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Public Utility Commission of Texas

Memorandum

TO: Chairman Thomas Gleeson
Commissioner Lori Cobos
Commissioner Jimmy Glotfelty
Commissioner Kathleen Jackson
Commissioner Courtney K. Hjaltman

FROM:
Sherryhan Ghanem, Engineering Specialist, Infrastructure Division

DATE: September 5, 2024

RE: September 12, 2024 Open Meeting – Agenda Item No. 33
Project No. 53385, *Project to Submit Emergency Operations Plans and Related Documents Under 16 TAC § 25.53*

Commissioners, attached please find Commission Staff's recommended Weather Emergency Preparedness Report, for discussion and possible action at the September 12, 2024, Open Meeting. The report is due to the Lieutenant Governor, the Speaker of the Texas House of Representatives, and members of the Texas Legislature not later than September 30, 2024.

Senate Bill 3, Section 24, enacted by the 87th Texas Legislature, requires the Commission to analyze emergency operations plans (EOPs) developed by electric utilities, power generation companies, municipally owned utilities, electric cooperatives, and retail electric providers and prepare a weather emergency preparedness report on power weatherization preparedness.

To analyze and review the EOPs, the Commission sought the expertise of a qualified contractor to perform a baseline assessment of the EOPs and develop recommendations for improvements of the plans that can be incorporated in a future rulemaking initiative. Guidehouse, Inc. was selected and began its review of the EOPs in March 2024. The Weather Emergency Preparedness Report presents Guidehouse's findings.

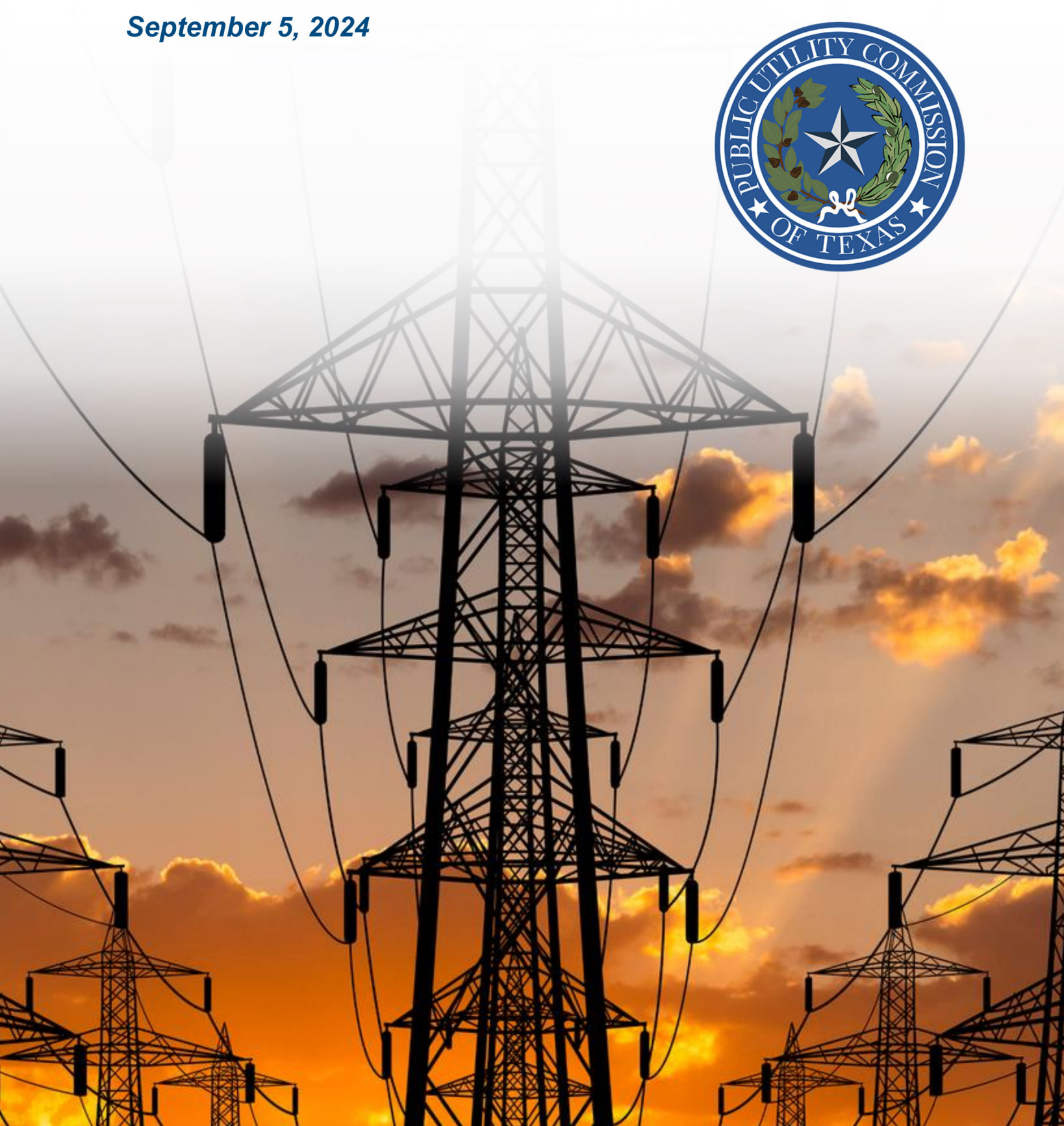
Commission Staff recommends the Commission adopt the report and approve it for distribution to Lieutenant Governor, the Speaker of the Texas House of Representatives, and members of the Texas Legislature.

Guidehouse will be present at the September 12, 2024 Open Meeting to address any questions.

Public Utility Commission of Texas

Weather Emergency Preparedness Report

September 5, 2024



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Executive Summary

History has shown that Texas is subject to a diverse range of severe weather, such as extreme heat and drought, extreme cold, hurricanes, tornadoes, and severe storms. Extreme weather carries a risk of loss of generation, loss or tripping of transmission and distribution facilities, and customer outages. Electric entities addressed in this report develop, implement, and train staff on emergency operations plans (EOPs) to minimize the risk and impact of extreme weather to their systems and facilities through emergency preparedness and coordinated response actions.

Guidehouse reviewed EOPs representing 691 electric entities, including any electric utility, transmission and distribution utility, power generation company (PGC), municipally owned utility (MOU), electric cooperative (Coop), and retail electric provider (REP).[1] throughout Texas.[2] The review consisted of an adherence analysis within the context of 16 Texas Administrative Code (TAC) § 25.53, specifically assessing the weather emergency preparedness portions of the Texas electric entities' EOPs. Based on the review of these EOPs, the assessment team analyzed the ability of the electric grid to withstand extreme weather events in the upcoming year. In addition, based on this analysis, Guidehouse assessed how information provided in the EOPs promotes reliability of the electric grid during extreme weather conditions in the non-ERCOT power regions of Texas.

In addition to the adherence review of all EOPs, Guidehouse developed a weather emergency preparedness framework to evaluate the maturity[3] of entities' EOPs with specific focus on preparedness and response to adverse weather events. To evaluate

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[1] 16 Tex. Admin. Code § 25.53 (2023).

[2] Hereafter, transmission and distribution entities may be referred to as TDUs, power generation company as PGCs, municipally owned utilities as MOUs, electric cooperatives as COOPs, and retail electric providers as REPs. Guidehouse's assessment also includes investor-owned utilities, referred to as IOUs and river authorities, referred to as RAs.

[3] Three levels of maturity ratings were used to improve consistency of evaluation and generate robust results during EOP reviews. The definitions included the criteria necessary to assign a specific rating for each of the 12 indicators. Guidehouse assigned a rating of 1, 2, or 3 for each indicator to establish its maturity level in relation to its response to a variety of adverse weather scenarios (e.g., extreme cold weather, extreme hot weather, hurricane, etc.). A rating of 1 (low maturity) signals that an indicator lacks the required content or contains good business practices with minimal details provided. A rating of 2 (medium maturity) establishes that key elements of good business practices for weather emergency preparedness and response are present, but some important elements are missing. A rating of 3 (high maturity) indicates that the EOP demonstrated advanced level of preparedness and operational response, incorporating all required criteria associated with each indicator. For specific definitions and criteria associated with each emergency preparedness indicator and its maturity rating options, please refer to Appendix B: Maturity Matrix.

EOP maturity and derive a maturity rating for electric entities' EOPs, Guidehouse first applied a high-level risk framework to all electric entities and sampled 38 EOPs against emergency weather preparedness best practices beyond the scope of 16 TAC § 25.53. Guidehouse utilized a statistically significant random sample for its evaluation and assessed the overall maturity of the individual EOPs. The risk framework and maturity rating matrix drove recommendations to improve 16 TAC § 25.53 and the overall readiness of the electric grid and informed the assessment of the ability of the grid to withstand extreme weather events in the coming year. The maturity ratings of the individual EOPs are a measurement of the EOP against industry best practices that exceed the requirements of, and do not reflect strict adherence to 16 TAC § 25.53.

The review was strictly focused on the EOP documentation submittals required by 16 TAC § 25.53. Guidehouse acknowledges that electric entities may have additional processes, procedures, tools, and controls in place that are not fully represented in the 16 TAC § 25.53 EOP submittals.

High-Level Findings

A review of EOPs demonstrates programmatic readiness within and across the State of Texas. Specifically, electric entities are largely prepared for extreme weather. Both the ERCOT power region and non-ERCOT power region entities submitted EOPs that, as a group, exhibit basic emergency preparedness programs and have measures in place to respond to extreme weather. Unsurprisingly, electric entities have varying levels of maturity in a variety of weather preparedness areas and all entities have an opportunity to continuously improve.

However, such review is limited in scope as EOPs are not required to include and are not an appropriate vehicle to comprehensively cover resource adequacy, weatherization, system hardening efforts, or spare critical inventory, nor does information in the EOPs necessarily reflect actual implementation and activation levels of any one EOP or a group of EOPs in the aggregate.

Approximately 70% of all applicable electric entities provided an EOP submission, either EOP documentation or an affidavit that there were no material changes to the EOP in 2024. The remaining electric entities that did not submit were overwhelmingly low risk. The 2024 EOP data submittals closely adhered to the requirements of 16 TAC § 25.53 and provided the basic required information.

Areas of Relative Maturity

Broad areas of relative maturity include the indicators below, with particular strengths shown in electric entities establishing incident command system (ICS) structure and having programs and mechanisms for advancing public communications. The relative maturity of these indicators reflects that, as a group, electric entities in Texas have sufficient documentation to demonstrate that they are performing relatively well in these areas based on the information presented in their respective EOPs.

Indicator 1
ICS Structure

Indicator 4
Staffing

Indicator 6
Training and Emergency Drills

Indicator 7
Situational Awareness

Indicator 10
Activation of EOP

Indicator 12
Public Communications

Opportunities for Further Development

Broad areas with opportunities to further mature include the below indicators, several of which are outside the scope of what is currently required in an EOP. However, Guidehouse found value in including these factors within our weather preparedness assessment, as they were determined to be valuable strategies and procedures to augment or support a holistic emergency plan.

Indicator 2
Asset Management and Inspections

Indicator 3
Risk Management

Indicator 5
Mutual Assistance and Support

Indicator 8
System Design and Hardening

Indicator 9
Communication System

Indicator 11
Emergency Management and Planning Systems, Technologies, and Automation

Additionally, to promote and foster overall weather emergency preparedness and influence reliability of the grid there are opportunities to further strengthen 16 TAC § 25.53.

1. Introduction

As one of the largest and most climatically diverse states, Texas is often impacted by severe weather, which includes hurricanes, floods, tornadoes, droughts, wildfires, extreme heat, and extreme cold weather conditions. Since 2010, Texas has experienced several severe weather events that had significant impacts on the state and its electric grid. The most recent major events that lead to widespread power outages and disruptions across the state included an unprecedented cold weather event in 2011, Hurricane Harvey in 2017, and Winter Storm Uri in 2021. Most recently, in the spring and summer of 2024 Texas has endured severe storms, including Hurricane Beryl, which impacted the Houston area and coastal Texas regions, and resulted in extensive damage to electric utility equipment and extended loss of power to customers. Hurricane Beryl made landfall on July 8, 2024, and led to over 2 million customers without power in the greater Houston area. The extensive outages lasted for more than a week for some customers. Currently, the PUCT is performing an investigation into electric entities' preparation and response to Hurricane Beryl[4].

Although Texas experiences brief periods of cold weather regularly, in February 2011 the southwestern U.S. experienced extremely cold weather for over a week, which significantly impacted the electrical grid. During this event, many power generation companies (PGCs) operating within the Electric Reliability Council of Texas (ERCOT) power region[5] experienced outages, derate capacity or failure to start, affecting nearly 3.2 million customers.[6] Following these events, the PUCT, the Texas state legislature, and state entities from New Mexico and Arizona initiated investigations to identify the cause of service disruption and identify appropriate actions to mitigate future service disruption to customers.[7] Their findings indicated poor weatherization of facility infrastructure and the need to increase power reserve levels prior to severe weather events.[8]

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[4] Memorandum opening Project No. 56822, Investigation of Emergency Preparedness and Response by Utilities in Houston and Surrounding Communities, 56822_2_1410658.PDF (texas.gov)

[5] Electric Reliability Council of Texas (2024). ERCOT manages the Texas Interconnection power grid, which supplies power to nearly 26 million Texans, nearly 90% of the state's total electrical load. https://www.ercot.com/files/docs/2022/02/08/ERCOT_Fact_Sheet.pdf.

[6] Federal Energy Regulatory Commission (FERC), & North American Electric Reliability Corporation (NERC), (2011). Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011. sw-task-force-cover-new2.psd (nerc.com)

[7] Ibid.

[8] Ibid.

Hurricane Harvey struck the Texas coast as a Category 4 storm on August 25, 2017, causing record-breaking storm surges and wind speeds over 130 MPH.[9] The storm caused massive flooding along the coast and disrupted electric services in Corpus Christi, Houston, Galveston, Beaumont, and Port Arthur. Customer outages peaked at around 1.7 million in the ERCOT power region.[10] Although most customers had power restored in a few days, some restoration efforts stalled due to flooded and wind-damaged substations and PGCs in Southeast Texas and Louisiana.[11] Despite fewer customer outages than during Hurricane Ike in 2008[12], Harvey's prolonged flooding and wind damage highlighted the electric grid's vulnerability to severe weather.

In February 2021, a period of extreme winter weather, including Winter Storm Uri, impacted the Northwest, Northeast, Central Plains and Southeast regions of the U.S.[13] While all these areas experienced severe weather, including ice and snow accumulation and record-breaking low temperatures, this weather had the most significant impact in Texas, highlighting the state's vulnerabilities and lack of winter weather preparedness and resilience. This event led to a massive power grid failure as consumer demand for energy and heat outstripped the available power supply. According to ERCOT, power generation declined across nearly all fuel sources: wind generation declined by 46% from expected capacity, coal generation declined by 43%, gas by 37% and nuclear by 21%.[14] At its peak, ERCOT was forced to shed over 23,000 megawatts (MW) of power, the largest controlled load shed in the U.S. history[15].

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[9] North American Electric Reliability Corporation (NERC) (2021). Hurricane Harvey Event Analysis Report. https://www.nerc.com/pa/rrm/ea/Hurricane_Harvey_EAR_DL/NERC_Hurricane_Harvey_EAR_20180309.pdf

[10] Ibid.

[11] Ibid.

[12] Ibid.

[13] Federal Energy Regulatory Commission (FERC), & North American Electric Reliability Corporation (NERC), (2021). The February 2021 Cold Weather Outages in Texas and the South-Central United States, p. 10-11. The February 2021 Cold Weather Outages in Texas and the South-Central United States | FERC, NERC and Regional Entity Staff Report | Federal Energy Regulatory Commission

[14] Joshua W. Busby, Kyri Baker, Morgan D. Bazilian, Alex Q. Gilbert, Emily Grubert, Varun Rai, Joshua D. Rhodes, Sarang Shidore, Caitlin A. Smith, Michael E. Webber, Cascading risks: Understanding the 2021 winter blackout in Texas, Energy Research & Social Science, Volume 77, (2021). https://doi.org/10.1016/j.erss.2021.102106.

[15] Federal Energy Regulatory Commission (FERC), & North American Electric Reliability Corporation (NERC), (2021). The February 2021 Cold Weather Outages in Texas and the South-Central United States, p. 9. The February 2021 Cold Weather Outages in Texas and the South-Central United States | FERC, NERC and Regional Entity Staff Report | Federal Energy Regulatory Commission

At the peak of Winter Storm Uri, ERCOT issued an Energy Emergency Alert Level 3, requiring the shedding of firm load, resulting in nearly 4.5 million households (upwards of 10 million Texans) left without power.[16] Although rotational outages were issued, there was not enough power generation capacity to rotate after critical load customers' needs were met, and many customers were left without power for multiple days.[17] These extended outages accounted for over 200 deaths in Texas, with causes of death including hypothermia and carbon monoxide poisoning.[18]

In the immediate wake of this state-wide devastation, the 87th Texas Legislature passed multiple bills to support reformation of the state's electric industry. In particular, the legislature passed Senate Bill 3 (SB 3), which required electric entities to weatherize their equipment and facilities and granted PUCT the authority to establish weatherization requirements for electric entities.[19] SB 3 also required the PUCT to assess emergency operations plans (EOPs) and submit weather emergency preparedness reports on power weatherization preparedness to the Lieutenant Governor, the Speaker of the House of Representatives, and members of the Legislature by September 30th of even-numbered years. Under SB 3 authority, PUCT adopted new rule 16 TAC § 25.53, which required all registered Texas electric entities to submit an EOP annually. It established weatherization and preparation procedures that should be incorporated in an EOP, including but not limited to, weatherization procedures, emergency staffing plans, public communications, situational awareness, and specific annexes for wildfires, floods, and hurricanes. 16 TAC § 25.55 was also implemented, which established weather emergency preparedness requirements for extreme weather conditions during the summer and winter seasons. Although 16 TAC § 25.55 is not directly in scope of this report, Guidehouse, Inc. (Guidehouse) acknowledges that it has significant overlap to the weather preparedness portions of electric utilities EOPs with additional focus on asset management and inspections for summer and winter season preparedness.

PUCT procured professional consulting services of Guidehouse in March 2024 to assess emergency preparedness for extreme weather events of electric entities in Texas. PUCT contracted Guidehouse to complete the following activities:

- Review and assess weather emergency preparedness sections of the most recent version of EOPs filed by Texas electric entities with the PUCT.

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[16] Ibid., p. 10.

[17] Ibid., p. 9.

[18] Ibid., p. 9.

[19] Ibid., p. 159.

- Provide weather emergency annex information as prescribed in 16 TAC § 25.53 and a summary of the EOPs' assessment to ERCOT along with any information requested by ERCOT from the emergency operations plan review.

- Analyze and assess the ability of the electric grid to withstand a variety of extreme weather events in the upcoming year.

- Analyze the ability of non-ERCOT power regions of Texas to withstand a variety of extreme weather events in addition to analysis provided by ERCOT for the ERCOT power region.

- Make recommendations on improving EOPs and procedures designed to ensure continuity of electric service.

- Conduct analyses to assess the reliability of the electric grid during extreme weather conditions in non-ERCOT power regions in addition to analysis provided by ERCOT for the ERCOT power region.

- Provide information on best practices and other information necessary to support weather emergency preparedness.

The Guidehouse team evaluated the EOPs submitted by Texas electric entities in compliance with 16 TAC § 25.53 using a multi-faceted analysis approach focusing on 16 TAC § 25.53 compliance and emergency weather preparedness. Guidehouse also analyzed and made recommendations to the Commission on improving EOPs and procedures for Texas electric entities to ensure the continuity of electric service. The team completed all the aforementioned activities requested by PUCT. The following Section, **2. Evaluation Approach,** describes Guidehouse's 16 TAC § 25.53 compliance and emergency weather preparedness methodology in more detail.

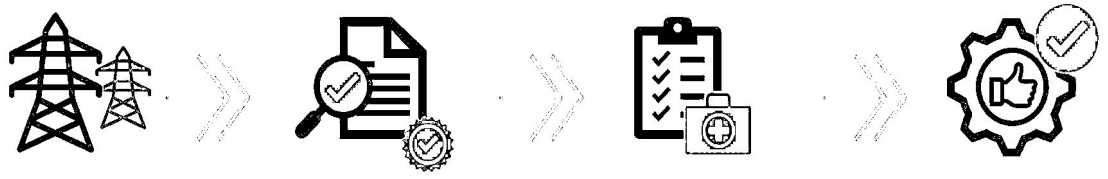
It is important to note that Guidehouse's review was strictly focused on the EOP documentation submittals required by 16 TAC § 25.53. Guidehouse acknowledges that electric entities may have additional processes, procedures, tools, and controls in place that are not fully represented in the 16 TAC § 25.53 EOP submittals.

2. Evaluation Approach

Transmission and distribution utilities (TDUs), power generation companies (PGCs), municipally owned utilities (MOUs), electric cooperatives (Coops), retail electric providers (REPs), investor-owned utilities (IOUs), and river authorities (RAs), collectively referred to as Texas electric entities, filed their EOPs with PUCT as required by 16 TAC § 25.53 starting in 2022. Texas electric entities are required to annually file an EOP or attestation stating that there were not any material changes. In 2024, 691 registered electric entities submitted their EOPs for review, or, alternatively, an attestation of no material changes since the prior submission. The PUCT provided Guidehouse with filed EOP documents via its filing database. The following sections of this report describe Guidehouse's approach to assess Texas electric entities' preparedness and response to adverse weather events through its reviews of the submitted EOPs.

