and 6 of this report, ERCOT recommends the following option (Option 2A) to address the reliability issues mentioned. Option 2A consists of the following:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and
  - The existing SR Bertron to Texas 138-kV Circuit 87.
- Upgrade substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate the new substation;
- Rebuild the existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 5.6-mile;
- Rebuild the existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 4.0-mile;
- Upgrade the existing Cedar Bayou Plant to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 2.4-mile;
- Upgrade the existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.6-mile;
- Upgrade the existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27-mile;
- Rebuild the existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.26-mile;
- Rebuild existing Baytown to Exxon 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 1.93-mile;

- Rebuild the existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 3.02-mile;
- Rebuild the existing NEWSUB to Texas 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.06-mile;
- Upgrade the existing Hopson to Warvue 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.3-mile;
- Upgrade the existing Brine to Dalton 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.82-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72-mile;
- Rebuild the existing Hermann to Grant 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing Gulfgate to Knight 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 6.78-mile;
- Rebuild the existing Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 2.26-mile;
- Rebuild the existing Westheimer to Memorial 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 2.4-mile;
- Rebuild the existing Memorial to Woodcreek 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.7-mile;
- Rebuild the existing Woodcreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing PH Robinson to Seabrook 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 7.97-mile;
- Rebuild the existing Seabrook to Hanna 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.62-mile;
- Rebuild the existing Hanna to Hunter 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.4-mile;
- Install 3 new 7.2 MVAr Switched Capacitor Banks at Bayway Substation;
- Install 1 new 60 MVAr Capacitor Bank at Mykawa Substation;
- Install 1 new 60 MVAr Capacitor Bank at Humble Substation; and
- Install 2 new 14.4 MVAr Switched Capacitor Banks at Treaschwig Substation.

The cost estimate for Option 2A is approximately $545.3 million and is classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3(a). The cost estimate includes the estimated capital cost with temporary work required for all structure replacements and full temp bypass. This project will not require a Certificate of Convenience and Necessity (CCN) application. The expected in-service date (ISD) of this project is January 2028.

Table of Contents

1 Introduction

In September 2024, CenterPoint Energy Houston Electric, LLC (CNP) submitted the Baytown Area Load Addition Project to the Regional Planning Group (RPG) to address North American Electric Reliability Corporation (NERC) Reliability Standard TPL-001-5.1 and ERCOT Planning Guide criteria thermal overloads and voltage violations in Harris County due to a new large load confirmed by Transmission Service Provider (TSP) Attestation Letter. The proposed project is in the Coast Weather Zone in Harris County.

The CNP proposed project was estimated to cost approximately $141.6 million and was classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3. The proposed project will not require a Certificate of Convenience and Necessity (CCN) application. The expected in-service date (ISD) of the project is January 2028.

ERCOT conducted an Independent Review for this RPG project to identify any reliability needs in the area and evaluate various transmission upgrade options. This report describes the study assumptions, methodology, and the results of the ERCOT Independent Review (EIR) for the project.

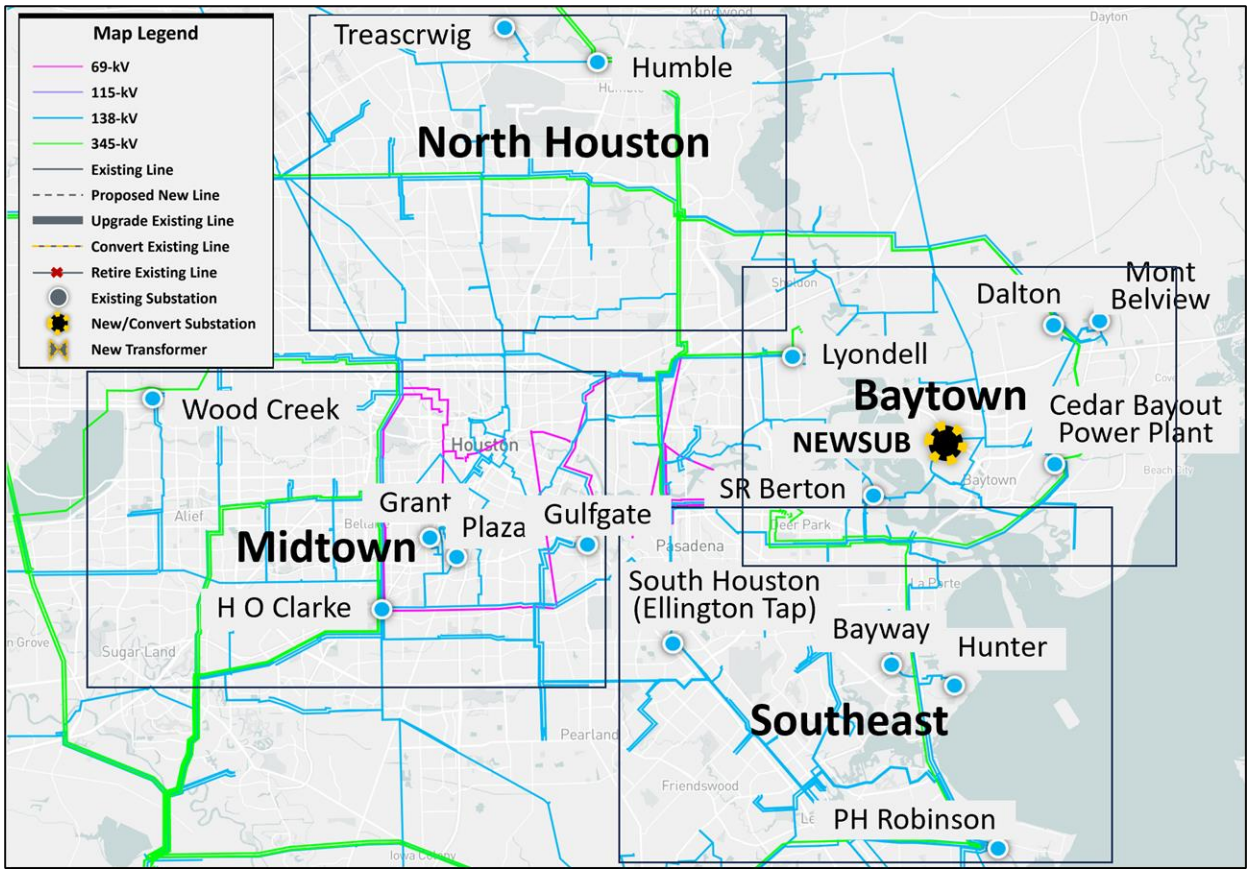


Figure 1.1: Map of Transmission System in Study Area

2 Study Assumptions and Methodology

ERCOT performed studies under various system conditions to identify potential reliability issues and corresponding transmission upgrades that will be necessary to support the proposed Baytown Area Load Addition Project. This section describes the study assumptions and criteria used to conduct this independent study.