2.1 Methodology

Guidehouse's analysis focused on reviewing the EOPs in the context of 16 TAC § 25.53, assessing the ability of Texas' electric power grid to withstand and respond to adverse weather events, with emphasis on weather preparedness and planning. Guidehouse performed the analysis in four distinct phases, as shown in **Figure 2-1**. The following sections provide additional details on the evaluation approach.



Electric Entity Type and Risk Categorization

- Conducted research to identify entity types
- Categorized entities by power region (ERCOT vs. non-ERCOT), service description (IOUs, TDUs, PGCs, etc.)
- Categorized entities by size of risk based on potential impact on the electric grid during adverse weather event

TAC Compliance

- Developed comprehensive checklist that followed 16 TAC §25.53 regulatory requirements
- Reviewed a census of EOPs submitted by 691 Texas electric entities in 2024 for compliance

Emergency Preparedness Assessment

- Developed emergency preparedness framework and defined indicators deemed critical to assess entities' preparedness and response to a potential weather emergency
- Defined maturity ratings to provide consistent method to assess overall emergency preparedness and operational response in the event of extreme weather in both ERCOT and non-ERCOT power regions
- Reviewed a sample of EOPs using the emergency preparedness framework

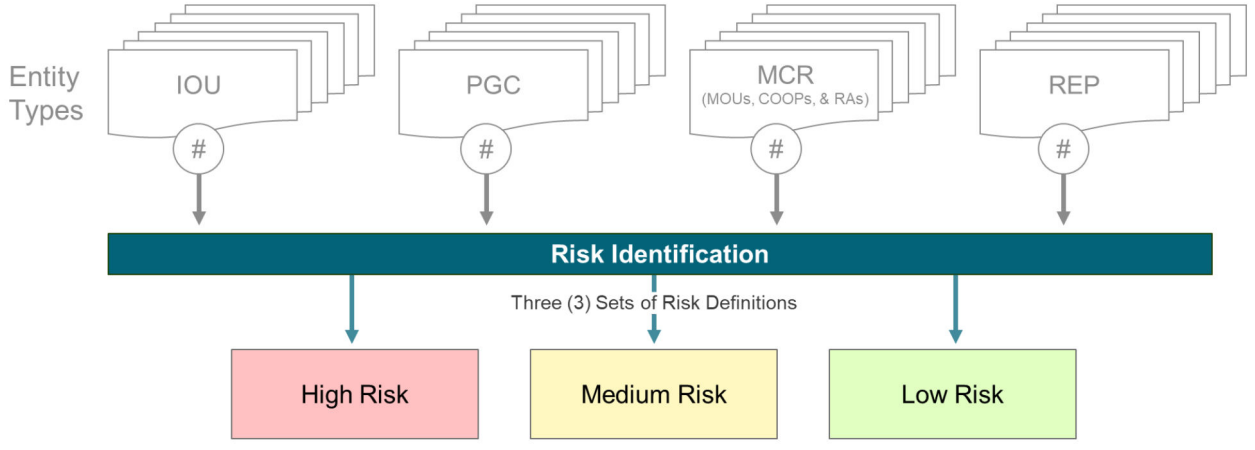
Findings, Recommendations, and Best Practices

- Summarized findings and generated recommendations and best practices that can be used to improve emergency preparedness and response by Texas electric entities
- Composed a recommended EOP template to be used for future EOP submissions

Figure 2-1 Analysis Methodology

2.2 Electric Provider Risk Categorization

Guidehouse developed a risk identification framework based on operational responsibilities or characteristics inherent to each individual electric entity. The framework developed is based, in part, on an existing Inherent Risk Assessment guide, developed and implemented by the North American Electric Reliability Corporation (NERC) in 2014[20]. The framework allowed Guidehouse to identify electric entities as low, medium, or high-risk based on risk factors specific to each organization type; IOU, PGC, MCR, and REPs. The MCR category aggregates MOUs, Coops, and RAs into one group because each category individually has a relatively small number of entities. Aggregating these entity types into one group ensured the random sample would be truly representative of all entity types for each risk group and would not omit an entity category based on its individually small sample size. Risk factors categorized electric entities based solely on the identified inherent risk factors and did not factor in risk mitigation activities. There are entities that are responsible for multiple functions. For those specific entities, Guidehouse deferred to the highest rated risk factor to determine the entity's risk factor. A common example of this was for entities that have transmission assets and distribution customers. Whichever risk factor was higher was used as the overall risk factor for that entity. **Table 1** provides the risk factors implemented for this assessment[21].



[20] ERO Enterprise Inherent Risk Assessment Guide, October 2014 (https://www.nerc.com/pa/comp/reliability%20assurance%20initiative/ero_enterprise_inherent_risk_assessment_guide_20141010.pdf)

[21] In certain, isolated instances, Guidehouse and PUCT staff used professional judgment and discretion to identify additional contributing factors that elevated or reduced the risk rating of an energy provider in order to best produce analysis supporting the needs of this report.

Figure 2-2 Entity Categorization and Impact Risk Identification

Table 1 Criteria Used to Assess Risk for Each Entity Category

Entity Type	High	Medium	Low
IOU/TDU	T: Owns and/or operates assets greater than 200 kV D: Greater than 200,000 customers	T: Owns and/or Operates 100 kV to 200 kV assets D: 50,000 to 200,000 customers	T: Owns and/or Operates assets less than 100 kV D: Less than 50,000 customers
PGC	Total generation portfolio capacity is greater than 2,500 MW or Generation portfolio includes a nuclear site	Total generation capacity is between 1,000 - 2,500 MW	Total generation capacity is less than 1,000 MW
MOU, COOP & RA	Greater than 200,000 customers	50,000 to 200,000 customers	Less than 50,000 customers
REP	Not Applicable	Greater than 50,000 customers	Less than 50,000 customers

2.3 16 TAC § 25.53 Compliance

Guidehouse developed a comprehensive checklist to assess compliance with 16 TAC § 25.53 for the EOP submissions by Texas electric entities. The team created this checklist based on the specified requirements defined by 16 TAC § 25.53. These requirements included, but were not limited to, those listed in

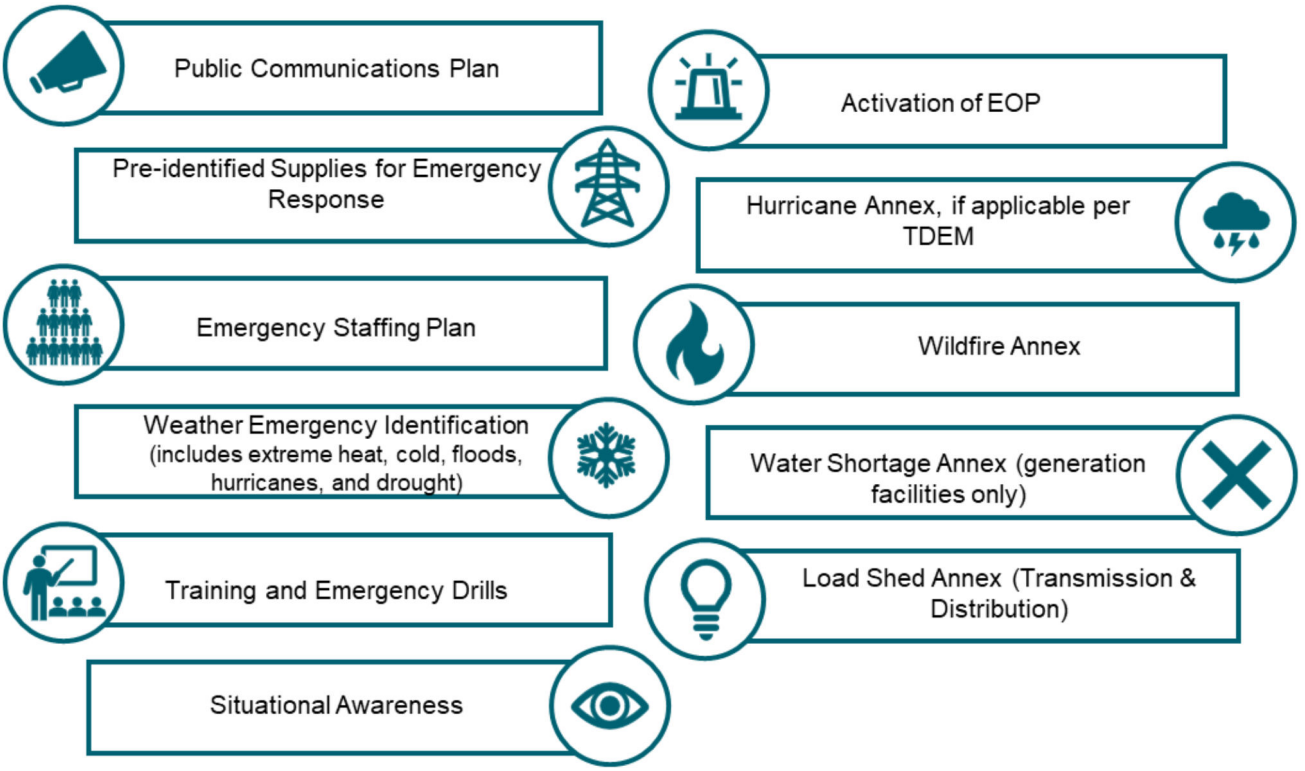


Figure 2-3. Additional 16 TAC § 25.53 requirements also specified a revision control summary, emergency contact lists, a list of individuals responsible for maintaining, implementing, and updating the EOP as well as a business continuity plan and more. For a full list of requirements that Guidehouse used to assess compliance with 16 TAC § 25.53, please see **Appendix A**.

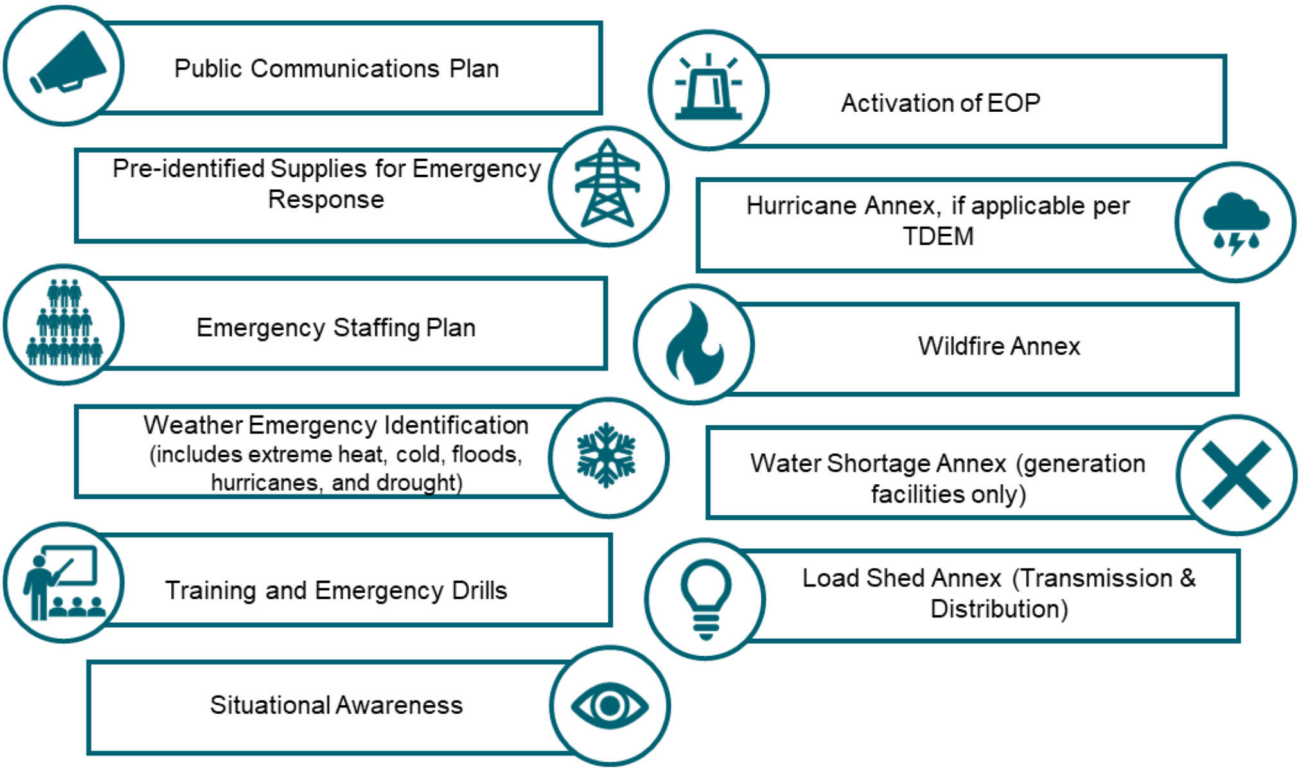


Figure 2-3 16 TAC § 25.53 Requirements

Using the compliance checklist, the team assessed the content included for each requirement of each EOP, checking that the required elements were present. Guidehouse reviewed a census of the EOPs submitted starting in 2022 through May 2024. The results and findings associated with 16 TAC § 25.53 compliance is discussed in Section **3. 16 TAC § 25.53 Compliance** Findings.

2.4 Weather Emergency Preparedness Framework

The next phase of the analysis focused on assessment of the Texas electric grid to prepare for and withstand adverse weather events. The team conducted in-depth reviews of a random sample of EOPs submitted by Texas electric entities across ERCOT and non-ERCOT power regions. To facilitate these reviews, Guidehouse developed a weather emergency preparedness framework to evaluate the maturity of entities' EOPs with specific focus on preparedness and response to adverse weather events. These events included extreme heat, extreme cold, storms, hurricanes, wildfires, tornadoes, drought/water shortage (generation only), and floods. The maturity framework and resulting maturity ratings are based purely on metrics that are above and beyond the requirements in 16 TAC § 25.53. The maturity framework and maturity ratings were developed to evaluate the overall maturity of the EOP submittals against industry best practices. The maturity framework provided the evaluation team with a consistent methodology to assess entities' maturity ratings across 12 indicators, allowing comparisons of the EOPs against industry best practices. The maturity ratings

for each individual EOP were determined solely on the information provided as part of the EOP filings for Project No. 53385 (Project to Submit EOPs and Related Documents under 16 TAC § 25.53).Thus, while the framework provides a repeatable method to assess maturity of an EOP (or group of EOPs in the aggregate), this framework does not consider information or processes that may be in place at an electric entity through programs and processes outside of the EOP filings for Project No. 53385. Similarly, this framework is based on defined weather emergency preparedness best practices that are above and beyond the minimum regulatory requirements. Failure to submit information around maturity in these areas does not necessarily indicate a failure to comply with 16 TAC § 25.53.

2.4.1 Weather Emergency Preparedness Indicators

Guidehouse identified the essential criteria that should be demonstrated in an emergency operations plan that would serve as indicators of the level of the electric entity's preparedness and response to an adverse weather event. The development of these indicators was informed by industry best practices on emergency preparedness. The team identified and defined 12 indicators that are considered critical to an effective emergency response to ensure electric service to customers and improve the reliability of the electric grid in an emergency. The assessment of the indicators was based solely on the EOP submissions provided to the PUCT and ERCOT.

Guidehouse understands that some entities may currently employ the practices associated with these indicators but did not report practices in their EOPs that are not specifically required by 16 TAC § 25.53. Review of the EOP submissions alone may not provide sufficient documentation to fully assess each indicator. Guidehouse acknowledges that the indicators exceed the requirements of 16 TAC §25.53 and were developed to identify best practices and information gaps in submitted EOPs. The indicators are not representative of non-adherence to 16 TAC §25.53 but rather used to identify organizational best practices. Deficiencies or gaps in an indicator represent potential weakness compared to best practices. However, for comprehensive assessment of weather emergency preparedness and to potentially provide a framework for future grid or 16 TAC §25.53 improvements, the assessment team employed all 12 indicators. **Table** provides the list and definitions of the critical indicators that Guidehouse used to assess emergency preparedness and response when reviewing the filed EOPs. The review team acknowledges that many entities may implement measures similar to these indicators but did not report their practices as many such practices are above and beyond that required by 16 TAC § 25.53.

Table 2 Assessment Framework Indicator Definitions

Indicator	Emergency Preparedness Indicators
Indicator 1 – ICS Structure	A formal emergency management governing body enhances communication, resource coordination, and operational effectiveness in an event of adverse weather conditions. The system must define roles and reporting relationships via a hierarchical structure for effective command, control, and coordination of emergency response efforts.
Indicator 2 – Asset Management and Inspections	Robust asset management strategies and protocols help ensure optimal performance, reliability, and safety of utility infrastructure during adverse weather conditions. An asset management plan must include procedures to maintain preidentified supplies for an emergency response. Processes must be defined and implemented to optimize utility infrastructure inspections and timely maintenance and repairs.
Indicator 3 – Risk Management	Risk management plans must be developed for critical infrastructure, and preventative mitigation actions must be performed in advance of an adverse weather season.
Indicator 4 – Staffing	Resource planning and acquisition must be sufficient for response to large-scale emergencies.
Indicator 5 – Mutual Assistance and Support	Mutual aid can be critical to lead an effective response to a large-scale emergency to ensure utilities can restore electric service to their customers in a timely manner.
Indicator 6 – Training and Emergency Drills	Employees must be prepared, knowledgeable, and trained. Annual drills to address all types of hazards must be conducted to test that training of all staff was effective.
Indicator 7 – Situational Awareness	Utilities must be able to recognize and monitor extreme weather conditions well in advance of a potential emergency to produce informed, comprehensive, and actionable preparation and response.
Indicator 8 – System Design and Hardening	Utilities should invest resources to achieve cost-effective short-term and long-term reliability solutions, minimizing the negative impacts of adverse weather to their customers.
Indicator 9 – Communication System	Employees must have multiple methods of communication to ensure all staff are aware of emergency updates and able to communicate with one another while responding to an emergency.
Indicator 10 – Activation of EOP	A defined process must exist to activate operational protocols in the event of adverse weather, including identifying the decision-makers that have the authority to activate an emergency response within the organization.
Indicator 11 – Emergency Management and Planning Systems, Technologies, and Automation	Electric entities that utilize automation and advanced systems and technologies in emergency situations can improve the efficiency and effectiveness of their response. These entities have the capability to improve on every step of emergency preparedness and response, minimizing power losses and impact on their customers and the public.
Indicator 12 – Public Communications	Electric entities must effectively communicate in emergency situations with their direct and indirect customers and stakeholders, including public officials, fuel suppliers, reliability coordinator (RC), regulatory entities, and the media to foster transparency related to climate hazards, speed and effectiveness of their response and restoration of power during an emergency.

2.4.2 Assessment Framework Maturity Matrix Overview

The team developed definitions associated with the three levels of maturity ratings to improve consistency of evaluation and generate robust results during EOP reviews. The definitions included the criteria necessary to assign a specific rating for each of the 12 indicators. Guidehouse assigned a rating of 1, 2, or 3 for each indicator to establish its maturity level in relation to its response to a variety of adverse weather scenarios (e.g., extreme cold weather, extreme hot weather, hurricane, etc.). A rating of 1 (low maturity) signals that an indicator lacks the required content or contains good business practices with minimal details provided. A rating of 2 (medium maturity) establishes that key elements of good business practices for weather emergency preparedness and response are present, but some important elements are missing. A rating of 3 (high maturity) indicates that the EOP demonstrated advanced level of preparedness and operational response, incorporating all required criteria associated with each indicator. For specific definitions and criteria associated with each emergency preparedness indicator and its maturity rating options, please refer to **Appendix B: Assessment Framework** Maturity Matrix.

2.4.3 Sample Design and In-Depth EOP Reviews

Guidehouse applied a statistically significant random sampling methodology[22] to improve the efficiency of its evaluation of the EOPs developed by various electric entities. The evaluation team segmented the population of EOPs into defined strata based on ERCOT vs. non-ERCOT power regions, entity type and its impact risk rating, as described in section **2.2 Electric Provider Risk Categorization**. This method guaranteed that all types of entities from various categories are represented in the random sample selection. The team chose to exclude REPs from its in-depth EOP reviews because REPs are only responsible for selling electricity to end-users and are not responsible for the ownership or operation of electric generation, transmission, and distribution facilities. Additionally, the team also excluded electric entities that were initially identified as low risk based on their low impact on the Texas electric grid. Guidehouse included all entities identified as high-risk in the sample set. Furthermore, evaluators included MOUs, electric Coops, and RAs in the same assessment group because of similarities in their structure and functions in areas such as local ownership, nonprofit nature, and community focus.

Next, Guidehouse conducted in-depth reviews of the sampled EOPs and assigned a maturity rating for the emergency preparedness indicators for each type of potential hazard. If certain portions of the EOPs (e.g., ICS structure, staffing, drills, and training,

[22] Appendix C: Sample Design Details provides additional data for the random sampling methodology utilized in this assessment

etc.) applied to all types of hazards, Guidehouse assigned a consistent rating across all potential weather emergencies. To calculate the overall score for each indicator, the team calculated a simple average of the maturity ratings assigned for each indicator across all reviewed EOPs for each category of entities. An average rating across the reviewed EOPs of 2.5 or above was defined as high maturity rating when evaluating emergency preparedness indicators of various entities by category in aggregate (Non-ERCOT, ERCOT PGCs, IOUs, etc.). A rating of 2.0 or above, but below 2.5, was defined as medium maturity; and a rating lower than 2.0 was defined as low maturity. These average ratings provided an overall assessment score of emergency preparedness across various electric entity types in ERCOT and non-ERCOT power regions.

During EOP reviews, the team encountered numerous electric entities that operate multiple power plants and/or own different types of energy infrastructure that led to development of different plans and procedures for each business segment or facility within its authority. In some cases, these different plans and procedures resulted in different maturity ratings for some of the indicators. For example, one entity provided multiple plans with different types of extreme cold and hot weather checklists for its different generation units. For this entity, some checklists and weather preparation procedures were comprehensive, and others were not. In these cases, the team assigned the most conservative rating (lower score) among the various plans provided to note these potential areas of improvement for that electric entity.

Following completion of emergency preparedness assessment via in-depth EOP reviews, Guidehouse generated results and summarized its findings and recommendations. The discussion of the results and findings associated with weather emergency preparedness and response are included in section **4. Weather Emergency Preparedness Findings.** Guidehouse also generated a list of recommendations and best practices, which are provided in section **7. Recommendations**. These recommendations and best practices, if implemented, will strengthen 16 TAC §25.53 and improve EOPs and organizational effectiveness when responding to a variety of weather-related emergencies.

It is important to note that Guidehouse's review was strictly focused on the EOP documentation submittals required by 16 TAC § 25.53. Guidehouse acknowledges that entities may have additional processes, procedures, tools, and controls in place that are not fully represented in the 16 TAC § 25.53 EOP submittals.

2.5 Seasonal Weather Analysis for 2024 and 2025

In adherence with Tex. Util. Code § 186.007, ERCOT performed an analysis of the reporting data required by 16 TAC § 25.55, Weather Emergency Preparedness, and provided the analysis to the PUCT. The information provided by ERCOT presents

additional insight into the expected performance of Texas electric entities during extreme seasonal weather and is included in Section 5 of this report.

ERCOT's analysis included the following:

1. Compile weather-zone averaged minimum and maximum ambient temperatures at which generation resources and Transmission Service Provider (TSP) facilities have experienced sustained operations. These temperatures are based on market participant-provided data as reported in Declarations of Preparedness[23] submitted to ERCOT by 12/1/23 (for minimum temperatures) and 6/1/24 (for maximum temperatures).

2. Compare the average temperatures calculated in 1) with the 95th percentile minimum average 72-hour wind chill temperature (for winter) and with the 95th percentile maximum average 72-hour temperature (for summer) specific to each of the ten weather zones in the ERCOT historical weather study, and

3. Draw inferences from the differences between the averaged weather zone based sustained temperatures and the historical weather study temperatures to estimate the ability of the electric grid to withstand extreme weather conditions.

[23] Declaration of Preparedness documents are required by applicable electric entities in the ERCOT power region by 16 TAC § 25.55.

3. 16 TAC § 25.53 Compliance Findings

According to the data provided by PUCT, 691 out of 990 applicable electric entities submitted EOPs or other documentation in 2024 and were subject to review for 16 TAC § 25.53 compliance using the compliance checklist. **Table 3**Table displays overall 16 TAC § 25.53 compliance along with a breakdown of compliance by entity type.

Guidehouse assessed compliance with the 16 TAC § 25.53 based on the presence of the 16 TAC §25.53 requirement in EOP documentation. Based on the compliance review of all EOPs submitted, Guidehouse determined that these entities generally provided sufficient information to demonstrate adherence to legal requirements. Importantly, weatherization procedures, staffing, training, situational awareness, and activation of EOP scored highly in compliance across all entity types.

16 TAC § 25.53 requires an extreme weather annex that includes operational plans for responding to a cold or hot weather emergency, distinct from weather preparations required under 16 TAC § 25.55. The rule requires submission of hurricane annexes for all entity types if the entity is in a hurricane evacuation zone per the Texas Division of Emergency Management (TDEM). Wildfire annexes and load shed annexes are required only for transmission and distribution (T&D) entities, so generation entities and REPs were not included in the compliance analysis. Water shortage annexes require information specific to generators using water to cool down equipment in the event of overheating, and therefore are only required by facilities with generation capacity. Similarly, because restoration of service annexes are only required for generation electric entities, REPs and T&D entities were not assessed for compliance. Flooding annexes are not explicitly required in 16 TAC § 25.53, however several entities provided an additional flood annex or addressed flooding information within the EOP if not in a separate flood annex. Required annexes such as cybersecurity and pandemic annexes were not included in the analysis as they are not directly related to severe weather.

Overall, the compliance findings indicate that electric entities generally adhere to 16 TAC § 25.53 requirements regarding updating and submitting documentation annually. However, compliance and adherence does not necessarily indicate plan quality or thoroughness. Strong documentation does not always have associated strong implementation efforts; likewise, weaker programs on paper may have exemplary implementation. For more information regarding recommendations around EOP submissions and administrative code adherence, refer to Section **6.4 Texas Administrative Code Improvements**.

Table 3 16 TAC § 25.53 Compliance Findings

16 TAC § 25.53	Description	Compliance (%)				
		All	IOU/TDU	PGC	MOU/ COOP	REP
(c) (1) (i)	Executive Summary	84%	90%	87%	69%	83%
(c) (3)	Continuous Maintenance of EOP	90%	100%	96%	72%	78%
(c) (4) (A)	Record of Distribution	61%	70%	68%	31%	63%
(c) (4) (B)	Emergency Contacts	77%	60%	87%	41%	71%
(c) (4) (C)	*Signed Affidavit from Entity's Highest-Ranking Representative Affirming the Following:*					
(c) (4) (C) (i)	Relevant Personnel are Familiar With and have Received Training on the EOP	93%	80%	94%	96%	89%
(c) (4) (C) (ii)	Reviewed and Approved by Appropriate Executives	96%	80%	96%	99%	93%
(c) (4) (C) (iii)	Drills Have Been Conducted to the Extent Required	93%	80%	96%	94%	76%
(c) (4) (C) (iv)	Distributed to Local Jurisdictions	70%	60%	75%	47%	71%
(c) (4) (C) (v)	Business Continuity Plan	88%	80%	86%	96%	87%
(c) (4) (C) (vi)	Personnel Training (IS-100, IS-200, IS-700, IS-800 NIMS)	72%	40%	79%	43%	76%
(d) (1) (A)	Approval and Implementation Section Introduction	92%	90%	92%	99%	84%
(d) (1) (A)	Outline of Applicability	95%	100%	97%	98%	80%
(d) (1) (B)	List of Individuals Responsible for Maintaining and Implementing EOP	79%	90%	77%	84%	85%
(d) (1) (B)	List of Individuals who Can Change EOP	75%	80%	73%	83%	76%
(d) (1) (C)	Revision Control Summary	88%	100%	94%	68%	80%
(d) (1) (D)	Dated Statement of Approval Adopting the Plan and Superseding Previous Plan	93%	80%	94%	96%	89%
(d) (1) (E)	Most Recent Approval Date	98%	100%	98%	98%	98%
(d) (2)	Communication Plan	90%	100%	89%	96%	85%
(d) (4)	Staffing	94%	100%	95%	97%	85%
(d) (5)	Identification of weather-related hazards and activation of EOP	89%	100%	90%	96%	76%

(e) (1) (A)	Weather Emergency Annex (T&D)	83%	83%	N/A	83%	N/A
	Cold Weather	*83%*	*83%*	*N/A*	*83%*	*N/A*
	Hot Weather	*81%*	*75%*	*N/A*	*82%*	*N/A*
(e) (1) (B)	Load Shed Annex (T&D)	94%	100%	N/A	94%	N/A
(e) (1) (C)	Revision Control Summary	88%	100%	94%	68%	80%
(e) (1) (D)	Wildfire Annex (T&D)	97%	100%	N/A	97%	N/A
(e) (1) (E)	Hurricane Annex (gen, T&D, REP)	87%	83%	85%	87%	N/A
(e) (2) (A)	Weather Emergency Annex (PGC)	95%	N/A	95%	100%	N/A
	Cold Weather	*95%*	*N/A*	*95%*	*100%*	*N/A*
	Hot Weather	*91%*	*N/A*	*91%*	*100%*	*N/A*
(e) (2) (B)	Water Shortage Annex (gen only)	68%	N/A	76%	100%	N/A
(e) (2) (C)	Restoration of Service Annex (gen only)	84%	N/A	88%	100%	N/A
(e) (2) (E)	Hurricane Annex (gen, T&D, REP)	86%	N/A	85%	100%	N/A
(e) (3) (B)	Hurricane Annex (gen, T&D, REP)	74%	N/A	N/A	N/A	74%

3.1 Non-Submittals for 2024

As of May 15, 2024, Guidehouse identified 990 registered electric entities for which 16 TAC § 25.53 is applicable and EOP's must be submitted. A total of 691 entities submitted an EOP for 2024 or an affidavit stating there were no material changes since a previous submission, representing 70% of the applicable electric entities. There were 299 entities that did not have an EOP submittal in 2024. **Table 4** represents the breakdown of the electric entities registered with the PUCT that did not provide EOP submittals for 2024.

Table 4. Non-submittals by Type and Risk Identification

Entity Type	Total	Entity Risk Rating		
		High	Medium	Low
COOP	12	1	0	11
PGC	229	0	5	224
REP	58	0	0	58
Total		1	5	293

There was one electric entity identified as high risk due to transmission facilities that did not submit EOP documentation in 2024. The entity had submitted EOP documentation in a previous year. Due to the fact that the entity was identified as a high-risk entity,

Guidehouse reviewed the entity's 2022 submission as part of the overall EOP review, detailed in Section **4. Weather Emergency Preparedness Findings**.

There are 5 generation entities that are identified as medium risk entities, using the risk identification in **Table 4**, that did not submit EOPs in 2024, leaving 293 low risk entities.

Out of the 293 low risk entities that did not submit EOPs, or affidavits stating there were no material changes, in 2024, there are 11 Coops and 58 REPs. The Coops are solely responsible for distribution to a small number of customers. The REPs do not own or operate infrastructure and are solely responsible for selling electric energy to retail customers.

The majority of entities that did not submit EOPs in 2024 are registered PGCs. Out of the 694 PGCs registered with the PUCT, 229 PGCs did not provide an EOP submittal in 2024. Out of the 229 PGCs, there are 2 entities that sold all of their generation assets but did not relinquish their registration. Additionally, there are 4 registered PGCs that do not have any PGC facilities in the PUCT registry. There were 104 PGCs that did not submit EOP data in 2024 and are less than 20 MW individually. **Table 5** provides a breakdown of the remaining PGCs that did not submit.

Table 5. Non-submittals by Type and Risk Identification[24]

PGC Non-Submittals for 2024	
1000 - 2500 MW	5
500 - 1000 MW	13
75 - 500 MW	74
20 - 75 MW	27
Less than 20 MW	104
0 MW or No Assets	6

[24] Pursuant to 16 TAC § 25.53(2) A person seeking registration as a PGC or certification as a REP must meet the filing requirements under paragraph (1)(A) of the subsection at the time it applies for registration or certification with the commission and must submit the EOP to ERCOT if it will operate in the ERCOT power region, no later than ten days after the commission approves the person's registration or certification.

4. Weather Emergency Preparedness Findings

4.1 Overview of Findings

The following sections present a high-level overview of maturity ratings associated with Texas electric entities weather emergency preparedness. This overview of the results is presented for the entities that operate in the ERCOT power region separate from the entities that operate outside ERCOT.

The assessment is based solely on the EOP submissions provided to the PUCT and ERCOT. Guidehouse acknowledges that review of the EOP submissions alone may not provide sufficient implementation evidence to comprehensively assess the overall ability of the grid(s) to operate, respond, and recover from a weather emergency. Specifically, reviewing EOPs provides an assessment of programmatic readiness. 16 TAC § 25.53 and indeed most EOPs address important preparedness elements that establish a minimum foundation for extreme weather events. However, resource adequacy, weatherization efforts including system hardening, or maintaining spare critical inventory is beyond the scope of the EOPs. In addition, EOPs themselves are plans comprised of multiple procedures, policies, instructions, and similar readiness documentation. As such, these do not necessarily reflect actual implementation and activation levels of any one EOP or a group of EOPs in the aggregate.

Texas electric entities are generally prepared for extreme weather events based on the information and processes provided in the EOPs. Both the ERCOT power region entities and non-ERCOT power region entities submitted EOPs that, as a group, demonstrate that basic emergency preparedness programs and measures are in place. Texas electric entities have varying levels of maturity in a variety of weather preparedness areas and all entities have an opportunity to further mature.

It is important to note that Guidehouse's review was strictly focused on the EOP documentation submittals required by 16 TAC § 25.53. Guidehouse acknowledges that entities may have additional processes, procedures, tools, and controls in place that are not fully represented in the 16 TAC § 25.53 EOP submittals.

4.1.1 ERCOT Power Region Findings Overview

This section includes a high-level overview of the maturity ratings that Guidehouse generated based on its review of the EOPs submitted to the PUCT by electric entities that operate within the ERCOT power region. The evaluation team reviewed a sample of submitted EOPs across various entity categories that were initially also categorized as high or medium impact risk entities and assigned risk ratings for each emergency

preparedness indicator. The maturity assessment is an additional review beyond the scope of 16 TAC § 25.53. Guidehouse averaged these ratings to generate one risk score for each indicator and an overall rating for the three entity categories, as shown in **Table 6**.

Based on review and analysis of the sampled EOPs submitted by IOUs and TDUs, Guidehouse determined that these electric entities provided sufficient information to demonstrate that they are prepared and have provided strong business practices for weather-related emergencies across three indicators: ICS Structure, Situational Awareness, and Public Communications. The sampled EOPs scored high enough on average to deem these areas of emergency preparedness as having a high maturity within the EOP. Across sampled MOUs, electric cooperatives (Coops), and RAs (collectively referred to as MCRs), the team determined that these entities demonstrated sufficient preparedness receiving a high maturity score on average only for public communications.

Guidehouse rated, on average, 7 out of 12 indicators for MCRs, 5 indicators for PGCs, and 3 indicators for IOUs/TDUs a medium maturity rating. Medium maturity rating means that entities provided sufficient information to demonstrate acceptable or advanced level of emergency preparedness. However, the level of preparedness and response often varied widely across individual entities, and many entities demonstrated either partial or insufficient level of planning for weather-related emergencies across these indicators. The medium maturity areas could utilize additional information, and where appropriate, future improvement for some of the criteria among the submitted EOPs.

Most of the sampled entities provided sufficient information to demonstrate, at a minimum, ad hoc, or documented business practices with basic approaches to emergency preparedness and response. Overall, there is an opportunity for the region to further mature in many areas. It is possible that electric entities plan to perform some of the actions that would improve emergency preparedness and response across the low maturity indicators, but they may not have provided this information in the submitted EOPs because it is above and beyond the information required in EOP submittals by 16 TAC § 25.53.

Overall, these findings demonstrate a consistent and moderate level of readiness for weather-related emergencies across electric entities in the ERCOT power region. Guidehouse identified gaps that exist in the filed EOPs which pose potential risks to the electric grid during a weather emergency. There is a general need for enhancement and reinforcement of emergency preparedness measures across a variety of indicators for future EOP submissions. Guidehouse determined that these risks are the greatest among PGCs that generate electricity across Texas. Further findings associated with each of the indicators that contributed to these average risk ratings are detailed in Section **4.2 ERCOT Power Region: Summary of Findings by** Entity Type.

Table 6 Emergency Preparedness Average Maturity Ratings for ERCOT Power Region Entities

● High Maturity ● Medium Maturity ○ Low Maturity

Indicator	IOU / TDU	PGC	MCR
Indicator 1 ICS Structure	●	○	●
Indicator 2 Asset Management and Inspections	○	○	●
Indicator 3 Risk Management	○	●	○
Indicator 4 Staffing	●	○	●
Indicator 5 Mutual Assistance and Support	●	○	○
Indicator 6 Training and Emergency Drills	○	●	●
Indicator 7 Situational Awareness	●	●	●
Indicator 8 System Design and Hardening	○	○	○
Indicator 9 Communication System	○	●	○
Indicator 10 Activation of EOP	●	○	●
Indicator 11 Emergency Management and Planning Systems, Technologies, and Automation	○	○	○
Indicator 12 Public Communications	●	○	●
Average Ratings	●	○	●

4.1.2 Non-ERCOT Power Regions Findings Overview

This section includes a high-level overview of the maturity ratings that Guidehouse generated based on its review of the EOPs submitted to the PUCT by electric entities that operate outside of the ERCOT power region. The evaluation team reviewed a sample of EOPs and assigned maturity ratings for each of the emergency preparedness indicators. Guidehouse averaged these ratings into one risk score for each indicator, as shown in **Table 7**, to establish confidentiality of the information provided for the small number of entities that operate outside of the ERCOT power region.

Guidehouse rated most indicators on average as medium maturity, which means that entities provided sufficient information and demonstrated acceptable or advanced level of business practices for emergency preparedness. However, the level of information provided in the EOPs varied widely across individual entities, and many entities demonstrated either partial or insufficient level of detail related to planning for weather-related emergencies. The medium maturity areas could utilize additional information, and where appropriate, future improvement for some of the criteria among the submitted EOPs.

Guidehouse rated, on average, as low maturity 4 out of 12 indicators, which include Asset Management and Inspections; Mutual Assistance and Support; System Design and Hardening; as well as Emergency Management and Planning Systems, Technologies, and Automation. Most entities did not provide sufficient information to demonstrate strong business practices related to emergency preparedness as identified by the indicators, which points to potential areas of improvement in the submitted data.

Guidehouse acknowledges that electric entities perform many of the actions that provide sufficient emergency preparedness and response across the low maturity rated indicators but may not have provided this information in the submitted EOPs because it is above and beyond the information required in EOP submittals by 16 TAC § 25.53.

While information provided in the EOPs alone is not sufficient to demonstrate full maturity to the indicators, in the areas specifically required by 16 TAC § 25.53, gaps exist in the provided EOPs such that there are opportunities for further maturity in weather emergency preparedness. Overall, the EOPs reviewed demonstrated a number of foundational processes and procedures are in place in these regions to prepare for and respond to weather-related events. There is potential for enhancement and reinforcement of emergency preparedness measures for future EOP submissions across electric entities that operate outside of the ERCOT power region. Further findings associated with each of the emergency preparedness indicators that contributed to these average maturity ratings are further detailed in Section **4.3 Non-ERCOT Power Regions: Summary of Findings**.

Table 7 Emergency Preparedness Average Maturity Ratings for Non-ERCOT Power Region Entities[25]

● High Maturity ● Medium Maturity ○ Low Maturity

Indicator	Maturity Level
Indicator 1 ICS Structure	●
Indicator 2 Asset Management and Inspections	○
Indicator 3 Risk Management	●
Indicator 4 Staffing	●
Indicator 5 Mutual Assistance and Support	○
Indicator 6 Training and Emergency Drills	●
Indicator 7 Situational Awareness	●
Indicator 8 System Design and Hardening	○
Indicator 9 Communication System	●
Indicator 10 Activation of EOP	●
Indicator 11 Emergency Management and Planning Systems, Technologies, and Automation	○
Indicator 12 Public Communications	●
Average Rating	●

[25] Given the limited number of entities in the non-ERCOT power regions, we are only displaying the data in the aggregate rather than by entity type. In the ERCOT data, there are enough entities such that differentiating by entity type (PGC, IOU, MCR) showed meaningful differences. In addition, for non-ERCOT entities Guidehouse averaged these ratings into one risk score for each indicator to maintain confidentiality of the information provided for the smaller number of entities that operate outside of the ERCOT power region.

4.2 ERCOT Power Region: Summary of Findings by Entity Type

ERCOT comprises approximately 90% of the electric load in Texas and covers approximately 75% of the land mass of Texas[26]. As such, most electric entities are in this power region and thus a majority of the high-risk and medium risk entities are in the ERCOT power region. The following sections include the findings associated with Guidehouse's review of the emergency operation plans provided by the electric entities that operate in the region managed by ERCOT.

4.2.1 Investor-Owned Utilities

The following table provides a summary of the findings based on Guidehouse's review of a sample of five emergency operation plans provided by the IOUs and transmission and distribution entities that operate in the ERCOT power region.