2.1 Study Assumptions for Reliability Analysis

The project is in the Coast Weather Zone in Harris County. However, both Chambers and Harris were included in the study area because of the electrical proximity of Chambers County to the proposed project.

2.1.1 Steady-State Study Base Case

A Final 2023 Regional Transmission Plan (RTP) case, published on the Market Information System (MIS) on December 20, 2023, was used as the reference case for this study. The 2029 study year was selected for the long-term outlook. The steady-state study base case was constructed by updating transmission, generation, and loads of the following 2029 Summer peak load case[1]:

- Summer Peak Case: 2023RTP_2029_SUM_12222023

2.1.2 Transmission Topology

Transmission projects within the study area with ISDs by June 1, 2028, were added to the study base cases. The ERCOT Transmission Project Information and Tracking (TPIT)[2] report posted in October 2024 was used as a reference. The added TPIT projects are listed in Table 2.1.

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

TPIT	Project Name	Tier	Project ISD	County
73371A	BP24 Sub Upgrades	Tier 4	Oct-24	Harris
73371B	BP24 Sub Upgrades	Tier 4	Oct-24	Harris
73371H	BP24 Sub Upgrades	Tier 4	Nov-24	Harris
69892	Deer Park Tap to NOBEL Ckt.21C Upgrades	Tier 4	Dec-24	Harris
73371C	BP24 Sub Upgrades	Tier 4	Dec-24	Harris
86009	Expand ADLONG substation for XE Murat Storage (24INR0329)	Tier 4	Dec-24	Harris
69902B	New 345kV Mission (MSS) substation for generator interconnection to Parliament Solar	Tier 4	Jan-25	Harris
70660	Plaza to Grant Ckt.08I Upgrade	Tier 4	Feb-25	Harris
75856B	Rebuild and reconductor portions of Ckt.28A to prepare for ETHYL 138kV conversion. Loop into Ckt.06E to create new Ckt.06 Jefferson to ETHYL 138kV to South Channel. Retire ETHYL 69kV substation and remaining portions of 69kV Ckt.16D and Ckt.28A	Tier 4	May-25	Harris

[1] 2023 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning?id=pg3-3200-m
[2] TPIT Report: https://www.ercot.com/gridinfo/sysplan/index.html

TPIT	Project Name	Tier	Project ISD	County
73578C	Heights 138kV Loop Conversion	Tier 4	May-25	Harris
73578H	Heights 138kV Loop Conversion	Tier 4	May-25	Harris
73578I	Heights 138kV Loop Conversion	Tier 4	May-25	Harris
87479I	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479F	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479H	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479C	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479A	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
78427A	Bohemian (BOH) 138kV CEHE Substation for Destiny Storage (24INR0397)	Tier 4	Oct-25	Harris
78427B	Bohemian (BOH) 138kV CEHE Substation for Destiny Storage (24INR0397)	Tier 4	Oct-25	Harris
73332	Install Hermann (HER) Distribution Substation	Tier 4	Dec-25	Harris
76350	Install new TARGA 138kV customer substation as Ckt.86 Jordan to TARGA to CITIES	Tier 4	Dec-25	Chambers
73352C	PH Robinson Area 138kV Upgrades	Tier 4	Dec-25	Harris
87640	New load customer interconnection RAOULT connecting on Ckt 86 between DALTON and BRINE	Tier 4	Jan-26	Harris
80632	Install Kilgore 35kV Distribution Substation. Loop on Ckt.86B to create new Ckt.86 CHEVRON to Kilgore to LANGSTON	Tier 4	May-26	Chambers
87346	Upgrade Ckt 25 Jeanetta to Westwood to increase thermal limits	Tier 4	May-26	Harris
73578D	Heights 138kV Loop Conversion	Tier 4	May-26	Harris
73578E	Heights 138kV Loop Conversion	Tier 4	May-26	Harris
86022	Jordan 138kV Substation Expansion for Coneflower Storage (23INR0425)	Tier 4	Oct-26	Chambers
87344	Upgrade 345kV Ckt 71 Addick's-White Oak to increase thermal limits	Tier 4	Oct-26	Harris

The transmission project, listed in Table 2.2, identified in the 2023 RTP as a placeholder project in the study area and was not approved by RPG was removed from the study base cases.

Table 2.2: List of Transmission Project Removed from the Study Base Cases

RTP Project ID	Project Name	County
	None	None

2.1.3 Generation

Based on the September 2024 Generator Interconnection Status (GIS)[3] report posted on the ERCOT website on October 2024, generators that met Planning Guide Section 6.9(1) conditions with Commercial Operations Date (COD) prior to June 1, 2028, were added to the study base cases. These generation additions are listed in Table 2.3. All generation dispatches were consistent with the 2024 RTP methodology.

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

Table 2.3: List of Generation Added to the Study Base Cases Based on the September 2024 GIS Report

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
23INR0408	TECO GTG2	GAS	10/15/2024	50.0	Harris
22INR0546	Enchanted Rock NEWPP	GAS	11/16/2024	30.0	Harris
22INR0354	XE Murat [Adlong] Solar	SOL	12/30/2024	60.4	Harris
24INR0329	XE Murat Storage	OTH	03/01/2025	60.1	Harris
24INR0397	Destiny Storage	OTH	01/31/2026	205.6	Harris
23INR0425	Coneflower Storage Project	OTH	02/03/2027	178.9	Chambers

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 (turned off) in the study base case to reflect their mothballed/retired status.

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

Bus No	Unit Name	Max Capacity (~MW)	Weather Zone
150711	STEA_STEAM_1	17.5	NORTH_CE
130121	SGM_SIGNALMT	7.5	FAR_WEST

Generation listed in Table 2.5 were closed (turned on) in the study base case to reflect the change in their Generation Resource as these resources are returning to year-round service.

Table 2.5: List of Generation Closed to Reflect Returning to Service Status

Bus No	Unit Name	Max Capacity (~MW)	Weather Zone
151361	CHSMGRD_BES1	101.7	NORTH_CE

2.1.4 Loads

Loads in the ERCOT system were consistent with 2023 RTP. This project is driven by the 500.5 MVA large load confirmed by TSP Attestation Letter with a 95% power factor, shown in Table 2.6. Load was adjusted outside the East and Coast Weather Zones to maintain the minimum reserve requirements consistent with the 2023 RTP methodology.

Table 2.6: Newly Confirmed Load

Year	Load (MW)
2029	475.5

2.2 Long-Term Load-Serving Capability Assessment

ERCOT performed a long-term load-serving capability assessment to compare the performance of the study options.

Incremental load serving capability was evaluated to assess the long-term load-serving capability. The loads in the study area were increased (customer designated as non-scalable remained at the same

level as in the study base case), and conforming loads outside of East and Coast Weather Zones were decreased to balance power.

2.3 Maintenance Outage Scenario

ERCOT performed a planned maintenance outage evaluation based on historic off-peak system load. Conforming loads in the East and Coast Weather Zones were scaled down to 85% of the summer peak load to create the off-peak case. Loads designated as non-scalable remained at the same level as in the study base case. Next, ERCOT Planning Guide Section 4.1.1.8 Maintenance Outage Reliability Criteria was evaluated to identify and address violations.

2.4 Study Assumptions for Economic Study

An economic study was performed to further evaluate the study options and to identify any new congestion in the study area with the addition of the respective transmission upgrade options.

The 2024 RTP 2029 economic case was updated based on the February 2025 GIS[4] report for generation updates and the February 2025 TPIT[5] report for transmission updates to conduct the economic study. The 2029 study year was selected as it's the future year case currently available.

New transmission project additions are listed in Table A.1 in Appendix A of this document.

New generation additions listed in Table A.2 in Appendix A of this document were added to the economic base case and all generation listed in Table 2.4 were opened (turned off) in the study base case to reflect their mothballed/retired status. Furthermore, generation listed in Table 2.5 were removed from seasonal settings in the study base case as these resources are returned to year-round service.

The newly confirmed load (full load of 475.5 MW) listed in Table 2.6 was added to the economic study cases.

2.5 Methodology

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

2.5.1 Contingencies and Criteria

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

Contingencies[7] 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:

[4] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER
[5] TPIT Report: https://www.ercot.com/gridinfo/planning
[6] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current
[7] Details of each event and contingency category is defined in the NERC Reliability Standard TPL-001-5.1

- P0 (System Intact);
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (345-kV only);
- P3: G-1+N-1 (G-1: generation outage) {Cedar Bayou G2, Exxon G4, Baytown Energy G1 and Diamon Shamrock Battleground G3}; and
- P6-2: X-1+N-1 (X-1: 345/138-kV transformer only) {Cedar Bayou A3, Greens Bayou A1, Bellaire A4, PH Robinson A4 and Jordan A1}.

All 60-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 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.

2.5.2 Study Tools

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

- PowerWorld Simulator version 23 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis; and
- UPLAN version 12.3.0.30786 to perform 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 thermal overloads in Chambers County under NERC P7(N-1), P3(G-1+N-1) and P6-2(X-1+N-1). These issues are summarized in Table 3.1 and detailed violations are listed in Table 3.2.

Table 3.1: Reliability Issues Seen Under NERC TPL-001-5.1 and ERCOT Planning Criteria in the Study Area

NERC Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
P0: N-0	None	None	None
P1, P2-1, P7: N-1	None	1	None
P3: G-1+N-1	None	2	None
P6-2: X-1+N-1	None	2	None

Table 3.2: Thermal Overloads Observed in the Study Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Length (~miles)	Max Loading (%)
P7, P3, P6-2	SR Bertron to NEWSUB	138	3.02	106
P3, P6-2	H.O. Clarke to Bunker	138	2.28	102

A planned maintenance outage scenarios analysis was also conducted on the base case to identify project need. This analysis indicated thermal overloads and voltage violations in the study area.

Thirteen (13) thermal overloads and twenty-three (23) low voltage violations were observed under various planned maintenance outage conditions. Detailed violations are listed in Table 3.3 and Table 3.4. All thermal overloads and voltage violations are illustrated in Figure 3.1.

Table 3.3: Thermal Overloads Observed in the Study Area

ERCOT Contingency Category	Overloaded Element	Voltage Level (kV)	Length (~miles)	Max Loading (%)
P1.2 + P7	Decker to NEWSUB	138	0.6	123
P1.2 + P7	PH Robinson to Seabrook	138	7.97	122
P1.2 + P7	Seabrook to Hanna	138	0.62	117
P1.2 + P7	Hanna to Hunter	138	1.40	115
P1.2 + P7	Gulfgate to Knight	138	6.78	118
P1.2 + P7	Knight to Plaza	138	2.26	121
P1.2 + P7	SR Bertron to NEWSUB	138	3.02	119
P1.2 + P7	Britmoore to Woodcreek	138	3.5	113
P1.2 + P7	Memorial to Wook Creek	138	1.7	108
P1.2 + P7	Hopson to Warvue	138	1.30	108
P1.2 + P7	Mont Belvieu to Brine	138	2.82	110
P1.2 + P7	Brine to Dalton	138	0.82	110
P1.3 + P7	Cedar Bayou Plant to NEWSUB	138	5.6	100

Table 3.4: Voltage Violations Observed in the Study Area

ERCOT Contingency Category	Bus Name	Voltage Level (kV)	Voltage (pu)
P1.2 + P7	BAYWAY	138	0.92
P1.2 + P7	BIGBAY	138	0.91
P1.2 + P7	CELANESE CHEMICAL	138	0.91
P1.2 + P7	CELNES	138	0.91
P1.2 + P7	COUGAR	138	0.92
P1.2 + P7	EL DORADO	138	0.90
P1.2 + P7	ELLINGTON	138	0.90
P1.2 + P7	ENCO	138	0.90
P1.2 + P7	GULFGATE	138	0.92
P1.2 + P7	HIMONT	138	0.91
P1.2 + P7	HUMBLE	138	0.90

ERCOT Contingency Category	Bus Name	Voltage Level (kV)	Voltage (pu)
P1.2 + P7	KINGWOOD	138	0.91
P1.2 + P7	LOMAX	138	0.91
P1.2 + P7	MEADOW	345	0.90
P1.2 + P7	PEARLAND	138	0.92
P1.2 + P7	PH ROBINSON	345	0.89
P1.2 + P7	POWELL	138	0.91
P1.2 + P7	SEPTON	138	0.91
P1.2 + P7	SHORE ACRES	138	0.91
P1.2 + P7	SOUTH HOUSTON (ELLINGTON TAP)	138	0.91
P1.2 + P7	SPENCER	138	0.89
P1.2 + P7	TELEPHONE	138	0.91
P1.2 + P7	TREASCHWIG	138	0.89