Table 8 IOUs Emergency Operation Plan Findings

● High Maturity ● Medium Maturity ○ Low Maturity

Indicator	Summary of Findings	Maturity Level
Indicator 1 – ICS Structure	• The reviewed entities defined their ICS structure and governance and fully integrated it for their emergency response for events and abnormal system conditions. • The entities established a process to track and address lessons learned along with plan updates to demonstrate continuous improvement.	●
Indicator 2 – Asset Management and Inspections	• The majority of the EOPs did not provide details for processes in place to ensure that critical infrastructure will properly operate during adverse weather events. • The EOPs did not provide details as to how the entities identify critical assets and potential points of failure within their systems. • Some of the sampled entities demonstrated a process for how critical supplies and backup equipment are inventoried and strategically deployed in their EOPs. • Some entities referenced transmission and distribution inspection cadences and defined temperature limits for critical equipment, however, the inspection plan did not address all potential hazards.	○

[26] Texas RE Info Sheet (https://www.texasre.org/Documents/General/Texas%20RE%20Info%20Sheet.pdf)

Indicator	Summary of Findings	Maturity Level
Indicator 3 – Risk Management	• The EOPs included some limited procedures, but did not include multiple processes, procedures and checklists used to assess system readiness and risks in advance of adverse weather events. • If entities provided some of the winter/summer weatherization checklists and/or hurricane, flood, wildfire preparation procedures, they did not consistently provide this information across all potential hazards. • Most plans did not include actions to take if an issue occurs to remediate the situation to continue providing electric service to customers. Guidehouse recognizes that weatherization efforts are required in 16 TAC § 25.55, which is outside of the full scope of this evaluation.	
Indicator 4 – Staffing	• All the reviewed entities defined roles and responsibilities for their primary staff. • The EOPs identified staff to estimate and acquire resources in preparation for adverse weather events and during execution of EOP. • However, the majority of the EOPs did not define backup staff in case primary staff are not available. • Also, the entities did not provide a plan for the number of staff in specific roles that would be required for various levels of emergencies (e.g., additional crew needed for restoration of power).	
Indicator 5 – Mutual Assistance and Support	• The majority of the EOPs identified key stakeholders and established associated arrangements for mutual aid. • However, one entity did not include any considerations for mutual aid. • Some of the EOPs did not provide a description of an established communication plan with the associated mutual aid organizations.	
Indicator 6 – Training and Emergency Drills	• The majority of the reviewed EOPs mentioned training in concept as an action that should be done but did not explicitly state that they train their personnel, the types of or required frequency of the trainings provided. • The majority of the entities also stated that they conduct annual drills for hurricanes but did not state that they conduct drills for other types of weather-related emergencies (e.g., cold/hot weather, tornado, etc.). • None of the EOPs provided any information on identifying and training their emergency response team (EMT)'s backup counterparts.	
Indicator 7 – Situational Awareness	• All reviewed plans provided a process to recognize and monitor adverse weather by utilizing various weather sources and foundational tools. • The majority of EOPs demonstrated processes to assure situational awareness is deployed during all phases of severe weather response. • Some entities provided forecasting to potentially impacted areas to alert leaders how severe weather may affect operations.	
Indicator 8 – System Design and Hardening	• The EOPs included very limited information regarding short-term and long-term system improvements. If long-term plans to upgrade the T&D system exist, this information was not detailed in the submitted EOPs. • Some entities mentioned modifying design and construction standards and retrofitting portions of their transmission lines with anti-galloping devices to avoid damage along with proactive maintenance, however, the information provided was very limited.	
Indicator 9 – Communication System	• The EOPs typically established primary communication systems and protocols used to communicate internally within the organization during an emergency. • However, the plans often did not consider backup communication systems. • One entity did not provide information on internal communication plans during an emergency. • The EOPs did not consistently incorporate technology into internal communication plans throughout the organization.	

Indicator	Summary of Findings	Maturity Level
Indicator 10 – Activation of EOP	• Most of the plans specified the conditions necessary to activate the EOPs and the process to notify the staff. • Some but not all plans specified the decision-makers who are responsible for activating the EOP.	
Indicator 11 – Emergency Management and Planning Systems, Technologies, and Automation	• The majority of the reviewed EOPs did not demonstrate the use of advanced systems, tools, technology, software, or automation processes that streamline management and reporting (e.g., tracking of equipment, staff, completed actions, issues, metrics and benchmarks) prior to and/or during an emergency response. • Deployment of technologies to monitor utility staff's response and progress to address an emergency were not provided.	
Indicator 12 – Public Communications	• Most plans demonstrated prevalent use of a diverse set of communication channels, such as email, phone calls and texts, cable media and social media to communicate with the public, stakeholders, and customers before, during, and after an adverse weather event. • One entity focused on social media and news conferences but did not discuss their plan of outreach directly to their customers during an emergency. • Most entities provided communication plans for the following groups: the media, customers, fuel suppliers, the Commission, the Office of Public Utility Counsel (OPUC), local and state government officials, emergency operations centers, the reliability coordinator (RC), regulatory entities, and critical load customers. • Most of the reviewed entities addressed procedures for handling customer complaints.	

4.2.2 Power Generation Companies

The following table provides a summary of the findings based on Guidehouse's review of a sample of 10 emergency operation plans provided by the PGCs that operate in the ERCOT power region.

Table 9 PGCs Emergency Operation Plan Findings

High Maturity Medium Maturity Low Maturity

Indicator	Summary of Findings	Maturity Level
Indicator 1 – ICS Structure	• Some of the reviewed entities defined their ICS structure and governance for their emergency response, but not all of them. • A few provided an outline with responsibilities for those who would oversee the emergency response but did not provide the governance and reporting structure. • Many of the entities did not establish a process to track and address lessons learned to demonstrate continuous improvement.	

Indicator	Summary of Findings	Maturity Level
Indicator 2 – Asset Management and Inspections	• The majority of the EOPs did not provide sufficient information to demonstrate that multiple practices are in place to ensure that critical infrastructure will properly operate during adverse weather events. • Very few of the reviewed EOPs included a process for how critical supplies and backup equipment are inventoried and strategically deployed. • Most of the EOPs did not identify critical assets, potential points of failure, and plans for quick remediation.	
Indicator 3 – Risk Management	• The majority of the plans included multiple processes, procedures, and checklists used to assess system readiness and risks in advance of adverse weather events, however, a few of the reviewed plans did not provide this critical information. • Some EOPs had well documented winter/summer weatherization and hurricane/flood/wildfire procedures and checklists; however, many of the entities could significantly improve their procedures and checklist by providing more thorough assessment of their generators and follow best practices. • Few of the plans included actions to take if an issue occurs to remediate the situation to continue providing electric service to customers.	
Indicator 4 – Staffing	• All of the reviewed entities defined roles and responsibilities for their primary staff. • However, the majority of the EOPs did not define backup staff in case primary staff are not available during an emergency. Many EOPs did not identify staff to estimate and acquire resources in preparation and during an adverse weather event. • Entities did not provide a plan for the number of staff that would be required for various roles of emergencies (e.g., additional crew that may be needed for quick restoration of power).	
Indicator 5 – Mutual Assistance and Support	• PGCs did not provide information on establishing arrangements for mutual aid in their EOPs.	
Indicator 6 – Training and Emergency Drills	• All entities mentioned that they conduct training and perform drills with their Emergency Management Teams typically on an annual basis. • One entity mentioned that they require exercises to be conducted in periods not exceeding 2-3 years. • EOPs typically did not specify if all types of hazards are addressed in training and drills. • None of the EOPs provided any information on identifying and training their EMT's backup counterparts. • The EOPs did not demonstrate tracking of personnel trainings or participation in drills for various hazards.	
Indicator 7 – Situational Awareness	• Most plans provided a process to recognize and monitor adverse weather by utilizing various weather sources and foundational tools. • A majority of plans did not provide further details on how various tools are applied to monitor the various weather events that would lead to activation of the EOP. • Many entities did not provide evidence of monitoring conditions for wildfire probability.	
Indicator 8 – System Design and Hardening	• The EOPs did not include any information on short-term and long-term system design and hardening improvements.	

Indicator	Summary of Findings	Maturity Level
Indicator 9 – Communication System	• Primary communication systems and protocols used to communicate internally within the organization during an emergency were typically established. • However, backup communication systems were often not considered in the EOPs. • Incorporation of technology into internal communication plans was not consistent throughout the organizations.	
Indicator 10 – Activation of EOP	• Very few reviewed plans defined decision-makers and provided conditions needed to activate the EOPs and the process to notify the staff. • Many of the EOPs provided the above information only in reference to non-weather-related emergencies or a subset of specific hazards.	
Indicator 11 – Emergency Management and Planning Systems, Technologies, and Automation	• The majority of the reviewed EOPs did not demonstrate the use of advanced systems, tools, technology, software, or automation processes that streamline management and reporting (e.g., tracking of equipment, staff, completed actions, issues, metrics and benchmarks) prior to and/or during an emergency response.	
Indicator 12 – Public Communications	• Many entities included some discussion of a public communication plan and considered a set of communication channels to reach the public, stakeholders, and customers before, during and after an adverse weather event. • Although entities included public communication procedures and strategies with some of the stakeholders, most entities did not include all of the groups as required under 16 TAC § 25.53: the media, customers, fuel suppliers, the Commission, OPUC, local and state government officials, emergency operations centers, the reliability coordinator and critical load customers.	

4.2.3 Municipally Owned Utilities, Electric Cooperatives, and River Authorities

The following table provides a summary of the findings based on Guidehouse's review of a sample of 15 emergency operation plans provided by the MOUs, Coops, and RAs that operate in the ERCOT power region.

Table 10 Municipally Owned Utilities, Electric Cooperatives, and River Authorities Emergency Operation Plan Findings

● High Maturity ● Medium Maturity ● Low Maturity

Indicator	Summary of Findings	Maturity Level
Indicator 1 – ICS Structure	• Most of the reviewed entities defined their ICS structure and governance for their emergency response. • A few defined responsibilities for the leader who would oversee the emergency response but did not provide the governance and reporting structure. • A few of the entities did not establish a process to track and address lessons learned to demonstrate continuous improvement.	●
Indicator 2 – Asset Management and Inspections	• The majority of EOPs included asset management and inspections practices to ensure that critical infrastructure will properly operate during adverse weather events. The plans for system inspections included critical system infrastructure and vegetation management. • Many EOPs provided preidentified emergency supplies and identified critical assets. • However, a majority of entities did not identify potential points of failure or provide plans for quick remediation. • Very few of the sampled entities demonstrated a process for how backup equipment is inventoried and strategically deployed.	●
Indicator 3 – Risk Management	• Some of the EOPs included winter and summer preparedness and weatherization checklists, but most did not include thorough processes to assess system readiness and risks in advance of adverse weather events. • Many of the EOPs did not establish processes to manage risk for all relevant hazards. Some of the established procedures were focused on safety of employees and not relevant to managing risks to the infrastructure. • Most plans did not include actions to take if an issue occurs to remediate the situation to continue providing electric service to customers.	●
Indicator 4 – Staffing	• All of the reviewed entities defined roles and responsibilities for their primary staff. • However, they did not define backup staff in case primary staff are not available. • Also, the entities did not provide a plan for the number of staff at various levels that would be required for various levels of emergencies (e.g., additional crew needed for restoration of power).	●
Indicator 5 – Mutual Assistance and Support	• Almost half of the entities established arrangements for mutual aid and provided a communication approach for mutual assistance during an emergency, but the majority of entities did not appear to have mutual aid agreements in place.	●

Indicator	Summary of Findings	Maturity Level
 **Indicator 6 –** Training and Emergency Drills	• All of the entities mentioned conducting training for their staff and performing annual emergency drills. • Very few EOPs specified who is trained on the emergency procedures and required to participate in drills. • None of the EOPs mentioned training their emergency response team (EMT)'s backup counterparts. • Additionally, EOPs rarely specified which type of hazards were addressed in training and drills. • Most EOPs did not demonstrate tracking of personnel training or participation in drills for various hazards and lacked lessons learned procedures for debriefs.	
 **Indicator 7 –** Situational Awareness	• Many of the reviewed plans provided a process to recognize and monitor adverse weather by utilizing various weather sources and foundational tools. • A few of the plans mentioned that weather will be monitored but did not specify the tools and technologies that will be used for situational awareness. • Many plans demonstrated processes to assure situational awareness is deployed during all phases of severe weather response.	
 **Indicator 8 –** System Design and Hardening	• The EOPs included very limited information regarding short-term and long-term system improvements. If long-term plans to upgrade the T&D system exist, EOPs did not include this information in detail. • A few of the entities mentioned moving distribution lines underground but did not provide long-term plans.	
 **Indicator 9 –** Communication System	• The majority of the reviewed EOPs established primary and secondary communication systems and protocols used to communicate internally within the organization during an emergency. • A few of the EOPs established primary communication systems but did not establish backup systems in case the primary communication systems fail. • Some of the EOPs did not include any processes for internal communications.	
 **Indicator 10 –** Activation of EOP	• Most plans identified the decision-makers and defined the conditions necessary to activate the EOPs. • A few of the EOPs did not define the conditions (e.g., metrics, types of weather events, etc.) to activate the EOPs and/or focused on onsite emergency incidents and not their response to an adverse weather event.	
 **Indicator 11 –** Emergency Management and Planning Systems, Technologies, and Automation	• The majority of the reviewed EOPs did not demonstrate the use of advanced systems, tools, technology, software, or automation processes that streamline management and reporting (e.g., tracking of equipment, staff, completed actions, issues, metrics and benchmarks) prior to and/or during an emergency response. • A few entities mentioned some uses of advanced technologies but typically only one or two were used within each organization. Examples of advanced technologies include LiDAR for wildfire mitigation and monitoring, ArcGIS Survey 123 to conduct/assess employee training as well as hazard and damage assessments; tools to monitor tornado activities and flash floods; Everbridge for communication; Supervisory Control and Data Acquisition (SCADA), EMS, Advanced Distribution Management System (ADMS), Milsoft Outage Management/Tracking system for monitoring of outages.	

Indicator	Summary of Findings	Maturity Level
Indicator 12 – Public Communications	• The majority of plans demonstrated prevalent use of a diverse set of communication channels, such as email, phone calls and texts, cable media and social media to communicate with the public, stakeholders, and customers before, during and after an adverse weather event. • The majority of entities provided their communication plans to reach the following groups: the media, customers, fuel suppliers, the Commission, OPUC, local and state government officials, emergency operations centers, the reliability coordinator and critical load customers. • The EOPs addressed procedures for handling customer complaints.	

4.3 Non-ERCOT Power Regions: Summary of Findings for All Entities

The following table provides a summary of detailed findings based on Guidehouse's review of the emergency operation plans provided by the IOUs, PGCs as well as MOUs, Coops, and RAs that operate outside of the ERCOT region.

Table 11 Emergency Preparedness Findings for Non-ERCOT Entities

● High Maturity ● Medium Maturity ○ Low Maturity

Indicator	Summary of Findings	Maturity Level
Indicator 1 – ICS Structure	• Most of the entities defined their ICS structure and governance for their emergency response and established a process to track and address lessons learned to demonstrate continuous improvement, but not all of them. • A few entities provided an outline with responsibilities for those who would oversee the emergency response but did not provide the governance and reporting structure.	●
Indicator 2 – Asset Management and Inspections	• A majority of entities did not provide sufficient information to demonstrate that multiple practices are in place to ensure that critical infrastructure will operate properly during adverse weather events. • A few entities identified critical assets. One discussed capital emergency spare parts and materials, listing out frequently used electric T&D materials, and mentioned items held as backup equipment. It recognized the need for maintaining the spare parts and materials over a specific timeline. They also preidentified facilities that would serve as local dispatch centers. • None of the entities discussed identifying potential points of failure and setting up plans for quick remediation.	○
Indicator 3 – Risk Management	• Most of the plans included multiple processes, procedures, and checklists to assess system readiness and risks in advance of adverse weather events; however, a few of the reviewed plans did not provide this critical information. • Some EOPs had well documented winter/summer weatherization and hurricane/flood/wildfire procedures and checklists; however, some of the entities could improve their procedures and checklists by providing more thorough seasonal assessment of their systems. • Few of the entities included actions to take if an issue occurs to remediate the situation to continue providing electric service to customers.	●
Indicator 4 – Staffing	• All of the reviewed entities defined roles and responsibilities for their primary staff. • However, they did not define backup staff in case primary staff are not available. • One EOP specified the number of staff in various roles that would be required for various levels of emergencies (e.g., additional crew needed for restoration of power).	●
Indicator 5 – Mutual Assistance and Support	• Some of the entities established arrangements and communications procedures for requesting mutual aid. • A few others mentioned mutual aid in general but did not state that they set up specific agreements in advance. • Almost half of the entities did not mention any information related to mutual aid in their EOPs.	○

Indicator	Summary of Findings	Maturity Level
Indicator 6 – Training and Emergency Drills	• All the entities mentioned conducting training for their staff and performing annual emergency drills. • Very few EOPs specified who receives training on the emergency procedures and is required to participate in drills. • None of the EOPs mentioned training their emergency response team (EMT)'s backup counterparts. • Additionally, EOPs rarely specified which type of hazards were addressed in training and drills. • Most EOPs did not demonstrate tracking of personnel training or participation in drills for various hazards and lacked lessons learned procedures for debriefs.	
Indicator 7 – Situational Awareness	• Some of the reviewed plans provided a process to recognize and monitor adverse weather by utilizing various weather sources and foundational tools. • Few of the plans demonstrated processes to assure situational awareness is deployed during all phases of severe weather response. • Only one plan did not include any discussion of situational awareness.	
Indicator 8 – System Design and Hardening	• The EOPs included very limited information in regard to short-term and long-term system improvements. If long-term plans to upgrade the T&D system exist, EOPs did not include this information in detail.	
Indicator 9 – Communication System	• Some of the reviewed EOPs established primary and secondary communication systems and protocols used to communicate internally within the organization during an emergency. • A few of the EOPs established primary communication systems but did not set up backup systems in case the primary communication system fails. • One entity did not include any processes or protocols for internal communications.	
Indicator 10 – Activation of EOP	• Most of the reviewed plans identified the decision-makers and defined the conditions necessary to activate the EOPs. Activation of the EOPs was often based on well-defined levels of severity of the event along with specified activation triggers. • One EOP specified in detail how the organization plans to scale their response, their team and staff responsibilities based on various event impact and complexity levels. • A few of the EOPs defined the decision-makers for EOP activation, but did not define the conditions (e.g., metrics, types of weather events, etc.), or vice versa – defined the conditions, but did not clearly specify the decision-makers.	

Indicator	Summary of Findings	Maturity Level
 **Indicator 11 –** Emergency Management and Planning Systems, Technologies, and Automation	• The majority of the reviewed EOPs did not demonstrate use of advanced systems, tools, technology, software, or automation processes that streamline management and reporting (e.g., tracking of equipment, tracking of outages, staff, completed actions, issues, metrics and benchmarks) prior to and/or during an emergency response. • A few entities demonstrated their use of advanced technologies and tools in their EOPs. Examples of advanced technologies that were mentioned include emergency tools to execute and track emergency response, predictive risk models, systems to monitor status of response based on alert level, outage management program, which provides mapping, outage prediction, incident management and reconfiguration functionality, Governance, Risk and Compliance tools to ensure compliance with core NERC requirements, loss projection tools to estimate affected areas and needed response make up, tools to project resources to restoration ratio as well as use of helicopters for damage assessment.	
 **Indicator 12 –** Public Communications	• The majority of plans demonstrated prevalent use of a diverse set of communication channels, such as email, phone calls and texts, cable media and social media to communicate with the public, stakeholders, and customers before, during and after an adverse weather event. • A few of the entities did not provide their public communication procedures and strategies with the following groups required under 16 TAC §25.53: the media, customers, fuel suppliers, the Commission, OPUC, local and state government officials, emergency operations centers, the reliability coordinator and critical load customers.	

5. Seasonal Weather Analysis for 2024 and 2025

In adherence with Texas Utility Code § 186.007, ERCOT performed an analysis of some of the reporting data required by 16 TAC § 25.55 and provided the analysis to the PUCT. The information provided by ERCOT prepared the following summary which provides additional insight into the expected performance of Texas electric entities during extreme seasonal weather.

ERCOT's analysis included the following:

1. Compile weather-zone averaged minimum and maximum ambient temperatures at which generation resources and Transmission Service Provider (TSP) facilities have experienced sustained operations. These temperatures are based on market participant-provided data as reported in Declarations of Preparedness[27] submitted to ERCOT by 12/1/23 (for minimum temperatures) and 6/1/24 (for maximum temperatures).

2. Compare the average temperatures calculated in 1) with the 95th percentile minimum average 72-hour wind chill temperature (for winter) and with the 95th percentile maximum average 72-hour temperature (for summer) specific to each of the ten weather zones in the ERCOT historical weather study, and

3. Draw inferences from the differences between the averaged weather zone based sustained temperatures and the historical weather study temperatures to estimate the ability of the electric grid to withstand extreme weather conditions.

In addition to ERCOT's analysis, Guidehouse performed an assessment of all available data for the entities that are not part of the ERCOT power region to identify additional information regarding those electric entities ability to sustain operations through extreme weather for winter 2024/2025 winter and summer 2025.

5.1 ERCOT Winter Data Analysis

For its analysis of winter weather performance, ERCOT compared data reported by electric entities and compared it against the established 95th percentile minimum average 72-hour wind chill temperature as part of their declarations of weather preparedness submitted just prior to the winter of 2023/2024.

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[27] Declaration of Preparedness documents are required by applicable electric entities in the ERCOT power region by 16 TAC § 25.55.

In its July 2022 Historical Weather Study[28], ERCOT developed the 95th percentile minimum average 72-hour wind chill temperatures for the 10 different weather zones within the ERCOT power region, as referenced in 16 TAC § 25.55(c)(1)(B) and (f)(1)(B). The 95th percentile minimum average 72-hour wind chill temperatures represent the weather zone specific cold conditions for which each generation resource and TSP facility must implement weather emergency preparation measures that could reasonably be expected to ensure sustained operation.

ERCOT calculated the average minimum experienced ambient temperature at which operation was sustained, as reported by the entities within each zone. The average minimum experienced ambient temperature in which operation was sustained represents the average lowest ambient outside temperature at which facilities within each individual weather zone maintained operation of the facilities without outages taken. This temperature is reported for both transmission and generation facilities. It is important to recognize that these average temperatures (average minimum experienced ambient temperature) do not take into consideration any simultaneous wind that may have been occurring at those times (i.e., they are dry bulb temperatures and do not account for wind chill values).