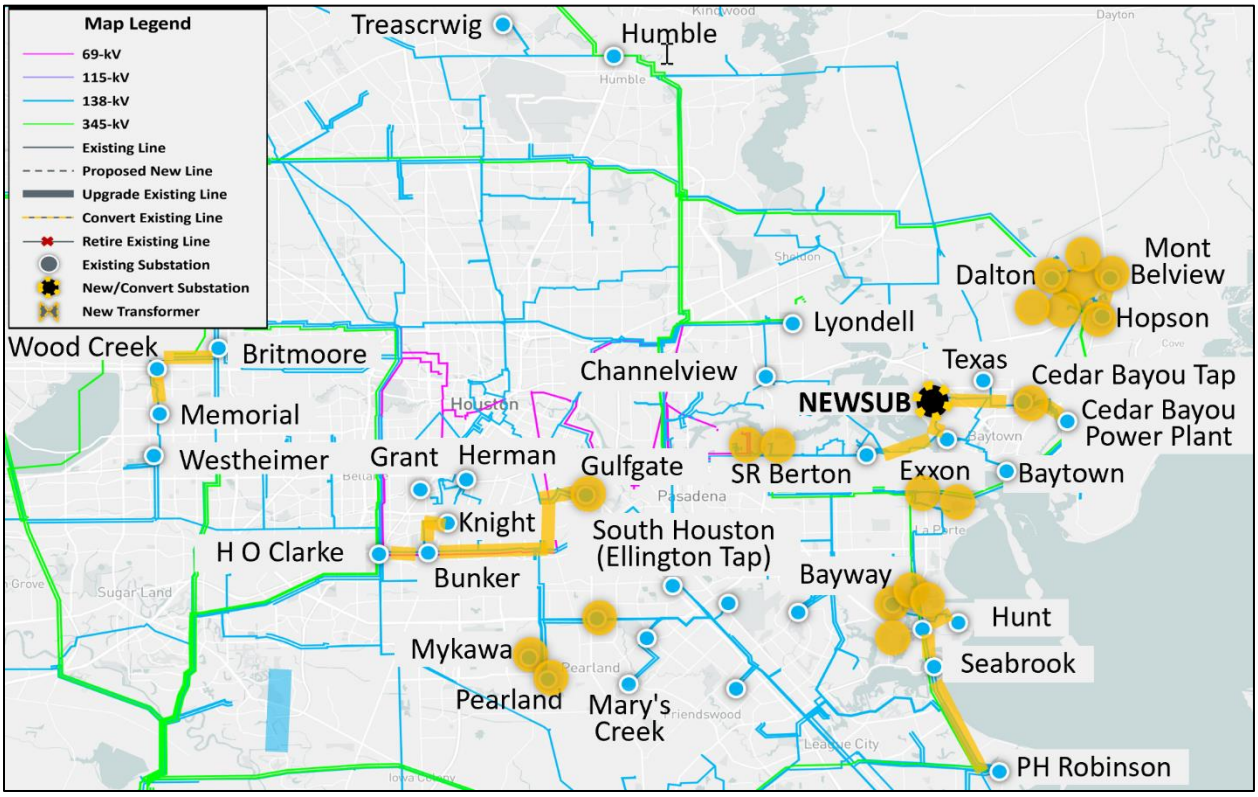


Figure 3.1: Study Area Map Showing Project Need Seen by ERCOT

4 Description of Project Options

ERCOT evaluated four system improvement options to address the reliability violations observed in the study base case in the study area.

Option 1 (CNP proposed solution) consists of the following:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and
  - The existing SR Bertron to Texas 138-kV Circuit 87.
- Upgrade substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate new substation;
- Rebuild the existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 4.0-mile;
- Upgrade the existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.6-mile;
- Upgrade the existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27-mile;
- Rebuild the existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.26-mile;
- Rebuild the existing Baytown to Exxon 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 1.93-mile;
- Rebuild the existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 3.02-mile;
- Rebuild the existing NEWSUB to Texas 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.06-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72-mile;
- Rebuild the existing Hermann to Grant 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 0.25-mile; and
- Install 100 MVAr Capacitor Bank at Cedar Bayou East.

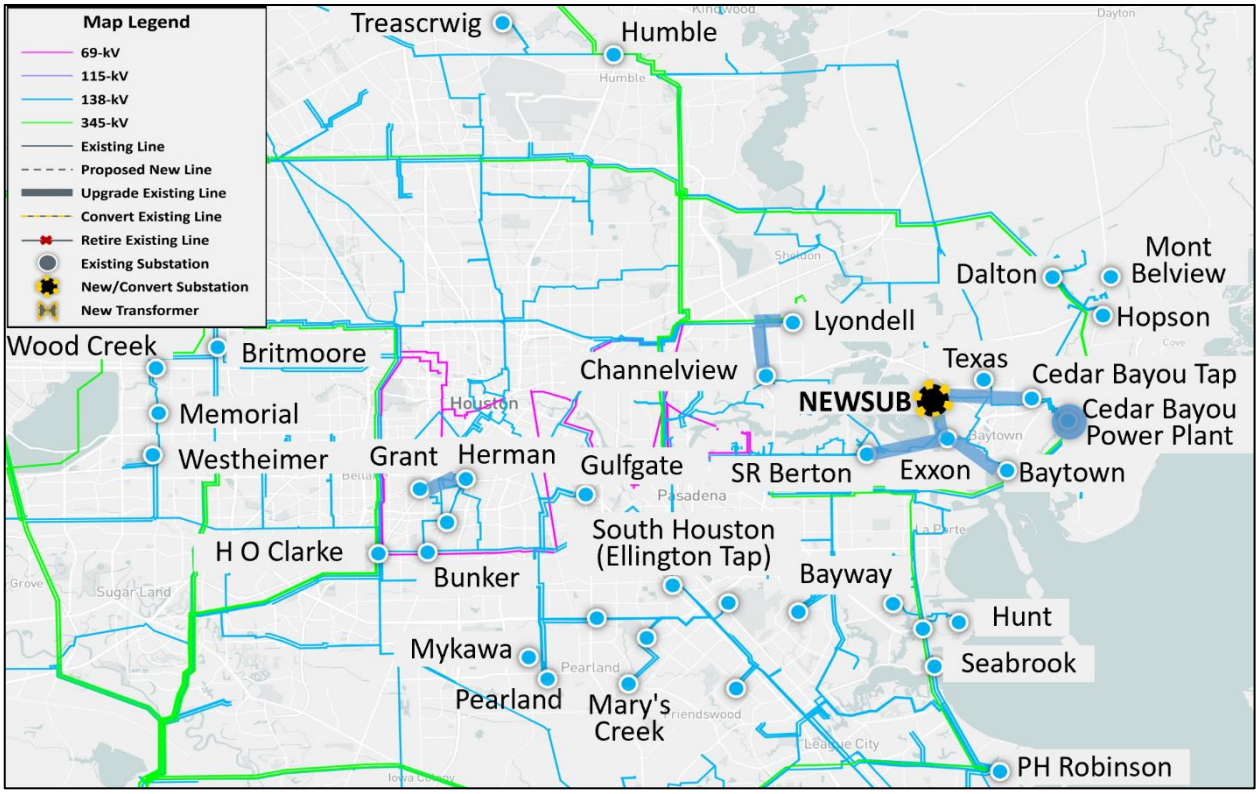


Figure 4.1: Map of Option 1

Option 2 consists of the following:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and
  - The existing SR Bertron to Texas 138-kV Circuit 87.
- Upgrade substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate the new substation;
- Rebuild the existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 5.6-mile;
- Rebuild the existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 4.0-mile;
- Upgrade the existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.6-mile;
- Rebuild the existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 3.02-mile;
- Upgrade the existing Hopson to Warvue 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.3-mile;
- Upgrade the existing Brine to Dalton 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.82-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72-mile;