ERCOT then calculated the percentage of minimum experienced temperatures which were less than the 95th percentile minimum average 72-hour wind chill temperature. This represents the percentage of facilities in each weather zone for which the minimum ambient temperature at which they have sustained operations is at or below the wind chill values (95th percentile minimum average 72-hour wind chill temperatures).

Table 12 and **Table 13** provide the full breakdown of the winter figures by weather zone within ERCOT.

Design temperatures and wind speeds were available for approximately 59% of the TSP facilities and 83% of the generation resources listed in Tables 12 and 13. For those TSP facilities that submitted their design data, 100% of the resultant calculated wind chill values were below the chart wind chill values. For the generation resources that value was 96.9%.

As previously stated, the average minimum experienced ambient temperatures provided in Tables 12 and 13 do not take into consideration simultaneous wind that may likely occur during those periods of cold temperatures, ERCOT calculated the resultant wind chill if those average temperatures (average maximum experienced ambient temperature) had occurred with wind speeds of 10 mph and 20 mph. The results of this analysis showed that the percentages of facilities that maintained operation in each

[28] ERCOT Historical Weather Study Final Report Version 1.0, https://interchange.puc.texas.gov/Documents/52691_6_1221755.PDF

weather zone for which the average minimum experienced ambient temperature plus wind chill of 10 mph and 20 mph increased. The increased percentages show that the facilities would sustain operation at a higher percentage with the wind chill factored in.

In summary, ERCOT's analysis indicates that the majority of transmission facilities and generation resources are capable of maintaining operation in the winter conditions required by the PUC's Weather Emergency Preparedness rule.

Table 12. Winter Data for TSP Facilities

Weather Zone	95th Percentile Minimum Average 72-hour Wind Chill (°F)	Facilities Count	Average Minimum Experienced Ambient Temp (°F) at which Operation Sustained	% of Min Exp Temps < 95th Percentile Wind Chill
Coast	18.1	392	12.7	90.3%
East	4.4	347	-5.8	87.9%
Far West	1.3	713	-4.9	75.9%
North	-5.0	387	-11.8	95.3%
North Central	-0.5	1440	-10.3	97.4%
Panhandle	-17.6	60	-8.6	3.3%
South Central	8.4	651	5.2	75.7%
Southern	16.3	292	9.6	100.0%
Valley	20	138	13.3	84.8%
West	0.3	516	-3.4	77.3%
		4936		

Table 13. Winter Data for Generation Resources

Weather Zone	95th Percentile Minimum Average 72-hour Wind Chill (°F)	Facilities Count	Average Minimum Experienced Ambient Temp (°F) at which Operation Sustained	% of Min Exp Temps < 95th Percentile Wind Chill
Coast	18.1	231	17.8	66.7%
East	4.4	35	8.3	40.0%
Far West	1.3	152	7.9	23.0%
North	-5.0	74	5.7	18.9%
North Central	-0.5	143	6.2	25.9%
Panhandle	-17.6	40	-2.5	5.0%
South Central	8.4	82	10.4	31.7%
Southern	16.3	77	19.1	29.9%
Valley	20	56	22.6	30.4%
West	0.3	122	7.4	21.3%
		1012		

5.2 ERCOT Summer Data Analysis

For its analysis of summer weather performance, ERCOT compared data reported by electric entities and compared it against the established 95th percentile 72-hour maximum average temperature to evaluate operational performance of the electric entities in the summer of 2024.

In its July 2022 Historical Weather Study[29], ERCOT developed the 95th percentile maximum average 72-hour temperatures for the 10 different weather zones within the ERCOT Interconnection, as referenced in 16 TAC § 25.55(c)(2)(B) and (f)(2)(B). The 95th percentile maximum average 72-hour temperatures represent the weather zone specific hot conditions for which each generation resource and TSP facility must implement weather emergency preparation measures that could reasonably be expected to ensure sustained operation.

ERCOT calculated the average maximum experienced ambient temperature for each weather zone, as reported by the entities within each zone. The maximum experienced ambient temperature represents the highest ambient outside temperature recorded at each transmission and generation facility at which sustained operation was achieved.

ERCOT then calculated the percentage of maximum experienced temperatures that were greater than the 95th percentile maximum average 72-hour high temperature for

[29] 2021 ERCOT Historical Weather Study Final Report Version 1.0, 52691_5_1174266.PDF (texas.gov)

each weather zone. This represents the percentage of facilities in each weather zone for which the maximum ambient temperature at which they have sustained operations is greater than the rule requirement.

Table 14 and **Table 15** provide the full breakdown of the summer figures by weather zone within ERCOT.

It is important to note that there is some variation in the facilities count numbers in Tables 12 & 13 and Tables 14 & 15. The difference in the facilities counts between the summer data and winter data tables for the number of facilities in each zone is changing from season to season.

ERCOT's analysis indicates that nearly 100% of the transmission facilities have sustained operation at or above the 95th percentile maximum average 72-hour high temperature. Approximately 98.3% of the generation resources have sustained operation at or above the high temperature. This lower value for generation resources can be explained by the fact that there are numerous new generation resources in ERCOT that have not yet operated through a summer season and do not have historical data to provide for analysis.

In summary, the analysis indicates that the majority of transmission facilities and generation resources are capable of operating in the summer conditions required by the PUCT's Weather Emergency Preparedness rule.

Table 14. Summer Data for TSP Facilities

Weather Zone	95th Percentile 72-hour Maximum Average Temp (°F)	Facilities Count	Average Max Experienced Ambient Temp (°F)	% Max Exp Temp > 95th Percentile 72-hour Average Max Temp
Coast	90.1	462	107.7	100.0%
East	91.6	332	115.4	100.0%
Far West	92.7	718	116.6	100.0%
North	96.1	375	116.1	100.0%
North Central	95.4	1430	116.5	99.5%
Panhandle	90.3	62	113.3	100.0%
South Central	92.3	723	108.7	100.0%
Southern	88.9	389	114.2	100.0%
Valley	88.6	170	112.2	100.0%
West	92.9	550	113.2	100.0%
		5211		

Table 15. Summer Data for Generation Resources

Weather Zone	95th Percentile 72-hour Average High Temp (°F)	Facilities Count	Average Max Experienced Ambient Temp (°F)	% Max Exp Temp > 95th Percentile 72-hour Average High Temp
Coast	90.1	265	106.2	99.2%
East	91.6	48	107.4	93.8%
Far West	92.7	203	108.9	99.0%
North	96.1	87	109.8	98.9%
North Central	95.4	169	109.4	96.4%
Panhandle	90.3	41	107.7	100.0%
South Central	92.3	93	108.6	95.7%
Southern	88.9	89	107.3	100.0%
Valley	88.6	62	106.4	100.0%
West	92.9	128	109	100.0%
		1185		

5.3 NOAA Winter 2024/2025 Weather Outlook

The National Oceanic and Atmospheric Administration's (NOAA's) Climate Prediction Center forecasts varying probabilities for above normal temperatures and below normal precipitation for the upcoming winter across the state of Texas.

Most of Southeast and South Texas have a 50-60% chance of above normal temperatures this winter (based on a 1991-2020, 30-year normal), which is the highest likelihood of above normal across Texas. Far West Texas and the Panhandle have the lowest probability for above normal temperatures this winter at 33-40%. Between these two regions, the largest part of the state is forecasted for a 40-50% chance of above normal temperatures this winter.

Texas is forecasted to see below normal precipitation for the upcoming winter season. The majority of the state has a 50-60% chance of below normal precipitation. Small areas over Northeast Texas and the Panhandle are showing a 40-50% chance of below normal precipitation.

Figure 5-1 NOAA Winter 2024/2025 Temperature Outlook

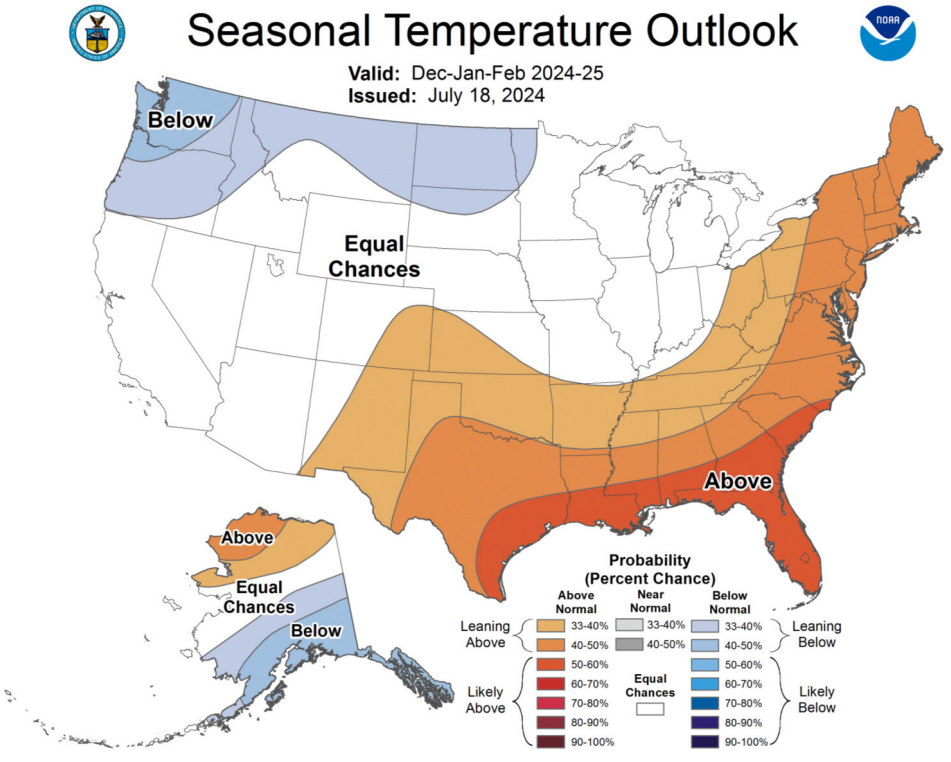
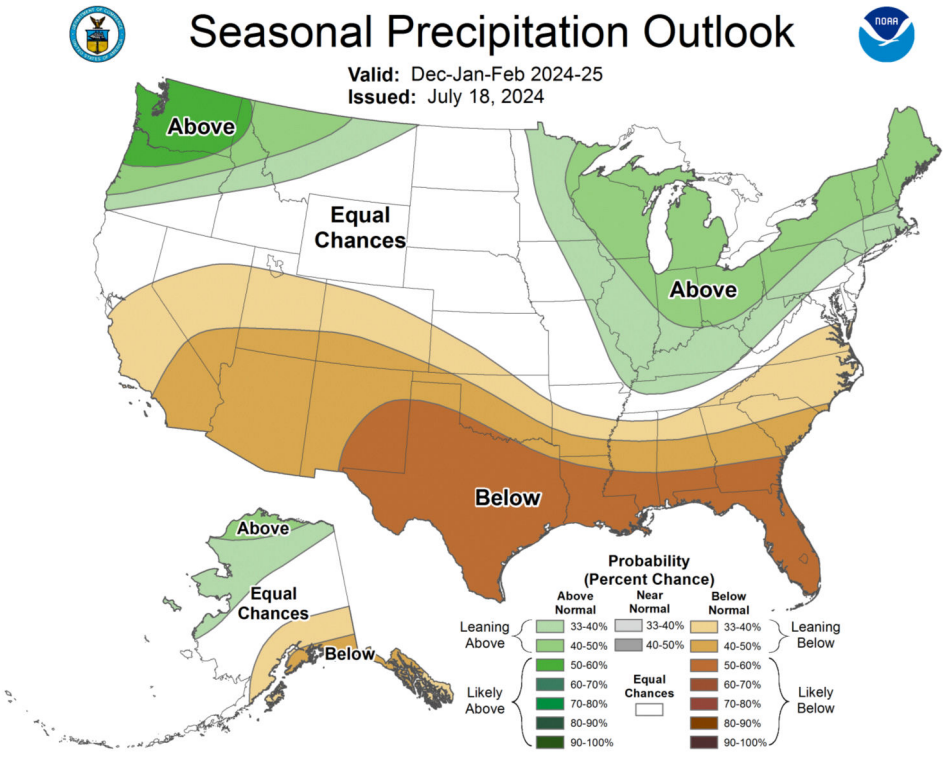


Figure 5-2 NOAA Winter 2024/2025 Precipitation Outlook



5.4 ERCOT Preliminary Winter 2024/2025 Weather Outlook

The ERCOT preliminary winter weather outlook shows an above normal temperature pattern and below normal precipitation across the majority of Texas between December and February.

The East, South Central, and South zones have the highest potential for above normal temperatures this winter, including Houston, San Antonio, and Austin.

A La Nina pattern is currently developing and is expected to impact the winter weather patterns. This most commonly results in a relatively dry pattern across Texas. The below normal precipitation forecast across most of the state this winter would support increasing drought heading into next spring.

To note, the seasonal outlooks are averages across three months and do not discount potential for an extreme winter weather event. In fact, extreme cold periods have been occurring with greater frequency in recent winters – even in otherwise very mild winters. For example, Dallas-Fort Worth (DFW) has recorded 14° or colder in five of the past eight winters. That same threshold was met only five of the previous twenty-five winters. The 2024-25 winter should be approached with the potential for a period of extreme winter weather.

Figure 5-3 ERCOT Preliminary Winter 2024/2025 Temperature Outlook

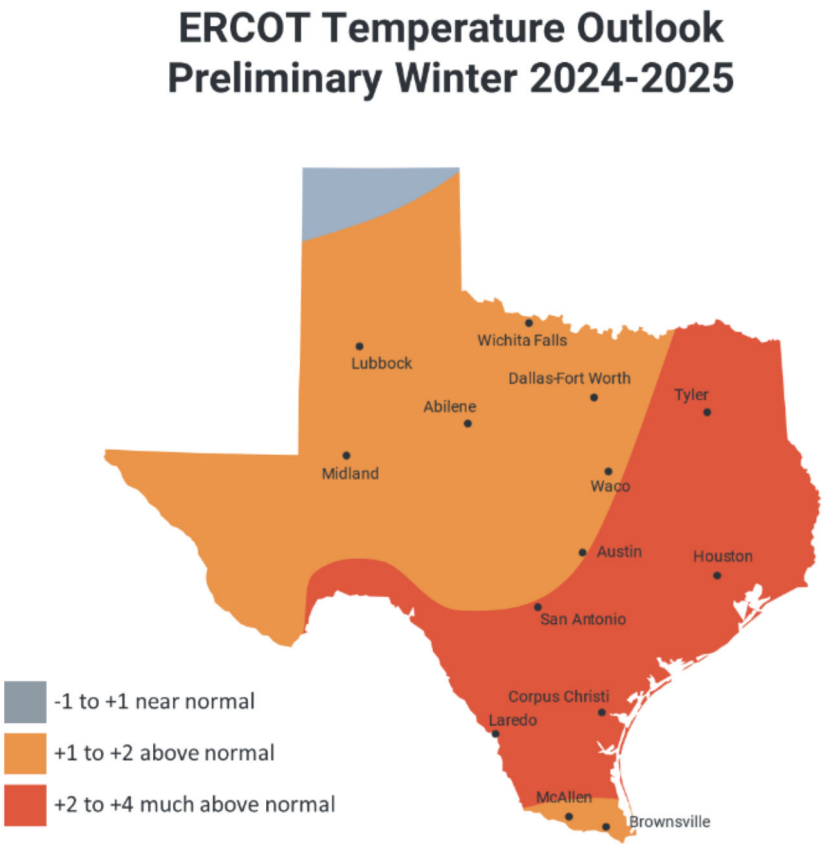
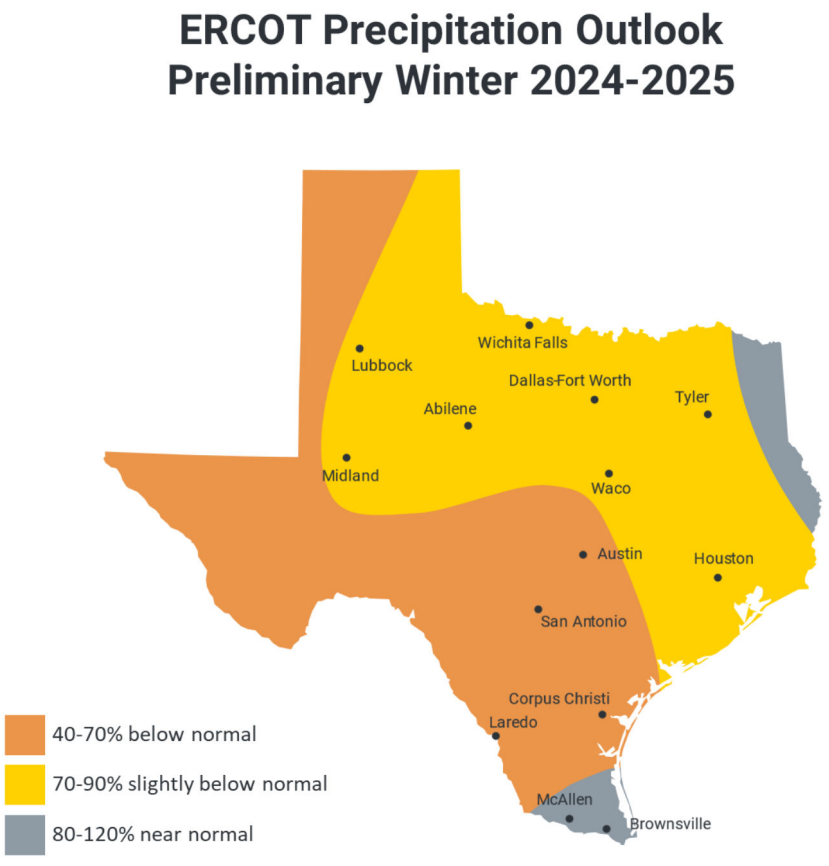


Figure 5-4 ERCOT Preliminary Winter 2024/2025 Precipitation Outlook



ERCOT's forecast is preliminary at the time of reporting and may be adjusted if necessary. ERCOT's forecast for winter 2024/2025 will be finalized in November.

5.5 NOAA Summer 2025 Weather Outlook

NOAA's Climate Prediction Center is forecasting above normal temperatures as the most likely scenario with equal chances for above normal, below normal, and normal rainfall.

All of Texas falls within the 50-60% probability for above normal temperatures next summer.

Regarding precipitation, NOAA's Climate Prediction Center does not currently have a lean toward any forecast category, instead projecting equal chances for above, below, and normal precipitation next summer across Texas.

Figure 5-5 NOAA Summer 2025 Temperature Outlook

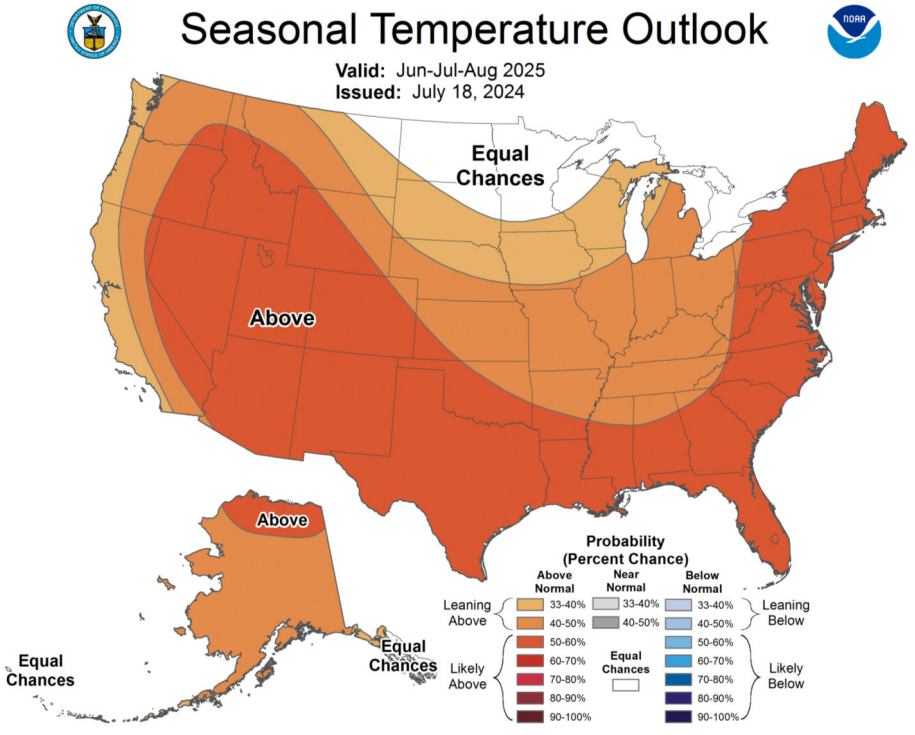
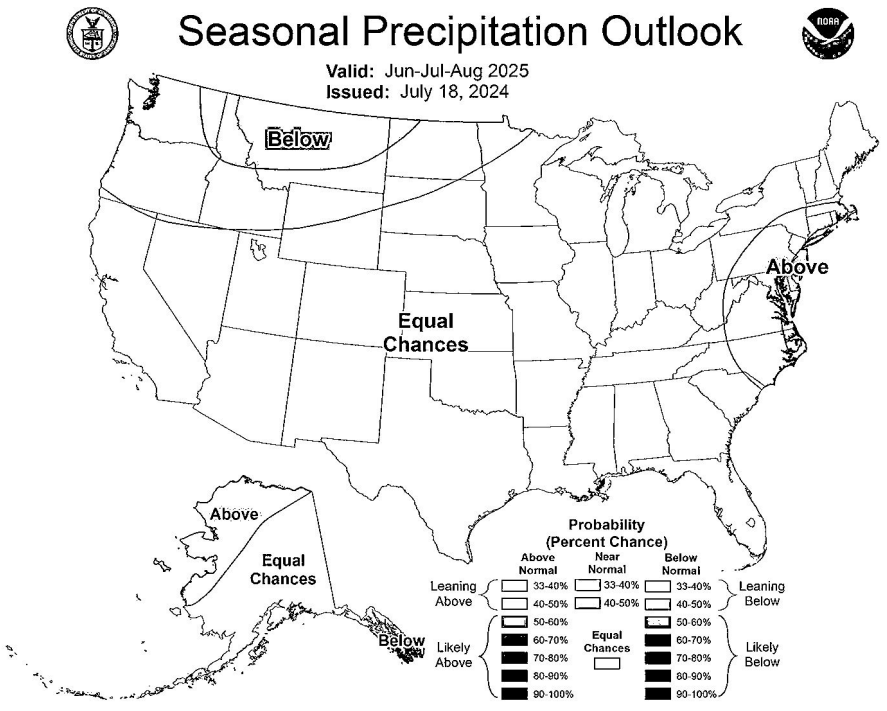


Figure 5-6 NOAA Summer 2025 Precipitation Outlook



5.6 Non-ERCOT Power Region Analysis

Within the state of Texas, there are multiple markets and Reliability Coordinators (RCs). Each of the RCs is responsible for ensuring the reliable operation of the electric facilities within their respective territories.

ERCOT is the most prominent RC in Texas. ERCOT covers 75% of the land mass of Texas and 90% of the electric load. Midcontinent Independent System Operator (MISO) is the RC responsible for the majority of east Texas outside of the ERCOT power region. Southwest Power Pool (SPP) is the Reliability Coordinator responsible for north Texas and portions of northeast Texas outside of the ERCOT power region. Southwest Power Pool is also the RC responsible for the portion of west Texas that is outside of the ERCOT power region, under the name of SPPW.

Each of these RCs has winter and summer preparedness studies, analysis, and requirements. Although MISO and SPP have operational oversight and responsibilities for facilities in Texas, the vast majority of their systems are outside of Texas. This results in SPP and MISO focusing on their whole systems when performing analysis and studies for seasonal weather preparedness. Figure 5-5 provides an overview of the territories of the RCs.

Figure 5-7 Reliability Coordinator Areas, as of July 2022[30]

16 TAC § 25.55 requires that entities report the data to ERCOT that was used in Sections 5.1 and 5.2. 16 TAC § 25.55 is not applicable to electric entities in Texas that are in the MISO or SPP areas. This results in specific data analysis for the ERCOT power region but does not allow for the same level of analysis of the non-ERCOT portions of the state.

SPP published its 2024 Deliverability Study Winter Season Report on June 4, 2024[31]. The study indicates that throughout the entire SPP area (not just Texas) that SPP will be able to meet planning margins to meet demand and provide adequate reserves during the 2024/2025 winter. SPP has not published documentation outlying additional details for the 2024/2025 winter or 2025 summer.

MISO has not published its winter 2024/2025 or summer 2025 analysis documentation at the time of this report.

At the federal regulatory level, all applicable registered entities that meet the criteria for NERC registration must adhere to NERC Reliability Standards. NERC Reliability Standard EOP-011-4 has an effective date of October 1, 2024, and requires registered Transmission Operators and registered RCs to have emergency operation plans that

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[30]NERC Reliability Coordinators, as of July 2022 https://www.nerc.com/pa/rrm/bpsa/Pages/RCs.aspx

[31] 2024 Deliverability Study Winter Season Report, https://www.spp.org/Documents/71726/2024%20Deliverability%20Study%20Winter%20Season%20Report.docx

include provisions to determine the reliability impact of cold weather conditions and extreme weather conditions[32]. NERC Reliability Standard EOP-012-2 has an effective date of October 1, 2024 and requires registered Generator Owners and Generator Operators to evaluate extreme cold weather temperatures for each of its applicable units, implement freeze protection measures to protect critical components that provide the capability to operate at the unit's extreme cold weather temperature with sustained concurrent twenty mph wind speed, and implement a cold weather preparedness plan for generating units[33].

The NERC Reliability Standards provide an additional layer of regulatory oversight for entities in Texas. The entities are required to adhere to both state regulations through the PUCT, Texas Administrative Code, Texas Utilities Code, and ERCOT protocols (for entities within the ERCOT power region) as well as NERC Reliability Standards, as mandated by the Federal Power Act of 2005.

ERCOT's power region includes approximately 75% of the land mass and 90% of the electric load of Texas. ERCOT's analysis of summer and winter operational temperatures determined that the majority of generation and transmission assets have proven capable of performing beyond the expected high and low temperatures for each region within ERCOT. SPP's study results indicate that generation within the SPP region will exceed required operational margins for the 2024/2025 winter. Transmission and generation electric entities are required to adhere to mandatory NERC Reliability Standards EOP-011-2 and EOP-012-2 which require preventative measures be taken to withstand extreme weather conditions. The culmination of these data points led Guidehouse to determine that electric entities in Texas are capable of maintaining operational reliability through the upcoming winter of 2024/2025 and summer of 2025 weather conditions[34].

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[32] NERC Reliability Standard EOP-011-4, Final Ballot_Phase 2_EOP-011-4 (nerc.com)

[33] NERC Reliability Standard EOP-012-2, Final Ballot_EOP-012-1_clean (nerc.com)

[34] This determination is based on weather outlook currently forecast by NOAA described earlier in this report.

6. Conclusion

A review of EOPs demonstrates foundational programmatic weather emergency preparedness in Texas. However, such review is limited in scope as it does not comprehensively cover resource adequacy, weatherization, system hardening efforts, or spare critical inventory, nor does information in the EOPs necessarily reflect actual implementation and activation levels of any one EOP or a group of EOPs in the aggregate.

The review was strictly focused on the EOP submittals required by 16 TAC § 25.53. Guidehouse acknowledges that electric entities may have additional processes, procedures, tools, and controls in place that are not fully represented in the 16 TAC § 25.53 EOP submittals.

Texas electric entities are largely prepared for extreme weather events based on the information and processes provided in the EOPs. Both the ERCOT power region and non-ERCOT power region entities submitted EOPs that, as a group, show basic emergency preparedness programs and measures are in place. The electric entities have varying levels of maturity in a variety of weather preparedness areas and all entities have an opportunity to further improve.

Approximately 70% of all applicable electric entities provided an EOP submission, either EOP documentation or an affidavit that there were no material changes to the EOP, in 2024. The remaining entities that did not submit were overwhelmingly low risk. The 2024 EOP data submittals closely adhered to the requirements of 16 TAC § 25.53 and provided the basic required information.

A detailed review of all high-risk entities a significant number of medium risk entities' EOPs for the ERCOT and non-ERCOT power regions demonstrated that entities had procedures in place to prepare and respond to weather emergencies further enforced the determination that entities are largely prepared for extreme weather.

There is significant overlap of multiple efforts across the PUCT that focus on enhancing preparation and response for weather events and system improvements. These ongoing efforts, such as 16 TAC § 25.53, 16 TAC § 25.55, and system hardening efforts combined can provide a robust view of Texas electric grid's resiliency efforts. This evaluation was focused solely on the based annexes and adherence to 16 TAC § 25.53. The maturity rankings are based on the EOPs submitted to comply with 16 TAC § 25.53 but are based on comparisons to best practices above and beyond the requirements specified by rule.

7. Recommendations

Guidehouse provided recommendations to the PUCT informed by the overarching analysis, with insights from EOP reviews, emergency weather preparedness assessments, and industry best practices. Guidehouse's recommendations are focused on promoting long-term reliability and resiliency of the Texas electric grid, streamlining, and improving the EOP submission process for entities, and improving monitoring and compliance methods for the PUCT. The recommendations are based upon the information submitted by the applicable electric entities, and reviewed by Guidehouse, as part of the weather emergency preparedness portion of the EOP submittals required by 16 TAC §25.53.

7.1 Improve Weather Emergency Preparedness Across Texas

Guidehouse recommends PUCT consider the following suggestions to improve the state of preparedness of electric entities across Texas for future adverse weather events:

1. **Establish financial penalties for noncompliance with 16 TAC § 25.53 for electric entities**.

   Implementing a penalty structure, including public filings of findings would provide an additional tool for PUCT to incentivize entities to file all the required information for 16 TAC § 25.53. The penalty structure should include escalation of financial penalties for continued noncompliance with 16 TAC § 25.53.

2. **Establish annual or bi-annual workshops and training sessions for electric entities and entities in the process of registering with the PUCT**.

   PUCT should consider creating workshops and/or training sessions for entities to provide clarity around requirements and expectations for 16 TAC § 25.53 submissions. The workshops should be developed to also share best practices and encourage participation from all applicable entities. The workshops should focus on improving reliability through strengthening EOP submissions and enhancing organizational activities across Texas. The workshops should be developed to include regulatory compliance staff, incident commanders, electric entity representatives and subject matter experts in charge of EOPs, as well as nationally recognized experts in emergency preparedness to share best practices in preparing for adverse weather events (similar to the summer and winter preparation readiness workshops organized by ERCOT).

Attendance at the workshops should be highly encouraged and tracked by the PUCT. This will help identify the audience for each workshop and help to shape topics for future workshops.

7.2 Improve Weather Emergency Operation Plans

Guidehouse suggests electric entities consider the following recommendations to improve their emergency operation plans and simplify EOP review process when developing and updating their emergency operations plans in the future:

1. **Establish greater focus on actions to prepare their power delivery functions to withstand extreme weather events and additional measures taken to provide power to critical customers.**

   The vast majority of the EOP submittals reviewed in 2024 focused on employee safety, building closures, evacuations, facilitation of critical payments, cash forecasting, and business continuity. A large number of the EOPs did not provide detailed information that demonstrates their considerations in providing uninterruptible electric power services during emergencies, or rapid response to loss of generation, load, and electric infrastructure.

   One example identified in multiple EOP submissions is the inclusion of a detailed list of food items needed for an entity's staff during emergency situations. This provides a detailed list of what is needed to support staff, but the plans did not include strategies, or equipment needs for field responses. Plans should include a focus on equipment, tools, and resources needed to provide response to infrastructure damage (transmission and distribution lines and substations, generation facilities and interconnection substations). The EOPs should include a spare equipment strategy and resource plan to acquire additional infrastructure equipment in response to weather related event infrastructure damage.

   Additionally, a very significant number of EOPs did not include detailed processes or procedures beyond the basic requirements of the language of 16 TAC § 25.53. EOPs would frequently reference processes or procedures that an electric entity follows in preparation and response to weather related events but did not include the processes or procedures in the EOP submittal. This created a gap in reviewing the documentation and verifying an electric entity's capabilities to prepare and respond to abnormal system conditions as part of weather-related events.

   Guidehouse recognizes that electric entities have emergency response procedures (system restoration, mitigation plans for system deviations, etc.) that may not have been included as part of the EOP submission for 16 TAC § 25.53.

2. **Develop uniform emergency operations processes, procedures, and tools across the organization that consistently apply across all of the subsidiary power delivery business units and address all types of identified emergency response actions.**

   During the 2024 EOP submittal review, Guidehouse noted that submittals for organizations frequently varied between affiliates, and in some cases, individual sites within an organization. Plans and procedures varied drastically in submissions for individual entities/affiliates, and even individual sites. This was especially prevalent in PGC submissions where a single submission was made for multiple, individually registered entities that are part of a single larger corporate organization.

   Electric entities should identify opportunities to standardize processes, plans, procedures, and documentation into a uniform document or uniform template providing a standardized approach across its business functions and affiliated entities. If an organization operates multiple generation plants or infrastructure systems, it should develop site-specific procedures integrated into one plan, using a templated approach. Using a standardized approach across affiliated organizations and individual generation facilities will create uniform documentation and utilize an organizational approach to streamline the information presented in the documentation. This approach will provide efficiency in reviewing, revising, and ultimately implementing plans in an emergency situation within organizations.

3. **The EOP should include fully developed content for its emergency response preparation and response procedures.**

   During the 2024 EOP review, Guidehouse identified a repeated pattern of EOPs providing very high-level detail without any supporting content or specific actions taken. A commonly identified example was in the sections of the EOP submittals that identified staffing needs and response for various emergencies. The plans would frequently state that appropriate staffing levels would be determined, and communication plans will be developed when an emergency occurs. The EOPs would not provide any additional detail as to how the staffing needs would be identified and staff would be put in place to prepare and respond to emergencies.

   EOPs should include detailed information explaining how the electric entities plan, develop, and establish staffing plans within the organization. Staff should be trained in the developed emergency procedures in advance of an adverse weather event to improve the speed and quality of their staff's response during an emergency.

Additionally, EOPs often provided high-level responses, such as in the event of abnormal system conditions, the entity will adhere to its applicable operating procedures. The EOP submittals did not include those operating procedures or provide any additional detail as to what is included in the operating procedures. EOPs should include a comprehensive response to abnormal system conditions and efforts to restore a system, for all events, not just weather-related events. It is critical for the PUCT to be able to review and verify procedures used by entities in preparation and response to abnormal system conditions. This will allow the PUCT to have better insight into the stability and reliability of the bulk electric system in Texas.

7.3 16 TAC § 25.53 Enhancements

Guidehouse recommends PUCT consider the following recommendations to enhance 16 TAC § 25.53 to require more detailed emergency operation plans submitted by Texas electric entities[35]:

1. **Require individual EOP submittals for each individually registered electric entity**.

   Currently 16 TAC § 25.53 allows organizations to submit a single filing for multiple entities. This results in a parent organization making a single EOP submittal for multiple electric entities. Over the past three years of filings, there are many instances where the filings have been made under a company name that doesn't align with an entity's registered name. This includes filings that were made under a corporate entity name, an individual's name, or a name that doesn't align with any PUCT registration. This creates difficulty in tracking and verifying the submittals.

   16 TAC § 25.53 should be amended to require an EOP submission for each individual entity instead of a single filing by a parent organization. The EOP may be the same corporate-wide EOP, encompassing multiple entities, if it meets all the criteria of 16 TAC § 25.53, but it should be submitted for each entity using the exact entity name in the PUCT registration. 16 TAC § 25.53 should also include a standard formatting for the description for filing submittals. Examples of the standard formatting language are provided below.

   a. 20XX Emergency Operations Plan Submission for ENTITY,
   b. 20XX Executive Summary to Accompany ENTITY's EOP
   c. 20XX Affidavit for No Substantial Change for ENTITY

[35] The recommendations in this report do not constitute a petition for rulemaking activity under Texas Government Code § 2001.021.

d. 20XX Emergency Contacts for ENTITY

Adding additional language to require filings for each individual entity, even if the filing consists of a corporate wide plan for multiple affiliates, will allow efficient tracking and review of the EOPs by the PUCT staff.

2. **Develop a template for the executive summary for EOPs.**

Currently, 16 TAC § 25.53 requires entities to submit an executive summary as part of the EOP submissions. 16 TAC § 25.53 provides a list of requirements for the executive summary but does not include a required template. This has resulted in a diverse range of executive summaries. Executive summaries range from bare minimum, sometimes incomplete, to very comprehensive, detailed executive summaries.

Developing a mandatory executive summary template would

Appendix C: Sample Design Details

Guidehouse calculated the minimum sample size needed to achieve at least 10% absolute precision at 80% confidence level for estimating maturity ratings and assessing preparedness and response of energy providers to adverse weather events, as shown in Table C-18C-17. Guidehouse used a binomial distribution, and a conservative proportion estimate of 0.5 for each stratum. The team selected a sample of 37 EOPs, 30 EOPs from the ERCOT power region and 7 EOPs from the non-ERCOT power region, to conduct this in-depth assessment of weather emergency preparedness.

Table C-18 Sample Design for In-Depth EOP Reviews

	Stratum	Population (# of EOPs)	Sample Size (# of EOPs)	Stratum Weight (%)	Absolute Precision (%)
Non-ERCOT	All High and Medium Risk Entities	8	7	12%	10%
ERCOT	IOUs and T&D - High-Risk	9	4	13%	32%
	IOUs and T&D – Medium Risk	1	1	1%	0%
	MOUs/COOPs/RAs - High-Risk	7	5	10%	20%
	MOUs/COOPs/RAs – Medium Risk	22	10	33%	17%
	PGC - High-Risk	7	4	10%	29%

[redacted]					
	PGC - Medium Risk	13	6	19%	23%
	Total	**67**	**37**	**100%**	**8%**

provide a uniform and distinct roadmap of what is required within the EOP submittal for every electric entity. The template would also provide an efficient reference point for the entity and PUCT to identify and review the information relevant to 16 TAC § 25.53. The template would also allow PUCT staff to provide instructions and additional information to provide clarity and specificity as to what should be included in the executive summary. The executive summary template could also be developed to include lists of assets, identify asset changes (sales, acquisitions, etc.), and affiliated entities (*Section 6.3 Recommendation 7*).

3. **Consider updating the regulations to include explicit instructions defining the type of content that each section of the EOP should include at a minimum.**

   Guidehouse recommends following the content suggested in the emergency preparedness framework, preparedness indicators and best practices provided in this report. The Guidehouse team noted that the 16 TAC § 25.53 provides specific requirements for load shed annexes (16 TAC § 25.53 (e) (1) (B) (i-iii)) but does not provide additional detail for pandemic and epidemic annexes, wildfire annexes, hurricane annexes, cybersecurity annexes, or physical security annexes. 16 TAC § 25.53 should include specific information for each type of annex.

   a. Electric utilities, transmission and distribution utilities, municipally owned utilities, and electric cooperatives:
      i. Weather Emergency Annex ((e) (1) (A)) should be updated to include:
         1. Methodology, tools, and resources used for identification of extreme hot and cold weather events
         2. Notification to personnel, customers, and media of impending weather event and potential impact to the electric system
         3. Include actions specific to hot weather events and cold weather events
         4. Incorporate checklists required in §25.55 as part of the EOP submission (to bolster overview of preparedness within a single filing/single source)
         5. Require entities to include all applicable processes and procedures related to weather event preparation and response, instead of allowing a reference to internal processes and procedures in the submittals
         6. Spare equipment strategy to quickly replace equipment and restore infrastructure to normal operating condition
      ii. Wildfire Annex ((e) (1) (D)) should include:

1. Overview of system hardening efforts (temporary and long-term) to reduce the risk, and impact of potential wildfires
2. Use of fire risk maps (e.g., FEMA Wildfire Risk Index or assess for localized/Texas maps) to identify wildfire risks for electric infrastructure within an entity's system
3. Identification and communication of wildfire dangers internally to personnel and externally to customers, reliability entities, and applicable stakeholders
4. Additional steps taken by the electric entity to prevent or minimize interruption of service and damage to electric infrastructure
5. Spare equipment strategy to quickly replace equipment and restore infrastructure to normal operating condition

iii. Hurricane Annex ((e) (1) (E)) should include:

1. Steps taken to identify hurricanes and provide advance notification to personnel, customers, and media, specific to hurricane dangers and impact
2. Management of personnel to respond to hurricanes
3. Spare equipment strategy to quickly replace equipment and restore infrastructure to normal operating condition

b. Electric cooperatives, electric utility, and municipally owned utilities that operate generation resources, and power generation companies:

i. Weather Emergency Annex ((e) (2) (A)) should be updated to include:

1. Methodology, tools, and resources used for identification of extreme hot and cold weather events
2. Notification to personnel, customers, and media of impending weather event and potential impact to the electric system
3. Incorporate checklists required in 16 TAC § 25.55 as part of the EOP submission (to bolster overview of preparedness within a single filing/single source)
4. Require entities to include all their applicable processes and procedures related to weather event preparation and response, instead of allowing a reference to internal processes and procedures in the submittals
5. Spare equipment strategy to quickly replace equipment and restore infrastructure to normal operating condition

ii. Hurricane Annex ((e) (2) (E)) should include:

1. Steps taken to identify hurricanes and provide advance notification to personnel, applicable stakeholders, reliability

entities, and media, specific to hurricane dangers and impact to operations
2. Management of personnel to respond to hurricanes
3. Spare equipment strategy to quickly replace equipment and restore infrastructure to normal operating condition

c. Retail electric providers:
   i. Hurricane Annex ((e) (3) (B))
      1. Steps taken to identify hurricanes and provide advance notification to personnel, applicable stakeholders, reliability entities, and media, specific to hurricane dangers and impact to operations

4. Add a requirement to 16 TAC § 25.53 for a Flooding annex to EOP submittals.

Flooding can create significant challenges to electric entities (generation, transmission, and distribution). Staffing needs and equipment needs are significantly different for utilities responding to flooding based on the potential impact and duration of floods. High waters can take days and even weeks to recede in impacted areas. High water from flooding creates unique challenges for electric entities, such as identifying access capabilities to areas of high water. High water can also impact and damage equipment, causing sustained outages of equipment. Flooding continues to be a threat to electric entities, as highlighted during Hurricane Harvey, during which multiple substations experienced flooding and could not operate.