- Rebuild the existing Hermann to Grant 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing Gulfgate to Knight 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 6.78-mile;
- Rebuild the existing Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 2.26-mile;
- Rebuild the existing Memorial to Woodcreek 138-kV transmission line, upgrade with conductors rated to at least 440 MVA Normal / 561 MVA Emergency, approximately 1.7-mile;
- Rebuild the existing Woodcreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 440 MVA Normal / 561 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing PH Robinson to Seabrook 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 7.97-mile;
- Rebuild the existing Seabrook to Hanna 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.62-mile;
- Rebuild the existing Hanna to Hunter 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.4-mile;
- Install 3 new 7.2 MVAr Switched Capacitor Banks at Bayway Substation;
- Install 2 new 23.36 MVAr Switched Capacitor Bank at South Houston Substation;
- Install 2 new 14.4 MVAr Switched Capacitor Banks at Humble; and
- Install 3 new 14.4 MVAr Switched Capacitor Banks at Treaschwig.

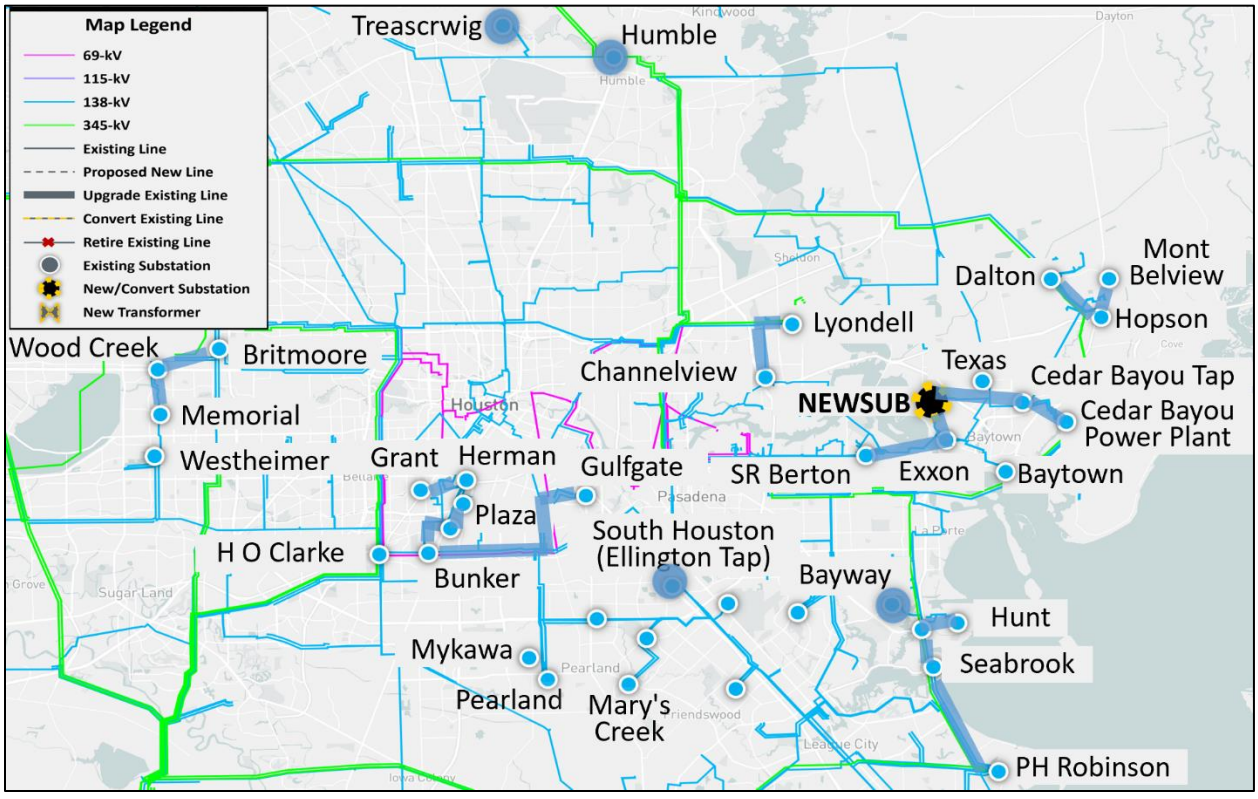


Figure 4.2: Map of Option 2

Option 2A consists of the following:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and
  - The existing SR Bertron to Texas 138-kV Circuit 87.
- Upgrade substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate the new substation;
- Rebuild the existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 5.6-mile;
- Rebuild the existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 4.0-mile;
- Upgrade the existing Cedar Bayou Plant to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 2.4-mile;
- Upgrade the existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.6-mile;
- Upgrade the existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27-mile;
- Rebuild the existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.26-mile;
- Rebuild existing Baytown to Exxon 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 1.93-mile;
- Rebuild the existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 3.02-mile;
- Rebuild the existing NEWSUB to Texas 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.06-mile;
- Upgrade the existing Hopson to Warvue 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.3-mile;
- Upgrade the existing Brine to Dalton 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.82-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72-mile;
- Rebuild the existing Hermann to Grant 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing Gulfgate to Knight 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 6.78-mile;
- Rebuild the existing Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 2.26-mile;
- Rebuild the existing Westheimer to Memorial 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 2.4-mile;

- Rebuild the existing Memorial to Woodcreek 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.7-mile;
- Rebuild the existing Woodcreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing PH Robinson to Seabrook 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 7.97-mile;
- Rebuild the existing Seabrook to Hanna 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.62-mile;
- Rebuild the existing Hanna to Hunter 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.4-mile;
- Install 3 new 7.2 MVAr Switched Capacitor Banks at Bayway Substation;
- Install 1 new 60 MVAr Capacitor Bank at Mykawa Substation;
- Install 1 new 60 MVAr Capacitor Bank at Humble Substation; and
- Install 2 new 14.4 MVAr Switched Capacitor Banks at Treaschwig Substation.

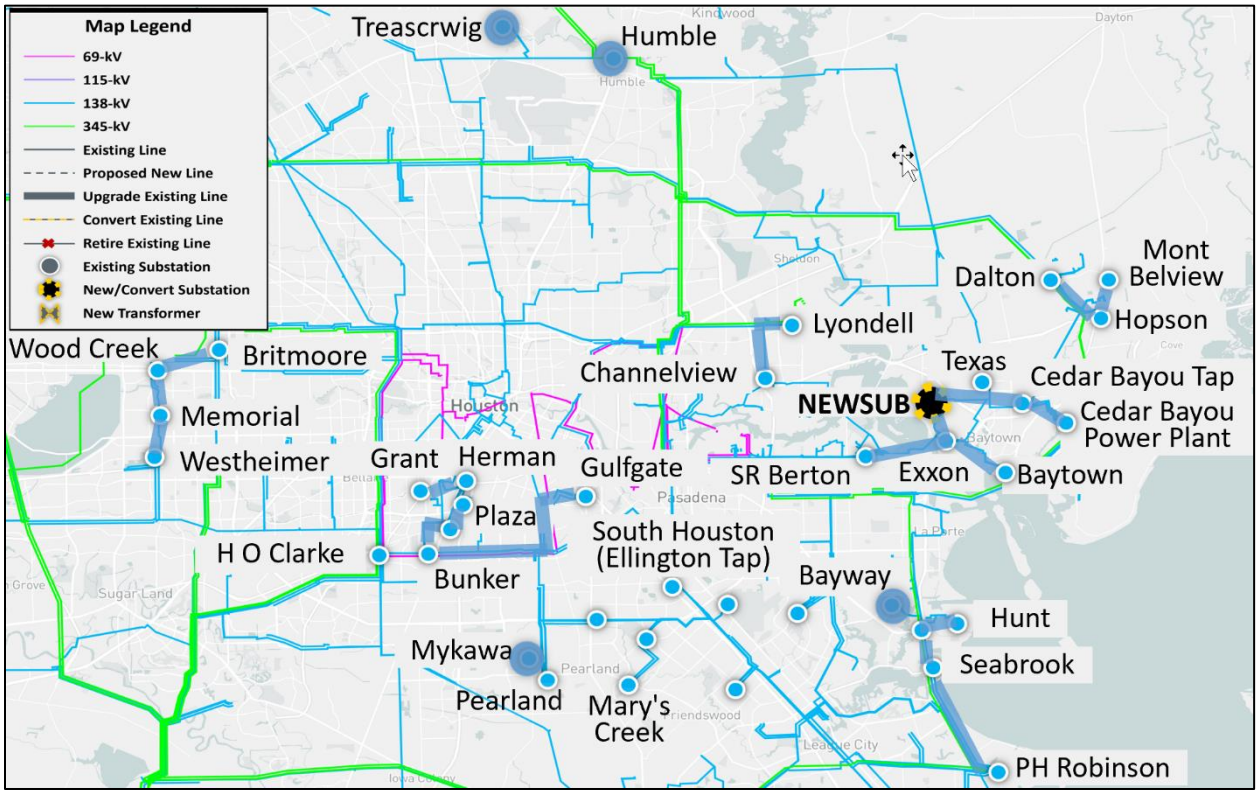


Figure 4.3: Map of Option 2A

Option 3 consists of the following:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and
  - The existing SR Bertron to Texas 138-kV Circuit 87.
- Upgrade the substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate the new substation;

- Upgrade the existing Hopson to Warvue 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.3-mile;
- Upgrade the existing Brine to Dalton 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.82-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72;mile;
- Rebuild the existing Hermann to Grant 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing Gulfgate to Knight 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 6.78-mile;
- Rebuild the existing Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 2.26-mile;
- Rebuild the existing Westminster to Memorial 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 2.4-mile;
- Rebuild the existing Memorial to Woodcreek 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.7-mile;
- Rebuild the existing Woodcreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing PH Robinson to Seabrook 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 7.97-mile;
- Rebuild the existing Seabrook to Hanna 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.62-mile;
- Construct a new 345/138-kV substation at NEWSUB with two new 345/138-kV Transformers rated to at least 800 MVA Normal / 1,000 MVA Emergency;
- Construct new Sheldon to NEWSUB 345-kV double-circuit transmission line install on common double-circuit towers with conductors rated to at least 2,987 MVA Normal / 3,286 MVA Emergency, approximately 12.0-mile;
- Construct a new Center Substation to NEWSUB 345-kV double-circuit transmission line on common double-circuit towers with conductors rated to at least 2,987 MVA Normal / 3,286 MVA Emergency, approximately 11.75-mile;
- Install 3 new 7.2 MVAr Switched Capacitor Banks at Bayway Substation;
- Install 2 new 23.36 MVAr Switched Capacitor Bank at South Houston Substation;
- Install 2 new 14.4 MVAr Switched Capacitor Banks at Humble; and
- Install 3 new 14.4 MVAr Switched Capacitor Banks at Treaschwig.

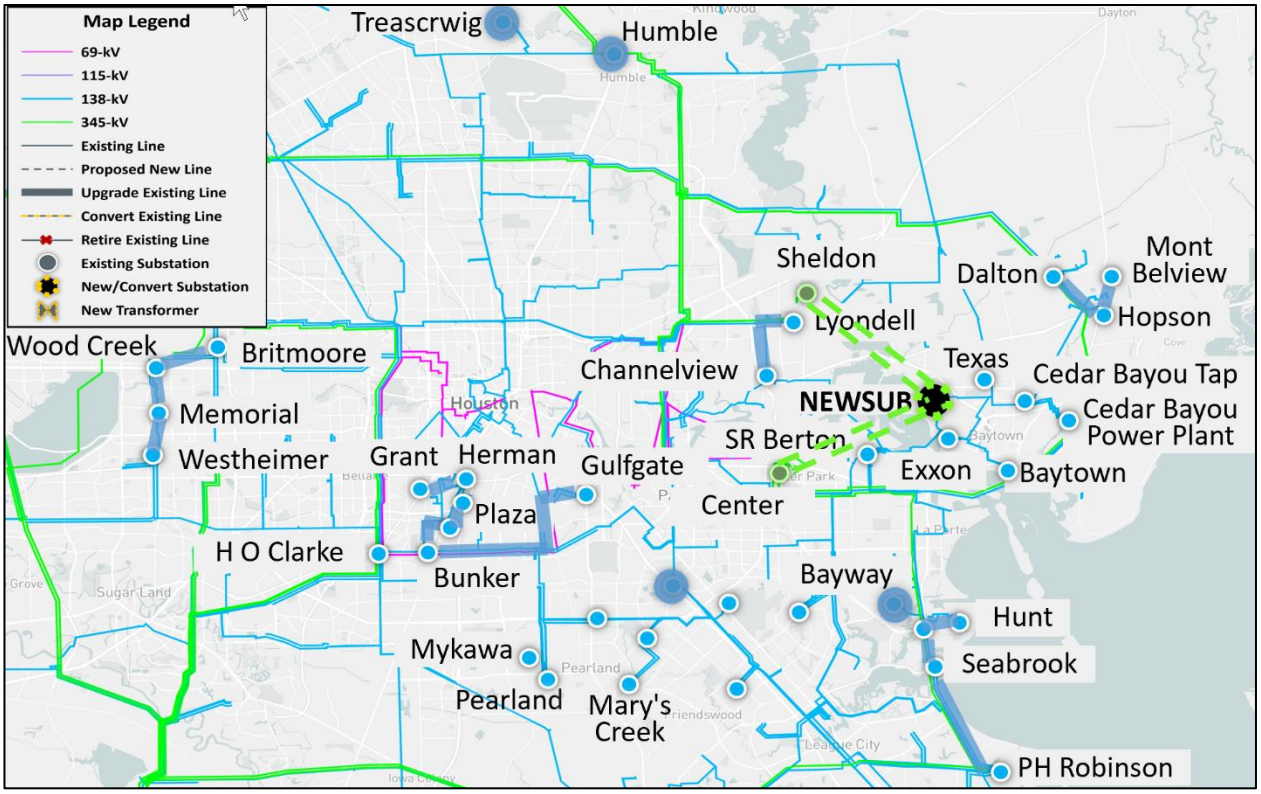


Figure 4.4: Map of Option 3

5 Option Evaluations

ERCOT performed a reliability analysis, planned maintenance outage evaluation and long-term load-serving capability to evaluate all four options and to identify any reliability impacts of the options in the study area. This section details these studies and their results and compares the options.