Currently, a flood annex is not specifically required in 16 TAC § 25.53, but a significant number of entities provided information in their EOP submittals regarding preparation and response to a flood event. Electric entities should develop and incorporate plans for managing power system facilities during flooding conditions so that they have a plan and are prepared in the event of flooding within their service territory or facilities. The annex should include the following:

a. Methodology used to identify flood plains and high-risk flood areas within an entity's system
b. List of flood plains and high-risk flood areas within an entity's system
c. Processes used to identify and prepare for potential flooding events
d. Equipment needed in a flood event

5. Add a requirement to 16 TAC § 25.53 for a Tornado annex to EOP submittals.

In areas of Texas that have an increased risk of tornadoes, preparation and identification of tornado risks is critical. Tornadoes can appear quickly and cause immense damage to anything within their paths. Areas of Texas are at higher risk of tornadoes and electric entities within those areas should be prepared to identify rapidly changing weather conditions that could lead to the formation of tornadoes.

Currently, a tornado annex is not specifically required in 16 TAC § 25.53, but a number of entities provided information in their EOP submittals regarding preparation and response to tornadoes. Electric entities should develop and incorporate plans for managing power system facilities during tornado conditions so that they have a plan and are prepared in the event of tornado damage within their service territory or facilities. The annex should include is plan should include the following:

a. Tools, processes, and resources used for identification of tornado risks within service territories and/or facility locations

b. Communication plan with organizational personnel, critical customers, regulatory bodies, and local media in the event of a tornado watch, tornado warning, and tornado damage

6. **Enhance the existing language of 16 TAC § 25.53 requiring all annexes be submitted with EOPs**.

Currently 16 TAC § 25.53 (d) states "If a provision in this section does not apply to an entity, the entity must include in its EOP an explanation of why the provision does not apply." During the review of the EOP submittals, Guidehouse identified a significant number of entities submitted EOPs that were missing specific annexes (e.g., Hurricane, Draught/Water Shortage) regarding weather related events. The EOPs did not provide any explanation as to why the annexes were not included.

EOP submittals should be comprehensive and include all information, or an explanation as to why a required annex is not included (e.g., Entity's facilities are not in hurricane evacuation routes as identified by TDEM). The language of 16 TAC § 25.53 should be further strengthened as a standalone requirement that all annexes be provided and if they are not applicable to an entity then an explanation must be provided. This should also be included in any future workshops (*Section 6.1 Recommendation 2*) and templates developed for EOP submittals (*Section 6.3 Recommendation 2*).

7. **Require a comprehensive list of assets be provided as part of the executive summary for PGCs**.

The current language of 16 TAC § 25.53 allows for the submission of a single EOP filing for joint and combined filings under paragraph (1). This allows a single filing for multiple facilities and affiliated entities but does not specifically require an organization to provide an extensive list of facilities or affiliated entities in the EOP submission. Mergers, sales, and acquisitions of facilities and organizations have occurred over the past three years. Multiple EOPs are filed under a parent organization name but don't specifically call out the individual affiliate entities or individual sites. This is especially prevalent for generation assets. A comprehensive list of affiliated entities and facilities under a single filing should be included as part of the executive summary.

The language of 16 TAC § 25.53 should add a requirement that the EOP filings should include a full list of affiliated organizations and facilities included in the EOP, including changes in facilities from the previous year (sale of assets, relinquishments, name changes).

8. **Enhance the existing requirements for drills in 16 TAC § 25.53 to include submittal of documentation of drill completion (via simulation, tabletop exercise, and/or actual event response) to support the provided EOPs**.

16 TAC § 25.53 (f) currently requires entities to conduct or participate in at least one drill each calendar year to test its EOP. The subsection requires entities to submit a notification to commission staff of the upcoming drill at least 30 days prior to the date of the drill.

There is not a requirement for entities to submit information that verifies the completion of the annual EOP drill. The language of 16 TAC § 25.53 should be updated to include all the information needed for PUCT staff to verify that the drill was performed. The information below should be included.

a. Overview of the drill performed
    i. Scenario of the drill – Hurricane, cold weather event, load shedding, etc.
    ii. Type of drill - table top, simulation, or activation of the EOP during an emergency situation

b. Roster of all personnel involved (including name and title),
c. Attendance log (with employee signatures) for personnel involved in the drill,
d. Agenda and operations logs for the drill
e. Assessment of drill to evaluate effectiveness and identify any enhancements to the EOP

9. Enhance the existing language of 16 TAC § 25.53 to limit the use of affidavits for EOPs without material changes.

16 TAC § 25.53 (c)(3)(B) allows entities to submit an affidavit and attestation stating that an entity did not make any material changes to its EOP in lieu of providing the EOP as part of the submittal. During the review of the EOP submittals, Guidehouse noted that the majority of the entities submitted an affidavit affirming there were not any material changes to the EOP in the previous years. Guidehouse then went to the previous year to review the EOP documents, often identifying an affidavit in 2023 as well. The result of these entities providing affidavits in 2023 and 2024 is that the PUCT has not received an updated EOP from these entities since the original submission in 2022.

While technically compliant with 16 TAC § 25.53, there is an inherent eventual need to update at least some component of an EOP regardless of whether an electric entity considers it inconsequential. PUCT should consider adding a specification requiring full EOP re-submittal at least once every two years, or at a less frequent period determined by PUCT staff. This would ensure that PUCT staff are receiving the most recent EOPs.

7.4 Other Considerations

1. Request declarations of weather preparedness for all applicable entities in Texas that are not part of the ERCOT power region.

16 TAC § 25.55 requires transmission and generation entities in the ERCOT power region to provide declarations of readiness for summer and winter each year. The declarations include identification of applicable facilities and assets, summary of all activities for weatherization, and ambient temperatures for reach applicable facility has experiences sustained operations. This information provides data points for ERCOT to perform additional analysis based on historical data from previous summer and winter seasons.

Entities that are not in the ERCOT power region are not required to provide this data to the PUCT. 16 TAC § 25.55 is applicable only to ERCOT power region entities but Guidehouse recommends that the commission request the same data from non-ERCOT power region entities to perform a historical analysis of non-ERCOT portions of the state to analyze the ability of those portions of the state to withstand extreme temperatures.

The information below should be requested by the PUCT for entities not in the ERCOT power region.

For generation entities, the following data should be provided:

1. Declaration of preparedness. A generation entity must submit to the PUCT, on a form prescribed by the PUCT, the following declarations of weather preparedness:

    a. No earlier than November 1 and no later than December 1 of each year, a generation entity must submit a declaration of winter weather preparedness for the upcoming winter season that:
        i. Identifies every resource under the entity's control for which the declaration is being submitted;
        ii. Summarizes all activities engaged in by the generation entity to complete the requirements of winter season preparations;
        iii. Provides the minimum ambient temperature at which each resource has experienced sustained operations, as measured at the resource site or the weather station nearest to the resource site; and
        iv. Includes a notarized attestation sworn to by the generation entity's highest-ranking representative, official, or officer with binding authority over the generation entity attesting to the completion of all applicable activities described in the submittal, and to the accuracy and veracity of the information described in the submittal.

    b. No earlier than May 1 and no later than June 1 of each year, a generation entity must submit a declaration of summer weather preparedness for the upcoming summer season that at a minimum:
        i. Identifies every resource under the generation entity's control for which the declaration is being submitted;
        ii. Summarizes all activities engaged in by the generation entity to complete the summer season preparations;
        iii. Provides the maximum ambient temperature at which each resource has experienced sustained operations, as measured at the resource site or the weather station nearest to the resource site; and
        iv. Includes a notarized attestation sworn to by the generation entity's highest-ranking representative, official, or officer with binding authority over the generation entity attesting to the completion of all applicable activities described the submittal, and to the accuracy and veracity of the information described in this submittal.

For transmission entities, the following data should be provided:

1. Declaration of preparedness. A generation entity must submit to the PUCT, on a form prescribed by the PUCT, the following declarations of weather preparedness:

    a. No earlier than November 1 and no later than December 1 of each year, transmission entities must submit a declaration of winter weather preparedness for the upcoming winter season that:
        i. Identifies each transmission substation or switchyard maintained by the transmission entity for which the declaration is being submitted;
        ii. Summarizes all activities engaged in by the transmission entity to complete winter season preparation,
        iii. Provides the minimum ambient temperature at which each transmission facility has experienced sustained operations, as measured at the substation or switchyard or the weather station nearest to the substation or switchyard; and
        iv. Includes a notarized attestation sworn to by the transmission entity's highest-ranking representative, official, or officer with binding authority over the transmission entity, attesting to the completion of all activities described in the submittal, except activities required to be completed after December 1, and to the accuracy and veracity of the information described in the submittal.

    b. No earlier than May 1 and no later than June 1 of each year, a transmission entity must submit a declaration of summer weather preparedness for the upcoming summer season that at a minimum:
        i. Identifies each transmission substation or switchyard maintained by the transmission entity for which the declaration is being submitted;
        ii. Summarizes all activities engaged in by the transmission entity to complete the requirements of summer season preparations;
        iii. Provides maximum ambient temperature at which each transmission facility has experienced sustained operations, as measured at the substation or switchyard or the weather station nearest to the substation or switchyard; and
        iv. Includes a notarized attestation sworn to by the transmission entity's highest-ranking representative, official, or officer with binding authority over the transmission entity attesting to the completion of all activities described in the submittal, except activities required to be completed after

June 1, and to the accuracy and veracity of the information described in the submittal.

2. **Coordinate with electric entities to develop and encourage use of a secure electronic filings process for emergency operation plan documents**.

   The existing PUCT filing process allows for confidential filings to protect critical information. The electronic filing process is utilized by the vast majority of the electric entities in Texas but not by all. A small number of entities submit paper copies for review by the PUCT but have a very limited chain of custody, resulting in personnel from those entities providing copies for a limited amount of time and then securing the documentation and removing it from PUCT staff.

   This process limits the amount of time and access to the EOPs for the entity. In the event that the PUCT needs to review the EOP documentation, the process must be repeated with the documentation being delivered, accounted for, and removed by the entity's personnel. The PUCT does not have immediate access to the documentation and must rely on the entity to provide the documentation or provide updates in the event of an immediate need to access the EOP documentation by PUCT personnel.

   PUCT should coordinate efforts with the entities that decline to use the electronic filing process to identify and address concerns with electronic submittal and secure storage of the EOP documents. PUCT and the entities, as well as any additional entities wanting to be involved in the process could identify solutions to address identified risks to the submittal and storage of electronic copies of the EOP documents.

3. **Develop a guided submittal process with specific parameters and backend mapping for filing submittals**.

   The current EOP submittal process in the PUCT's Agency Information System (AIS) allows users to have full control of the information in each submittal field. This results in submittals for corporate organizations instead of the registered subsidiaries. This also creates inconsistent submittal names for organizations (adding spaces or commas changes the name). It also allows users to submit documents for incorrect names or multiple submissions for a single entity under different entity names. The submittal process could be enhanced by adding backend pulldowns and/or selection criteria that includes only the proper names for entities that are registered with the PUCT. An additional option could be added to the pulldown list to allow unregistered entities that are currently undergoing the registration process to provide their submittals in AIS.

4. **Develop a backend tracking tool for EOP submittals based on filing number (53385) and entity names.**

   In addition to more rigid submittal inputs, PUCT staff should consider developing a backend tracking tool that facilitates efficient mapping of submittals for Project No. 53385. This backend tracking tool or database solution would combine the various repositories of entity data available to PUCT (e.g., AIS) and generate a single, robust export, resembling the EOP Submission Tracker workbook published by Guidehouse in March of 2024. Leveraging such a solution would allow PUCT to re-generate database exports instantaneously, on an ad hoc basis, while removing the current reliance on inefficient manual data entry.

5. **Establish a comprehensive risk framework and database tool to be used throughout the PUCT**.

   PUCT should gather comprehensive data for each entity using mandatory templated data requests for every registered organization. The data should then be stored in a database tool to provide all PUCT staff with a single source of information to be used across all PUCT work. The entity's inputs would generate a template that includes necessary submission components based on an entity's location, size, type, and other specifications. NERC and its supporting Regional Entities established an industry accepted model **(NERC's Risk-Based Compliance Oversight Framework)** that uses an entity's functions and characteristics to generate an Inherent Risk Assessment, then layers Internal Controls Evaluation, to assess an entity's risk and impact to the Bulk Electric System.

7.5 Best Practices for Weather Emergency Preparedness

Guidehouse recommends electric entities consider the following best practices to improve their emergency operation plans and update their plans in the future. Best practices listed below were informed by Guidehouse's review of the submitted EOPs and extreme weather preparedness. The best practices summarized below, if properly implemented, would significantly improve the level of preparedness of Texas electric entities for future adverse weather events.

General Best Practices

- Define organizational emergency preparedness and response levels based on expected level of impact on utility business operations and its customers and develop a response based on these levels for EOP activation, public communication, required staffing levels, mutual aid, etc.
- Incident commanders and those responsible for EOP development, among others, must attend and host workshops to expand and share knowledge to improve in all areas of emergency planning and response as well as share lessons learned from experts.

Indicator 1 – ICS Structure

- Define accountability and reporting hierarchical structure with an incident commander.
- Provide uniform, corporate-wide approach for managing emergencies.
- Set expectations for reliability, operational performance, and safety.
- Establish performance metrics and benchmarks to assess the effectiveness of preparation, response, and restoration efforts.
- Formally document continuous improvement process to update plans and procedures on a regular basis to adopt lessons learned.

Indicator 2 – Asset Management and Inspections

- Develop comprehensive asset management and inspection plans to include, but not limited to, periodic plant and pole inspections, vegetation management to inspect and maintain T&D lines (e.g., conduct aerial patrols), and maintain fuel and equipment supplies necessary for reliable grid operation during an emergency.

- Establish comprehensive asset inventories and effective data management systems to track asset information, maintenance history, inspections, and repairs for informed decision-making.
- Identify and prioritize critical components, systems, and other areas of vulnerability that may experience issues during adverse weather events (e.g., freezing problems or other operational issues).
- Assess critical parameters (e.g., ambient temperature design limits, single point of failure) for all equipment necessary for grid operations and use this information to determine whether units will be functional during extreme weather.
- Develop mitigation plans if weather is expected to exceed equipment limitations and document procedures to ensure that all failure points are addressed prior to an onset of extreme weather. Repeatable procedures are critical to a consistent response during an emergency when routine operations are compromised.
- Specify the process for how critical supplies are inventoried and strategically deployed for weather events. Critical supplies must be in strategic locations due to adverse impact of weather on delivery systems. Describe how the list is maintained, who is responsible for procuring items, or how the items are guaranteed to be where they are needed.
- Keep on hand backup equipment (e.g., mobile transformers). Generator operators should have stock of freeze protection equipment (heat lamps, guns, propane, torches, deicing material, fuel, insulation, extension). (Excess backup equipment can also be used in mutual aid support if pre-negotiated agreements are set up in preparation.)
- Set guidelines for maintenance practices to prioritize critical maintenance tasks, manage risks and optimize resources in preparation for extreme temperatures.

Indicator 3 – Risk Management

- Develop comprehensive summer and winter weatherization checklists per 16 TAC §25.55 requirements, along with checklists to prepare and detect any potential system issues prior to hurricane, tornado, flood and wildfire seasons.
- For wind power plants winterization procedures must include all steps necessary to prevent equipment failure during times of severe storm/cold weather events, such as incorporation of freeze protection measures, heating system equipment, de-icing procedures, insulation, and lubrication to prevent crucial components from freezing, etc.
- For all other PGCs winterization procedures must include all steps necessary to prevent equipment failure during times of severe storm/cold weather events, such as incorporation of insulation of vulnerable equipment components, installing heating systems, trace heating or heat tapes, monitor and maintain fuel quality, wind protection measures, use of temperature monitoring systems to

track equipment temperature levels and detect deviations, sealing and weatherproofing, HVAC inspections, and more.

- Ensure the site-specific plans include staffing, timelines, and procedures that direct all key activities before, during, and after an event.
- Schedule routine readiness inspections, repairs, and weatherization activities to be completed before the start of the adverse weather season to allow for enough time to respond to inspection findings before extreme weather occurs.
- Develop models for damage severity, resource needs, and restoration times using infrastructure and population databases, terrain, and Geographic Information Systems (GIS) models, existing damage data, tropical weather models, impact models resulting in T&D damage assessment, outages, power plant damage, and generation loss.
- Perform sensitivity studies to ensure sufficient generation and reserves are operational. Studies should use previous conditions as extreme scenarios with limits.
- Appoint a lead person responsible for keeping the procedure updated with industry-leading practices.
- Review work management systems for open corrective maintenance work orders that could affect the operation and reliability of the generating unit in extreme weather.
- Establish open lines of communication and firm agreements with fuel providers, inventory management, and the use of dual-fueled units to mitigate possible risk of non-deliverability.
- Test units that have been offline for a significant amount of time to ensure readiness.

Indicator 4 – Staffing

- Address how to maintain appropriate staffing levels based on predefined levels of emergencies. Specify how many resources and types of roles/skills that would be needed to effectively respond to various levels of emergencies and when resources should be increased, released, or reduced.
- Prepare alternate staff in case primary personnel are unable to for various reasons. Proactive staffing ahead of anticipated events enables more rapid response.
- Ensure enhanced staffing measures are in place prior to extreme weather season, including identified response personnel, identified and trained freeze protection operator and plan for additional staffing during cold weather response activation.
- Prepare to mobilize a restoration workforce and set up robust and strategic logistics plan.

Indicator 5 – Mutual Assistance and Support

- Set up agreements with mutual aid organizations.
- Pre-negotiate contracts with restoration vendors.
- Incorporate these plans into the EOP, including procedures to request additional equipment, if backup equipment is not sufficient.
- Become a member of multiple regional mutual assistance organizations, such as Texas Mutual Assistance Group, Midwest Mutual Assistance Group, Great Lakes Mutual Assistance Group, and Southeastern Electric Exchange. These memberships provide for a potential source of additional help from other utilities.
- Develop and share coordination, communication, and training plans with mutual aid groups.
- Coordinate and communicate with gas suppliers, markets, and regulators to identify issues with natural gas supply and transportation so that actions can be developed and implemented to secure firm supply and transportation at a reasonable rate.

Indicator 6 – Training and Emergency Drills

- Ensure primary and alternate staff are appropriately trained and participate in drills at least once per year.
- Consider fleet-wide annual emergency preparation meeting and training exercises that engage strategic partners and mutual aid groups.
- Expand emergency readiness drills beyond individual companies to encourage collaboration and include past scenarios, considering logistics and supply chains.
- Observe other utilities' drills.
- Each EOP should specify what types of trainings and drills are performed, their frequency, their participants as well as what types of hazards are addressed.
- Operators should be trained on freeze protection monitoring, methods to check insulation integrity and reliability, and output of heat tracing. Personnel should review weather scenarios affecting instrumentation readings, alarms, and other plant control systems.
- Operators should be trained to identify and prioritize repair orders when problems are unearthed.

Indicator 7 – Situational Awareness

- Define a process to recognize an adverse weather event to proactively activate emergency operations.

- Incorporate use of advanced technologies to predict, detect and monitor adverse weather conditions (e.g., LiDAR detection to track spread of wildfires, systems to monitor tornado activities).
- Improve situational awareness of fuel status of generators and fuel availability by developing plans to include maintenance of additional fuel reserves, fuel inventory solicitation process, and ability to dispatch plants early in advance of extreme weather.

Indicator 8 – System Design and Hardening

- Develop short-term and long-term system design and hardening plans that will prepare the energy infrastructure to withstand extreme weather conditions and include in the EOPs.
- Use dead-end structures and guy wires. Dead-end structures are on poles or towers to stop the cascading effect. When a power line breaks, the unbalanced forces on the pole are significant enough to cause several poles to break. This is useful in large, more extreme ice and snowstorms.
- Replace overhead lines with heavier, stronger wire such as Thermocouple Alloy Insulated Aluminum Conductor Steel Reinforced wire (T-2 ACSR).
- Straighten and inject concrete grout around bases of existing poles or replace poles with deeper sub-subgrade or engineered foundations.
- Create shorter distances between poles, installing larger poles and providing wind dampeners. Together these measures increase the strength of the distribution line.
- Move overhead lines underground when cost-effective.
- Develop criteria for minimum restoration times for single transformer substations. Replace control buildings with modular designs, relocate or elevate substations, install watertight enclosures for control equipment and junction boxes, elevate select equipment and raise air vents, and install water barriers and engineered solutions.
- Install synchronization and black start relay systems. Replace existing electromechanical relays with microprocessor-based relays that feature event reporting ability.
- Add automated switches with fault detection isolation and restoration capability.

Indicator 9 – Communication System

- Identify backup communications and ensure appropriate communications protocols are established. Install new or upgrade wide area and field area communications; add a mobile, containerized backup command center.

- Primary, secondary, and tertiary communications need to be established in advance of weather events, especially response and recovery operations. Protocols for cell, satellite, and very/ultra-high frequency radios need to be established.
- Control critical-to-mission communication systems, deploy backup communication systems, include IT personnel in command center, and install and maintain permanent backup generation at service centers and communication facilities.

Indicator 10 – Activation of EOP

- Define who is needed in the decision to activate and specify roles and responsibilities for response activation.
- Develop weather-based event categorization table to prescribe levels of activation based on weather-related and impact characteristics, including central dispatch center, storm site mobilization center and regional dispatch site. The classification table should determine when these centers should be activated, when crews should be mobilized, and additional internal and external resources acquired.
- Define specific criteria and procedures that require activation of the EOP for each type of hazard and level of potential risk or impact.