5.1 Results of Reliability Analysis

All four options were evaluated based on the contingencies described in Section 2.1 and 2.3 of this report. Option 3 observed thermal overloads under N-1, X-1+N-1, and G-1+N-1 contingency conditions. No reliability criteria violations were identified for Option 1, Option 2, and Option 2A as shown in Table 5.1.

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

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

5.2 Long-Term Load-Serving Capability Assessment

ERCOT conducted a long-term load-serving capability assessment for the four options to compare the relative performance.

The results show that the three of the four options provided additional long-term load-serving capability, with Option 3 providing the most incremental capability. These results are shown in Table 5.2

Table 5.2: Results of Long-Term Load-Serving Capability Assessment of All Four Options

Option	Incremental Load-Serving Capability (~MW)
1	239
2	0
2A	212
3	295

5.3 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 to represent system element outage(s) 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 between the contingencies. The transmission elements in the study area were monitored in the maintenance outage evaluation. ERCOT did not perform Maintenance Outage analysis without the new load addition to differentiate between the maintenance outage projects that were directly caused by the new load addition and those that existed prior to the load addition.

As shown in Table 5.3, the results of this planned maintenance assessment indicate only Option 2A did not result in any reliability violations, while Option 1, Option 2 and Option 3 have reliability violations.

Table 5.3: Results of Planned Maintenance Outage Evaluation for All Four Options

Option	Voltage Violations	Thermal Violations	Unsolved Power Flow
1	20+	18	None
2	0	7	None
2A	None	None	None
3	20+	28	None

5.4 Cost Estimate and Feasibility Assessment

TSPs performed feasibility assessments and provided final cost estimates for the four options. Table 5.4 summarizes the cost estimate, estimated mileage of CCN required, and option feasibility for the four options.

Table 5.4: Cost Estimates and Feasibility for All Four Options

Option	Cost Estimates (~$M)	CCN Required (~miles)	Feasible
1	163.1	0	Yes
2	417.5	0	No
2A	545.3	0	Yes
3	758.4	23.75	No

6 Comparison of Options

Based on the results from Option Evaluations in Section 5, the four options are summarized in Table 6.1.

Table 6.1: Comparison of All Four Options

	Option 1	Option 2	Option 2A	Option 3
Meets ERCOT and NERC Reliability Criteria	No	No	Yes	No
Improves Long-Term Load-Serving Capability	Yes	No	Yes	Yes
CCN Required (~miles)	No	No	No	Yes (23.75)
Construction Feasibility[8]	Yes	No	Yes	No
Capital Cost Estimates[9] (~$M)	163.1	417.5	545.3	758.4

ERCOT recommends Option 2A as the preferred option to address the reliability need in the study area based on the following considerations:

- Option 2A meets ERCOT and NERC Reliability criteria;
- Option 2A improves long-term load-serving capability; and
- Option 2A does not require a CCN and is feasible.

7 Additional Analysis and Assessment

The recommended option (Option 2A, with a cost estimate of approximately $545.3 million) is categorized as a Tier 1 project, pursuant to ERCOT Protocol 3.11.4.3(1)(a). ERCOT performed generation and load sensitivity studies to identify the recommended option performance, as required under Planning Guide Section 3.1.3(4). Additionally, a Sub-synchronous Resonance (SSR) Assessment was performed.

7.1 Generation Addition Sensitivity Analysis

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

[8] The construction feasibility was based on TSP(s) assessment.
[9] The cost estimates were provided by the TSPs.

Based on a review of the September 2024 GIS[10] report, no units were found within the study area that could have an impact on the identified reliability issues.

Table 7.1: List of Units that Could Have Impact on the Identified Reliability Issues

GINR	Unit Name	Fuel Type	Max Capacity (~MW)	County
	NONE			

7.2 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 EIR. 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.

The Power Transfer Distribution Factors (PTDFs) of overloaded elements with respect to the load transfer for each Weather Zone (excluding EC) were calculated using PowerWorld Simulator. The PTDFs were 2.5% or less for each of the overloaded elements, i.e., they were not significant enough to have an impact on the overloaded element. 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 Houston area.

7.3 Congestion Analysis

ERCOT conducted a congestion analysis to identify any potential impact on system congestion related to the addition of the recommend option (Option 2A) using the 2024 RTP 2029 economic study case.

The results of the congestion analysis indicated no significant congestion in the area due to the addition of the recommended transmission upgrades of Option 2A.

7.4 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Protocol Section 3.22.1.3(2), ERCOT conducted a SSR screening for the recommended option (Option 2A) and found no adverse SSR impacts to the existing and planned generation resources in the study area.

8 Conclusion

ERCOT evaluated four transmission upgrade options to resolve the thermal overloads and voltage violations identified in the study area. Based on the results of the independent review, ERCOT

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

recommends Option 2A as the preferred solution because it meets ERCOT and NERC Reliability criteria, improves long-term load-serving capability, does not require a CCN and is feasible.

Option 2A consists of the following upgrades:

- Loop the new customer-owned substation (NEWSUB) into both:
  - The existing Cedar Bayou East to Decker 138-kV Circuit 83; and
  - The existing SR Bertron to Texas 138-kV Circuit 87.
- Upgrade substation equipment at Cedar Bayou East, Decker, SR Bertron and Texas to accommodate the new substation;
- Rebuild the existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 5.6-mile;
- Rebuild the existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 4.0-mile;
- Upgrade the existing Cedar Bayou Plant to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 2.4-mile;
- Upgrade the existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.6-mile;
- Upgrade the existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27-mile;
- Rebuild the existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.26-mile;
- Rebuild existing Baytown to Exxon 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 1.93-mile;
- Rebuild the existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 3.02-mile;
- Rebuild the existing NEWSUB to Texas 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.06-mile;
- Upgrade the existing Hopson to Warvue 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 1.3-mile;
- Upgrade the existing Brine to Dalton 138-kV transmission line, upgrade rating to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.82-mile;
- Upgrade the existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.72-mile;
- Rebuild the existing Hermann to Grant 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing Gulfgate to Knight 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 6.78-mile;

- Rebuild the existing Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 2.26-mile;
- Rebuild the existing Westheimer to Memorial 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 2.4-mile;
- Rebuild the existing Memorial to Woodcreek 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.7-mile;
- Rebuild the existing Woodcreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.25-mile;
- Rebuild the existing PH Robinson to Seabrook 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 7.97-mile;
- Rebuild the existing Seabrook to Hanna 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 0.62-mile;
- Rebuild the existing Hanna to Hunter 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.4-mile;
- Install 3 new 7.2 MVAr Switched Capacitor Banks at Bayway Substation;
- Install 1 new 60 MVAr Capacitor Bank at Mykawa Substation;
- Install 1 new 60 MVAr Capacitor Bank at Humble Substation; and
- Install 2 new 14.4 MVAr Switched Capacitor Banks at Treaschwig Substation.