Indicator 11 – Emergency Management and Planning Systems, Technologies, and Automation

- Modernize system inspections and reporting to move away from paper-based inspection and weatherization checklists toward automated processes via software that would provide and generate automatic reports on system status and season preparedness to senior leadership.
- Adopt technologies to improve monitoring of critical equipment (i.e., temperature sensors to monitor equipment, flood sensors, etc.).
- Adopt use of emergency management software to track staff, responsibilities, actions, metrics and benchmarks during an emergency response.
- Use Artificial Intelligence to analyze satellite imagery to detect a fire's origin before it becomes difficult to control.
- Use of unmanned aerial vehicles to assist in damage assessment.
- Develop assessment framework and process to collect and transfer damage data to operations center. Use mobile communication technology to streamline collection and reporting including GIS, OMS, Automatic Metering Reading, and Advanced Metering Infrastructure.

- Install ADMS, which is a Distribution Management System with advanced applications, such as IVVC, Fault Location and Service Restoration, and Switch Order Management.
- Replace damaged and high-risk SCADA units. Upgrade substation SCADA backup power systems to provide reliable power for a minimum of 8 hours.

Indicator 12 – Public Communications

- Use multiple channels for customer communications before, during and after an adverse weather event to communicate directly with customers via phone texts, automatic phone calls, emails, news releases, daily press conferences, targeted ads and customer emails, media interviews, digital communications, mobile app, and social media for preparation, safety messages, and restoration updates.
- Identify roles and responsibilities for communications officers and liaisons to coordinate with local officials and stakeholders. Establish contacts for these positions.
- Provide daily updates via email to Government portal sites (where applicable) that includes localized outage and restoration information.
  Include communication procedures with telephone and cable companies in the EOP so that vital telecommunications can be restored quickly.

Appendix A: Compliance Framework Checklist

Table A-16. Compliance Framework Checklist

#	16 TAC §25.53	Category	Regulatory Filing Requirement
2	N/A	Asset Management and Inspections	A plan is set up to maintain preidentified supplies for emergency response.
4	(d) (4)	Staffing	A plan for adequate staffing during emergency response.
6	(c) (4) (C) (i); (c) (4) (C) (iii)	Training and Emergency Drills	• Relevant operating personnel have received training on the applicable contacts and execution of the EOP, and such personnel are instructed to follow the applicable portions of the EOP, recognizing that deviation from the plan may be appropriate as a result of specific circumstances during an emergency. • Drills have been conducted to the extent required by 16 TAC §25.53(f): An entity must conduct or participate in at least one drill each calendar year to test its EOP. Following an annual drill, the entity must assess the effectiveness of its emergency response and revise its EOP as needed. If the entity operates in a hurricane evacuation zone as defined by TDEM, at least one of the annual drills must include a test of its hurricane annex. An entity conducting an annual drill must, at least 30 days prior to the date of at least one drill each calendar year, notify Commission staff, using the method and form prescribed by Commission staff on the Commission's website, and the appropriate TDEM District Coordinators, by email or other written form, of the date, time, and location of the drill. An entity that has activated its EOP in response to an emergency is not required, under this subsection, to conduct or participate in a drill in the calendar year in which the EOP was activated.)
7	(d) (5)	Situational Awareness	• Include a description of how an entity identifies weather-related hazards, including tornadoes, hurricanes, extreme cold weather, extreme hot weather, drought, and flooding.
10	(d) (5)	Activation of EOP	• The process and procedures the entity follows to activate the EOP.
12	(d) (2)	Public Communications	• A communication plan. • The procedures during an emergency the entity uses for handling complaints. • Emergency procedures for communicating with the following prescribed groups: the media; customers; fuel suppliers; the Commission; the OPUC; local and state governmental entities, officials, and emergency operations centers, as appropriate in the circumstances for the entity; the reliability coordinator for its power region; and critical load customers directly served by the entity.

15 A	**(e) (1) (A)**	Compliance with Regulations - Cold Weather Emergency Annex (gen, T&D)	• Include a weather annex with operational plans for responding to cold weather emergencies and a checklist for facility personnel to use during cold weather emergency response. This annex must include checklists that reflect lessons learned from past weather emergencies to ensure necessary supplies and personnel are available. Entities with generation facilities must also include: • A weather annex that meets all of the requirements above produced by entities with T&D facilities and also includes a verification of the adequacy and operability of fuel switching equipment, if installed. An EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 B	**(e) (1) (A)**	Compliance with Regulations - Hot Weather Emergency Annex (gen, T&D)	• Include a weather annex with operational plans for responding to hot weather emergencies and a checklist for facility personnel to use during hot weather emergency response. This annex must include checklists that reflect lessons learned from past weather emergencies to ensure necessary supplies and personnel are available. Entities with generation facilities must also include: • A weather annex that meets all of the requirements above produced by entities with T&D facilities and also includes a verification of the adequacy and operability of fuel switching equipment, if installed. An EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 C	**(e) (1) (E)**	Compliance with Regulations - Hurricane Annex (gen, T&D, REP)	• Include operational plans for responding to hurricanes and a checklist for facility personnel to use during the emergency response. This annex must include checklists that reflect lessons learned from past emergencies to ensure necessary supplies and personnel are available. The hurricane annex should include evacuation and re-entry procedures if facilities are located within a hurricane evacuation zone, and any additional circumstances appropriate to the entity. (This is the only weather-related annex REPs are required to include in their EOPs.) • File an EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 D	**(e) (1) (D)**	Compliance with Regulations - Wildfire Annex (T&D)	• Include an annex with operational plans for responding to wildfire emergencies and a checklist for facility personnel to use during the emergency. This annex must include checklists that reflect lessons learned from past emergencies to ensure necessary supplies and personnel are available. An EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 E	**(e) (1) (B)**	Compliance with Regulations - Load Shed Annex (T&D)	• Include a load shed annex with procedures for controlled shedding of load and lists of priorities for restoring service to customers who were affected by load shedding. This annex must contain procedures for maintaining an accurate registry of critical load customers that is updated as necessary, but at least annually. This annex must also contain procedures addressing aiding critical load

			customers in the event of an unplanned outage; communicating with critical load customers during an emergency; coordinating with government and service agencies as necessary during an emergency; and training staff with respect to serving critical load customers. • File an EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 F	**(e) (2) (B)**	Compliance with Regulations - Water Shortage Annex (gen only)	• Include a water shortage annex that addresses supply shortages of water used in the generation of electricity for generation facilities. • File an EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 G	**(e) (2) (C)**	Compliance with Regulations - Restoration of Service Annex (gen only)	• A restoration of service annex that identifies plans and procedures to restore to service a generation resource that failed to start or that tripped offline due to a hazard or threat. File an EOP annex for each facility that conspicuously identifies the facility to which it applies.
15 H	**N/A**	Compliance with Regulations - Flooding Annex (if in flood zones)	• Include an annex with operational plans for responding to flooding emergencies and a checklist for facility personnel to use during the emergency. This annex must include checklists that reflect lessons learned from past emergencies to ensure necessary supplies and personnel are available. File an EOP annex for each facility that conspicuously identifies the facility to which it applies.
16 A	**(c) (4) (C)**	Compliance with Regulations - EOP Required Content and Affidavit	• File a complete copy with the Commission with all confidential portions removed. File an unredacted EOP with ERCOT if operating within the ERCOT power region. Make an unredacted EOP available in its entirety to Commission staff, if requested, at a location designated by Commission staff.
16 B	**(c) (3)**	Compliance with Regulations - EOP Required Content and Affidavit	• Demonstrate continuous maintenance of an EOP.
16 C	**(c) (4) (C) (ii)**	Compliance with Regulations - EOP Required Content and Affidavit	• Appropriate executives have reviewed and approved the EOP.
16 D	**(d) (1) (D)**	Compliance with Regulations - EOP Required Content and Affidavit	• An approval in the form of a signed statement formally recognizing and adopting the plan, how it will be implemented, and indicating that it supersedes all previous plans.
16 E	**(c) (1) (i)**	Compliance with Regulations - EOP Required Content and Affidavit	• Executive Summary (Describe the contents and policies contained in the EOP. Include a reference to specific sections and page numbers of the entity's EOP that correspond with the requirements of the rule. Contain the affidavit required under 16 TAC §25.53(c)(4)(C).)
16 F	**(c) (4) (A)**	Compliance with Regulations - EOP Required Content and Affidavit	• Record of distribution (Contain, in table format, the titles and names of persons in the entity's organization receiving access to and training on the EOP. Contain dates of access to or training on the EOP.)

16 G	**(c) (4) (B)**	Compliance with Regulations - EOP Required Content and Affidavit	• Emergency Contacts (List the primary contacts for the entity. List the secondary contacts for the entity. Identify specific individuals available immediately to address urgent requests) and questions from the Commission during an emergency.
16 H	**(d) (1) (A)**	Compliance with Regulations - EOP Required Content and Affidavit	• An introduction.
16 I	**(d) (1) (A)**	Compliance with Regulations - EOP Required Content and Affidavit	• An outline of the applicability of the plan.
16 J	**(d) (1) (B)**	Compliance with Regulations - EOP Required Content and Affidavit	• A list of the individuals responsible for maintaining and implementing the EOP.
16 K	**(d) (1) (B)**	Compliance with Regulations - EOP Required Content and Affidavit	• A list of the individuals who can change the EOP.
16 L	**(d) (1) (C)**	Compliance with Regulations - EOP Required Content and Affidavit	• A revision control summary that lists the dates of each change made to the EOP since the initial EOP filing.
16 M	**(d) (1) (D)**	Compliance with Regulations - EOP Required Content and Affidavit	• The date the EOP was most recently approved by the entity.
16 N	**(c) (4) (C) (iv)**	Compliance with Regulations - EOP Required Content and Affidavit	• The EOP or an appropriate summary has been distributed to local jurisdictions as needed.
16 O	**(c) (4) (C) (v)**	Compliance with Regulations - EOP Required Content and Affidavit	• The entity maintains a business continuity plan addressing the return to normal operations after disruptions caused by an incident.
16 P	**(c) (4) (C) (vi)**	Compliance with Regulations - EOP Required Content and Affidavit	• The entity's emergency management personnel who are designated to interact with local, state, and federal emergency management officials during emergency events have received the IS-100, IS-200, IS-700 and IS-800 National Incident Management System training.

Appendix B: Assessment Framework Maturity Matrix

Table B-17 Maturity Rating Matrix

In assessing maturity within the context of an EOP, the review team leveraged this framework based solely on information and processes described in an entity's EOP; thus, the framework provides a repeatable method to assess maturity of an EOP or group of EOPs in the aggregate. However, this framework does not consider information or processes that may be in place at an electric entity through programs and processes outside of the EOP. In addition, this framework is best on defined weather emergency preparedness best practices that are above and beyond minimum regulatory requirements.

Indicator	High (3)	Medium (2)	Low (1)
Indicator 1 – ICS Structure	• ICS structure and governance are explicitly defined and fully integrated. • Continuous improvement framework to track and address lessons learned is established. • Revisions to the plan are tracked, and actions to address updates are recorded.	• ICS structure and governance are defined. • Continuous improvement framework to track and address lessons learned is not established. • Revisions to the plan are not shown to be tracked, and actions to address updates are not shown as recorded.	• Plan does not include ICS and governance structure used during an emergency response.
Indicator 2 – Asset Management and Inspections	• Plans include multiple practices in place to ensure that critical infrastructure will properly operate during adverse weather events. • Plans include procedures to maintain preidentified supplies for an emergency response. • Critical assets are identified and listed. • Potential points of failure and plans for quick remediation are well defined. • Process is set up for how critical supplies and backup equipment are inventoried and strategically deployed.	• Plan includes some system inspection practices (e.g., vegetation management). • Critical assets and potential points of failure are not identified. • Plans for quick remediation during an emergency are not defined. • Process is not set up for how critical supplies and backup equipment are inventoried and strategically deployed for weather events. • Procedures to maintain preidentified supplies for an emergency response are missing.	• Plan includes very limited, if any, asset management and inspections practices. • Procedures to identify potential points of failure and plans for quick remediation during an emergency are not established.
Indicator 3 – Risk Management	• Plans include multiple processes, procedures, and checklists used to assess system readiness and risks in advance of adverse weather events. • Winter/summer weatherization and hurricane/flood/wildfire procedures and	• Plan includes some processes and procedures used to assess system readiness and risks to safe and reliable electric service in advance of adverse weather events. • However, plans are not fully complete or are poorly documented.	• Plan does not include any processes or procedures used to assess system readiness and risks to safe and reliable electric service in advance of weather threat.

Indicator	High (3)	Medium (2)	Low (1)
	checklists are well documented. • Plans include procedures and actions to take during and emergency if an anomaly occurs to remediate the situation.	• None or partial procedures or checklists to prepare for winter, summer, hurricane, etc. season are established. • Procedures to take during an emergency, including instructions on immediate remediation actions if an anomaly occurs are missing.	
 **Indicator 4 –** Staffing	• Roles and responsibilities are well defined. • Staff are identified to estimate and acquire resources in preparation for adverse weather events and during execution of EOP. • Resource planning and acquisition practices are in place, providing for additional or backup staff, for responding to large-scale emergencies.	• Roles and responsibilities are well defined. • Specific staff are not identified to estimate and acquire resources in preparation for adverse weather events and during execution of EOP. • No additional or backup staff are identified.	• Roles and responsibilities are not well defined, and no staff identified to estimate and acquire resources in preparation for adverse weather events and during execution of EOP. • No additional or backup staff are identified, which may be required for responding to large-scale emergencies.
 **Indicator 5 –** Mutual Assistance Support	• Plan identifies key stakeholders for mutual aid. • Arrangements for mutual aid have been established. • Establishes associated communications procedures.	• Plan identifies key stakeholders for mutual aid. • However, no communication plans or prearranged agreements for mutual aid have been established.	• Plan does not include mutual aid stakeholder engagement and mutual aid agreement information.
 **Indicator 6 –** Training and Emergency Drills	• Emergency management teams and their backup counterparts are trained for their specific EOP roles. • Personnel training programs are tracked. • Drills for all relevant hazards are performed at least once a year. • Process is set up to track lessons learned and their remediation.	• Limited number of emergency management staff are trained for their specific EOP roles. • No indication of training conducted for their backup counterparts. • Drills for all relevant hazards are performed at least once a year. • Process is not set up to track lessons learned and their remediation.	• Emergency management teams and their backup counterparts are not trained for their specific EOP roles. • Drills for all relevant hazards are not performed at least once a year. Process is not set up to track lessons learned and their remediation.
 **Indicator 7 –** Situational Awareness	• Plans include a process to recognize an adverse weather event and deployment of situational awareness approaches and technologies. • Processes assure situational awareness is deployed during all phases of severe weather response.	• Plan provides a high-level process to recognize an adverse weather event and describes high-level details of situational awareness tools and capabilities, • Does not provide specific details as to the application of those tools during the various weather events.	• Plan does not include a process to recognize an adverse weather event and deployment of situational awareness approaches and technologies.

Indicator	High (3)	Medium (2)	Low (1)
	• Entities report foundational tools and processes for situational awareness.		
 **Indicator 8 –** System Design and Hardening	• Plan includes an approach to short-term system hardening and lang-term system improvements for weather-related events. • Preventative mitigation actions to upgrade the system are performed.	• Plan includes an approach to short-term or (seasonal) system hardening for weather-related events, but not both. • Preventative mitigation actions to upgrade the system are performed, but very limited.	• Plan does not address system hardening efforts (short-term or long-term) to prepare for weather-related events.
 **Indicator 9 –** Communication System	• Primary and secondary communication systems and protocols are established and used to communicate with the organizations during emergency response. • Incorporation of technology into communication plans is consistent throughout the entire organizations.	• Only primary communication systems and protocols are established and used to communicate within the organization during the emergency response. • However, no backup communication system in place in case the primary communication system is unavailable. • Incorporation of technology into communication plans is not fully consistent throughout the entire organization.	• Plan does not provide an overview of internal communication systems.
 **Indicator 10 –** Activation of EOP	• Plan specifies conditions and staff responsible for activating the EOP. • Decision-makers needed to activate EOP are clearly defined. • Plans include detailed processes that include notification and activation of staffing needs.	• Plan provides weather conditions for activating the EOP, • Staff/ decision-makers' responsibilities for activation of the EOP are not described.	• Plan does not describe the process for the activation of the EOP.
 **Indicator 11 –** Emergency Management and Planning Systems, Technologies, and Automation	• Multiple systems, tools, technologies, and automation processes that support the execution and tracking of staff's emergency response and streamline management and reporting are established. • Demonstrated use of advanced tools and software to track equipment, staff, responsibilities, completed actions, issues, metrics and benchmarks prior to and during emergency response.	• Plan does not demonstrate a prevalent use of advanced tools and software critical for emergency management. • Plan describes a system, tool, technology, or automation process that supports execution and tracking of staff's emergency response. • However, application is limited, untested or vague, which may deem it unreliable prior at and during an emergency.	• Plan does not describe any systems, tools, technologies, or automation practices that the entity will use during a weather emergency to streamline its operations.

Indicator	High (3)	Medium (2)	Low (1)
 **Indicator 12 –** Public Communications	• Plan demonstrates prevalent use of a diverse set of communication channels, such as email, phone calls and texts, cable media and social media to communicate with the public before, during, and after an adverse weather event. • Communication plan is established with the following groups: the media; customers; fuel suppliers; the Commission; the OPUC; local and state governmental entities, officials, and emergency operations centers, the RC; and critical load customers. • Procedures for handling customer complaints are addressed (except generation only entities).	• Plan includes communication protocols for providing weather-related emergency information to some groups, but not all relevant stakeholders. • Significant gaps exist in providing timely communication with the public beyond media and regulatory bodies. PGCs only need to show communication protocols with the media and regulatory bodies, since they do not serve customers directly.	• Plan does not include an established communication plan for communicating with the public, customers, and stakeholders pre-, during and post an extreme weather event.

Appendix C: Sample Design Details

Guidehouse calculated the minimum sample size needed to achieve at least 10% absolute precision at 80% confidence level for estimating maturity ratings and assessing preparedness and response of energy providers to adverse weather events, as shown in Table C-18**C-17**. Guidehouse used a binomial distribution, and a conservative proportion estimate of 0.5 for each stratum. The team selected a sample of 37 EOPs, 30 EOPs from the ERCOT power region and 7 EOPs from the non-ERCOT power region, to conduct this in-depth assessment of weather emergency preparedness.

Table C-18 Sample Design for In-Depth EOP Reviews

	Stratum	Population (# of EOPs)	Sample Size (# of EOPs)	Stratum Weight (%)	Absolute Precision (%)
Non-ERCOT	All High and Medium Risk Entities	8	7	12%	10%
ERCOT	IOUs and T&D - High-Risk	9	4	13%	32%
	IOUs and T&D – Medium Risk	1	1	1%	0%
	MOUs/COOPs/RAs - High-Risk	7	5	10%	20%
	MOUs/COOPs/RAs – Medium Risk	22	10	33%	17%
	PGC - High-Risk	7	4	10%	29%
	PGC - Medium Risk	13	6	19%	23%
	Total	**67**	**37**	**100%**	**8%**

Appendix D: Glossary

Table D-19. Glossary

Term	Definition
C	
Critical load customer	Nonresidential customer whose load is designated as feeding the following uses: • Hospitals and nursing homes • Fire, Police, and 911 Stations • Some Wastewater and Water Treatment facilities • Specific components of the natural gas infrastructure • Industrial customers for whom an interruption would create life-threatening conditions
D	
Derate	Decrease in the available capacity of an electric generating unit
E	
Electric Reliability Council of Texas	Organization that operates Texas's electrical grid, the Texas Interconnection, which supplies power to more than 25 million Texas customers and represents 90% of the state's electric load
Emergency operations plan	Guide for the preparation, mitigation, response and recovery from an emergency
Extreme weather	Occurrences of unusually severe weather or climate conditions that can cause devastating impacts on communities and agricultural and natural ecosystems
L	
Load shedding	Intentional action by a utility that results in the reduction of more than 100 megawatts (MW) of firm customer load for reasons of maintaining the continuity of service of the reporting entity's bulk electric power supply system
N	
National weather service	Agency of the U.S. federal government that is tasked with providing weather forecasts, warnings of hazardous weather, and other weather-related products to organizations and the public for the purposes of protection, safety, and general information
O	
Outage	The loss of the electrical power network supply to an end user
P	
Power grid	System of synchronized power providers and consumers connected by transmission and distribution lines and operated by one or more control centers
Power region	Geographical service area for electric service operations. For the purposes of this report, power region refers to the ERCOT service area or non-ERCOT service areas.
R	
Reliability Coordinator	An entity with the highest level of authority who has the authority to prevent or mitigate emergency operating situations in real time operations and post-event analysis.
W	
Weatherization	The process of protecting a structure from outside elements

Appendix E: Acronyms

Table E-20. Acronyms

Abbreviation	Definition
AIS	Agency Information System
EIA	Energy Information Administration
ERCOT	Electric Reliability Council of Texas
FERC	Federal Energy Regulatory Commission
EOP	Emergency Operations Plan
ICS	Incident Command System
IOUs	Investor-Owned Utilities
MOUs	Municipally Owned Utilities
NERC	North American Electric Reliability Corporation
OPUC	Office of Public Utility Counsel
PGCs	Power Generation Companies
PUCT	Public Utilities Commission of Texas
RA	River Authority
RC	Reliability Coordinator
REPs	Retail Electric Providers
TAC	Texas Administrative Code
TDU	Transmission and Distribution Utilities
TDEM	Texas Division of Emergency Management