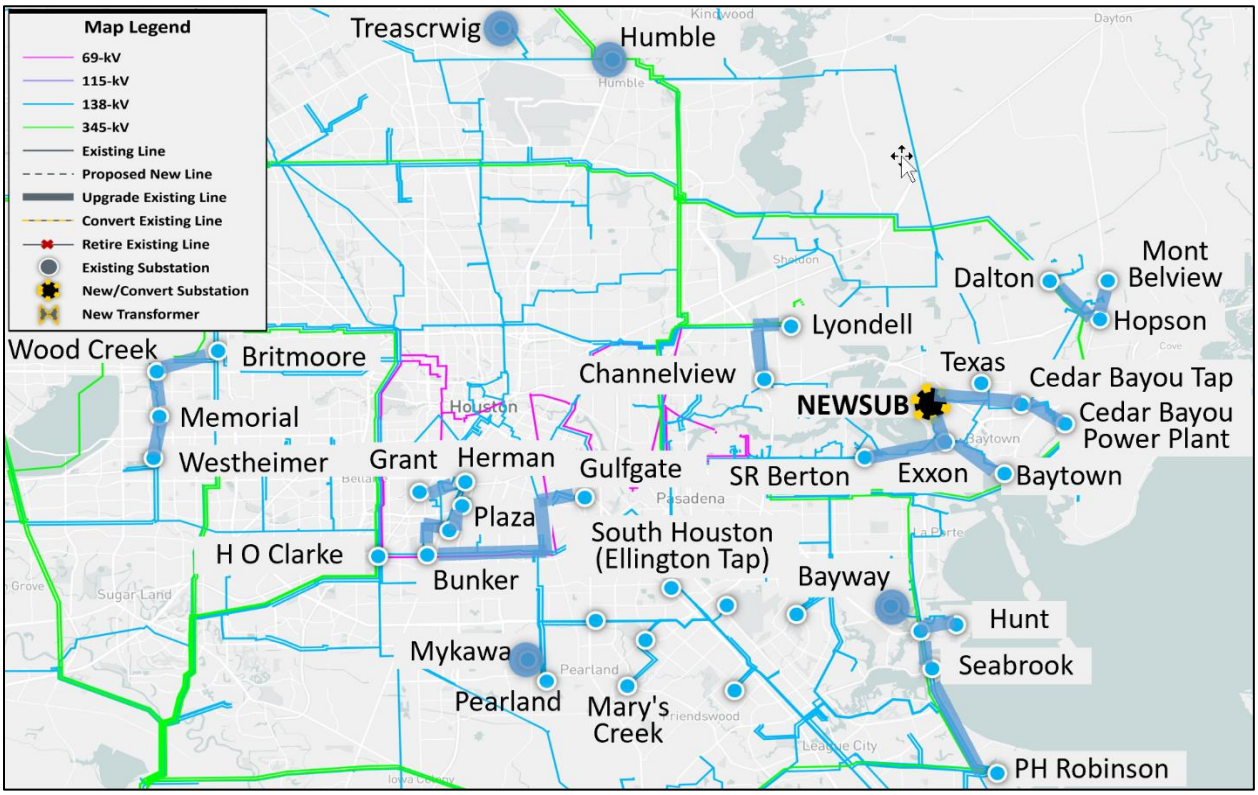


Figure 8.1: Map of Option 2A

The cost estimate for this project is approximately $545.3 million[11] and is classified as Tier 1 project per ERCOT Protocol Section 3.11.4.3(1)(a). The expected ISD of this project is January 2028 and no CCN applications are expected to be required for this project.

[11] Approximately 45% of the estimated capital cost is associated with temporary work required for all structure replacements and full temp by-pass

Appendix A

Table A.1: List of Transmission Projects added to the Economic Base Case

TPIT No	Project Name	Tier	Project ISD	County
80404	Reroute East to Rodgers 69-kV line to create East to Rayburn 69-kV line to accommodate the TXDOT SH6 project	Tier 4	Jun-26	Brazos
80424	Rebuild / Reconductor Dansby to Business Park 69-kV for Rail Spur	Tier 4	Jun-26	Brazos
80342	BEPC_TPIT80342_Hilltoplakes_Secondauto	Tier 4	Mar-27	Leon
80340	BEPC_TPIT80340_Keithsw_Iola	Tier 4	Mar-27	Grimes
80346	BEPC_TPIT80346_Sandysw_Crutchfield	Tier 4	Mar-29	Grimes
80373	BEPC_TPIT80373_Iola_Crutchfield	Tier 4	Mar-29	Grimes

Table A.2: List of Generation Added to the Economic Base Case Based on February 2025 GIS Report

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
23INR0079	Chillingham Storage	OTH	5/1/2025	153.9	Bell
23INR0249	Limewood Solar	SOL	12/31/2025	204.6	Bell
23INR0344	Hermes Solar	SOL	9/30/2025	100.4	Bell
23INR0469	Big Elm Storage	OTH	8/15/2026	100.8	Bell
24INR0166	Stillhouse Solar	SOL	9/1/2025	210.8	Bell
24INR0365	Hermes Storage	OTH	9/30/2025	100.4	Bell
23INR0079	Chillingham Storage	OTH	5/1/2025	153.9	Bell
21INR0517	Tidwell Prairie Storage 1	OTH	07/31/2025	204.0	Robertson
22INR0356	Jungmann Solar	SOL	06/30/2025	40.2	Milam
22INR0511	Gransolar Texas One	SOL	06/30/2025	50.8	Milam
23INR0235	Hoyte Solar	SOL	12/15/2026	206.8	Milam
24INR0031	Stoneridge Solar	SOL	09/04/2025	201.6	Milam
26INR0023	Leon Solar Park	SOL	07/01/2026	210.1	Leon

Table A.3: Project Related Document

No	Document Name	Attachment
1	CNP - Baytown Area Load Addition Project	 CNP_Baytown Area Load Addition 20240⁹